End Semester Examination, May 2019
B.Sc. (IT) – First Semester
INFORMATION TECHNOLOGY SYSTEM (7.101)

Time: 3 Hours
Max Marks: 100
No. of pages: 1

Note: Attempt FIVE questions in all. Q.1 is compulsory. Attempt any TWO questions from PART-A and two questions from PART-B. Each question carries equal marks.

Q.1 Multiple choice / shorts answer questions:
   a) Which of the following is not a major component of any information system?
      i) Applications    ii) Information Technology  iii) People   iv) The Company
   b) Which of the following are operating systems and which are applications: Microsoft Excel, Google Chrome, Junes, windows, Android, Angry Birds.
   c) Which came first, the Internet or the World Wide Web?
   d) What is an ERP system?
   e) How is data organized in a spreadsheet?
      i) Lines and spaces    ii) Layers and planes  iii) Rows and columns   iv) Height and width
   f) Which one is not a part of a computer system?
      i) Motherboard    ii) CPU    iii) Keyboard   iv) Scanner
   g) Dot Matrix is a type of __________.
   h) State two characteristic of Database.
      i) _______ and _______ types of Database systems.
   j) State any two ethical issues related to Information system. 2X10

PART-A

Q.2 "An information system is a system that comprises a set of interrelated elements that transform data into information" with the help of which resources, does an information system collect and organize the information? Do they face any risks? Name a certain specialized information systems. 20

Q.3 Write short notes on:
   a) Light pen and touch screen.
   b) Secondary storage devices.
   c) System units used in measurement of memory.
   d) Ports and various types. 5x4

Q.4 a) "Telecommunications is the exchange of information over significant distances by electronic means". Explain the process telling how telecommunication takes place. What are the basic elements of telecommunications? 10
   b) "Multiplexing is the set of technique that allow the simultaneous transmission of multiple signals". Write a note on multiplying and its various types. 10

PART-B

Q.5 a) Differentiate between traditional commerce and E-commerce. 10
   b) "ERP systems have been widely adopted in large organizations to store critical knowledge used to make the decisions that drive the organization’s performance.” Explain ERP with its benefits and limitations. 10

Q.6 Differentiate between data and Data management systems. What are the various types of database systems? 20

Q.7 What does the term Intellectual Property mean? What are the major forms of IP? Explain any two in detail. 20
End Semester Examination, May 2019  
B. Tech. – First Semester  
MATHEMATICS-I (BSC-MA-102)

Time: 3 hrs.  
Max Marks: 100  
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt ANY TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1  
a) Evaluate: \[ \int_{\frac{\pi}{2}}^{\frac{\pi}{2}} \sin^3 x \cos^2 x \, dx \]

b) Evaluate: \[ \int_{0}^{0} \sqrt{\tan \theta} \, d\theta \]

c) Find the maximum and minimum value of the function: \( f(x) = x^3 - 3x + 2 \).

d) If in Cauchy’s mean value theorem, \( f(x) = e^x \) and \( g(x) = e^{-x} \), show that \( c \) is the arithmetic mean between \( a \) and \( b \).

e) Test the convergence of the series: \[ \sum_{n=1}^{\infty} (-1)^n \frac{n}{n^2 + 1} \]

f) What is the half range sine series for \( f(x) = k \) in (0, 2)

g) If the vector \( \vec{F} = (ax^2 + yz)i + (xy^2 - xz^2)j + (2xyz - 2x^2 y^2)k \) is solenoidal, find the value of \( a \). Find also the curl of this solenoidal vector.

h) If \( u = \sin^{-1} \left( \frac{x + 2y + 3z}{\sqrt{x^2 + y^2 + z^2}} \right) \), show that \( x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} + z \frac{\partial u}{\partial z} + 3\tan u = 0 \).

i) Find the sum and product of the Eigen values of \[
\begin{bmatrix}
1 & 2 & 3 \\
2 & 4 & 6 \\
3 & 6 & 9 \\
4 & 8 & 12 \\
5 & 10 & 15 \\
-1 & -2 & -3
\end{bmatrix}
\]

j) Find the rank of the matrix: \[
\begin{bmatrix}
2 & 2 & 1 \\
1 & 3 & 1 \\
1 & 2 & 2
\end{bmatrix}
\]

PART-A

Q.2  
a) Derive an expression for the relationship between Beta and Gamma function.  

b) Find the volume of the solid obtained by revolving the ellipse \( \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \) about x-axis.

Q.3  
a) Find the maximum and minimum values of \( 10x^6 - 24x^5 + 15x^4 - 40x^3 + 108 \).

b) Expand \( f(x) = \log(1 + x), \forall x \in [-1, 1) \).
Q.4  a) Test for the convergence of the series: \( \sum_{n=2}^{\infty} \frac{\sqrt{n}}{n^2 + 1} \).

b) Obtain a half-range sine series for: \( f(x) = \begin{cases} x, & 0 \leq x \leq \frac{\pi}{2} \\ \pi - x, & \frac{\pi}{2} \leq x \leq \pi \end{cases} \).

**PART-B**

Q.5  a) If \( \frac{x^2}{a^2 + u} + \frac{y^2}{b^2 + u} + \frac{z^2}{c^2 + u} = 1 \), prove

\[
\left( \frac{\partial u}{\partial x} \right)^2 + \left( \frac{\partial u}{\partial y} \right)^2 + \left( \frac{\partial u}{\partial z} \right)^2 = 2 \left( x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} + z \frac{\partial u}{\partial z} \right).
\]

b) Find the directional derivative of the function \( f = x^2 - y^2 + 2z^2 \) at the point \( P(1, 2, 3) \) in the direction of the line PQ where Q is the point (5, 0, 4).

Q.6  a) Investigate the value of \( \lambda \) and \( \mu \) so that the equations:

\[
\begin{align*}
\lambda + y + z &= 6; \\
x + 2y + 3z &= 10; \\
x + 2y + \lambda z &= \mu
\end{align*}
\]

i) No solution,
ii) Unique solution and
iii) An infinite number of solutions.

b) Find the Eigen values and Eigen vectors of the matrix: \( A = \begin{bmatrix} 4 & 2 & -2 \\ -5 & 3 & 2 \\ -2 & 4 & 1 \end{bmatrix} \).

Q.7  a) Let \( r^2 = x^2 + y^2 + z^2 \) and \( V = r^m \), prove that \( V_{xx} + V_{yy} + V_{zz} = m(m+1)r^{m-2} \).

b) Find the characteristic equation of the matrix \( A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix} \). Also find the matrix representation.
Q.1 Answer the following questions:

a) Evaluate the improper integral \( \int_{a}^{\infty} e^x \, dx \).

b) Prove that \( \frac{1}{2} = \sqrt{p} \).

c) Determine \( \lim_{x \to a} (x-a) \).

d) Find \( n^{th} \) derivation of \( y = \log(ax+b) \).

e) Find inverse of \( \begin{bmatrix} 1 & 0 & 1 \\ 2 & 3 & 4 \\ 5 & 6 & 7 \end{bmatrix} \).

f) Find rank of \( \begin{bmatrix} 1 & 2 & 3 \\ 3 & 2 & 1 \end{bmatrix} \).

g) Prove that \( L: R^{2} \rightarrow R \) defined by \( L(x,y) = x_1 + x_2 \) is linear transformation.

h) Prove that \( \{v\} \) is L.D. iff \( v = 0 \).

i) Prove that product of two orthogonal matrices is again orthogonal.

j) Explain composition of two maps.

Q.2 a) Show that \( B(m,n) = \int_{0}^{\infty} \frac{x^{m-1}}{(1+x)^{m+n}} \).

b) Obtain the surface area of a sphere of radius “a”.

c) Find the volume of a solid obtained by revolving an arc of the cycloid \( B(m,n) = \int_{0}^{\infty} \frac{x^{m-1}}{(1+x)^{m+n}} \) about \( x \)-axis.

Q.3 a) Verify Rolle’s theorem for \( f(x) = x(x+3)e^{x} \) in \([3, 0]\).

b) Investigate for maximum and minimum values of the function given by \( y = \sin x + \cos 2x \).

c) Show that \( g \in R; \cos x = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \cdots \) \( (-1)^n \frac{x^{2n}}{(2n)!} + (-1)^{n+1} \frac{x^{2n+1}}{(2x+1)^{2n+1}} \sin(qx) \).

Q.4 a) Determine for what values of \( l \) and \( m \) the following equations have no solution, a unique solution and infinite solutions:
\[
\begin{align*}
    x + y + z &= 6, \\
    x + 2y + 3z &= 10, \\
    x + 2y + l \ z &= m
\end{align*}
\]

b) Solve by Gauss Jordan method:
\[
\begin{align*}
    x + y + z &= 2, \\
    2x + y - 3z &= 5, \\
    x + y + 2z &= 3
\end{align*}
\]
Q.5  
\begin{enumerate}
\item[a)] Show that \( B = \{(1, 2, 1), (1, -1, 1), (0, 1, 1)\} \) is a basis of \( R^3 \).
\item[b)] Verify rank nullity theorem for linear transformation \( T : R^2 \oplus R^3 \) defined by \( T(x, y) = (x + y, x - y, y) \).
\end{enumerate}

Q.6  
\begin{enumerate}
\item[a)] Find the distance from the point \( y = (0, 0, 0, 1) \) to the subspace \( V \subset C^4 \) spanned by vectors \( x_1 = (1, -1, 1, -1), x_2 = (1, 1, 3, -1) \) and \( x_3 = (-3, 7, 1, 3) \) by Gram Schmidt Orthogonalization process.
\item[b)] Find all Eigen values and Eigen vectors of \( \begin{bmatrix} 4 & 2 & -2 \\ -5 & 3 & 2 \\ 2 & 4 & 1 \end{bmatrix} \).
\end{enumerate}

Q.7  
\begin{enumerate}
\item[a)] Prove that the system of vectors \( \{(1, 2, 3), (1, -3, 2), (2, -1, 5)\} \) of \( V_3(R) \) is linearly independent.
\item[b)] Prove that sum of two symmetric matrices is also a symmetric matrix.
End Semester Examination, May 2019
B. Tech.—First Semester
APPLIED PHYSICS  BSC-PH-101 (BT)

Time: 3 hrs. Max Marks: 100
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer the following questions:
   a) With the help of a diagram, discuss the concept of spontaneous emission of radiation?
   b) Population inversion in Laser plays an important role. How it can be achieved in practice.
   c) Optical fibres have more merits than copper cables. Justify your answer.
   d) In an optical fibre, give the importance of V-number.
   e) Explain the gain factor of a photoconductor.
   f) Silicon solar cell is illuminated with light, the value of Vm/Voc=.90 and Isc=2mA. If the fill factor of the solar cell is 0.75, calculate the value of Im.
   g) Draw the planes for given Miller Indices (111), (110), (020), (101).
   h) With the help of a diagram explain primitive cell?
   i) Out of X-rays and light rays, which one are used to detect crystal structure and why?
   j) For building nanomaterials, describe top-down and bottom-up approaches

PART-A

Q.2 a) Briefly explain Einstein’s coefficients and derive the relations between them. 10
   b) Holography is different than photography. How? Discuss the process of construction of a hologram. 10

Q.3 a) Optical fibres can be classified on the basis of the refractive index and modes of propagation. Discuss this classification in details. 10
   b) Discuss different types of losses in an optical fibre. 07
   c) A glass cladding fibre is made with the core glass of refractive index 1.5 and the cladding is doped to give a fractional index difference of 0.0005. Determine the cladding index and numerical aperture. 03

Q.4 a) State the principle of photoconductive cell. Describe its construction, working and applications. 10
   b) Discuss the modified model to show the effect of traps on the photoconductivity. 10

PART-B

Q.5 a) Distinguish between amorphous and crystalline materials. Show that c/a ratio for HCP crystal structure is (8/3)^1/2. 10
   b) What is packing fraction? Calculate packing fraction of sc, bcc, fcc and hcp structures. 10

Q.6 a) X-rays are one of the very important electromagnetic radiations. Describe their origin, production and properties. 10
   b) Briefly explain Raman Spectroscopy. 7
   c) The angle of reflection of monochromatic X-rays for a crystal whose atomic spacing is 2.0Å is 30°. Calculate the wavelength of X-rays. 3

Q.7 a) Describe chemical vapour deposition and Ball milling methods for fabrication of nano materials. 10
b) Differentiate between single and double walled carbon nanotubes. Give any six applications of nanotubes.
End Semester Examination, May 2019
B. Tech. – First Semester
MECHANICS BSC-PH-101 (CE)

Time: 3 hrs. Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from Part-A and TWO questions from Part-B. Marks are indicated against each question.

Q.1 a) Is scalar quantity changed under the rotation transformation?
b) Write the expression for velocity in spherical polar coordinates.
c) Give two examples each of conservative and non-conservative forces.
d) What are central forces?
e) What do you understand by non-inertial frames of reference?
f) What is Foucault pendulum?
g) What do you mean by simple harmonic motion?
h) Write the equation of motion of forced damped oscillator.
i) Is the velocity of a particle under uniform rotational motion constant?
j) Explain the three-dimensional motion of a rigid body. 2×10

PART-A

Q.2 a) Discuss the Newton’s laws and its completeness in describing particle motion. 8
b) Explain the invariance of Newton’s second law. 8
c) Write short note on constraints. 4

Q.3 a) Show that for a conservative force field \( F(r) \), i.e. \( \nabla \times F = 0 \), we can define a scalar function \( V(r) \) such that \( F = -\nabla V \). 8
b) Write a short note on the law of conservation of angular momentum and its importance in Physics. 6
c) Explain in detail about elliptical orbit 6

Q.4 a) Calculate the fictitious acceleration of the sun relative to a reference frame fixed on the surface of the earth. 10
b) Discuss in detail about weather systems. 6
c) Write short note on Coriolis force. 4

PART-B

Q.5 a) Write differential equation for a damped harmonic oscillator. Solve the differential equation and discuss the case of under damped (low damping) 16
b) Discuss the sharpness of resonance. 4

Q.6 a) What is the difference between rectilinear and rotational motion? 4
b) Show that for a rigid body the angular momentum about the axis of rotation is equal to the product of moment of Inertia about that axis and angular velocity. 10
c) Discuss the Kinematic of rigid body motion. 6

Q.7 a) Evaluate the expression for rate of change of a vector rotating with angular velocity. 10
b) Calculate the components of angular momentum by taking the rigid body to be rotating in the principal axes frame frozen temporarily at a given instant. 10
End Semester Examination, May 2019
MCA — First Semester
FUNDAMENTALS OF IT AND PROGRAMMING TECHNIQUES
(MCA-101A CB)

Time: 3 hrs.  Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Multiple choice questions:
a) VGA is:
   i) Video graphics array
   ii) Volatile graphics array
   iii) Visual graphics array
   iv) Video graphics adapter

b) Where the programme and data are stored, when the processor uses them.
   i) Main memory
   ii) Disk memory
   iii) Secondary memory
   iv) Programme memory

c) Which part of the computer performs arithmetic calculations?
   i) ALU
   ii) Registers
   iii) Logic bus.

d) Which of the following is not an application software?
   i) Word processor
   ii) Spread sheet
   iii) Operating system
   iv) Browser

e) A computer program the converts assembly language to machine language:
   i) Compiler
   ii) Interpreter
   iii) Assembler
   iv) Comparator

f) A nibble is of:
   i) One bit
   ii) Four bit
   iii) Eight bit
   iv) Ten bit

g) A laser printer does not use:
   i) A print head
   ii) A laser beam
   iii) A photo conductive drum
   iv) None of the above.

h) A computer can only understand machine language and no other language.
   i) True
   ii) False

i) Logical errors are defected by compliers.
   i) True
   ii) False

j) Operating system is an application software.
   i) True
   ii) False

2x10

PART-A

Q.2 a) Differentiate between UVEPROM and EEPROM. 5

b) In terms of hardware, discuss what are the components that can be responsible to speed up your computer systems. 15

Q.3 a) Compare the features of C, C++ and Java languages. 10

b) What do you understand by pure object oriented languages and its importance. 10

Q.4 a) Write a short note:
   i) User Authentication.
   ii) Open Source Software.
   iii) Encryption Techniques. 5x3
b) Which is good to convert source code to machine code, an interpreter or compiler? Justify.

**PART-B**

Q.5  
   a) Differentiate between program testing and program debugging.  
   b) What do you understand by program designing approach? What are the advantages of a good program designing.

Q.6  
   Differentiate between an algorithm and a flow chart. Write an algorithm for a problem in which N numbers are read and it is desired to pick the largest of them.

Q.7  
   a) In your opinion, which approach is better, a top down approach or a bottom up approach? Explain by comparing both.  
   b) What is structured programming and how a programmer can achieve it?
End Semester Examination, May 2019
MCA—First Semester
PRINCIPLE OF MANAGEMENT (MCA-107CB)

Time: 3 hrs. Max Marks: 100
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer the following questions:
   a) Explain any four roles of manager
   b) "Staffing is a part of human resource management." Comment on the given statement.
   c) "Though management is a science, it is not an exact science like physics; chemistry etc. It is a social science. “ Do you agree with this statement? Give your opinion.
   d) What are the factors that affect the controlling process? 4 x 5

PART-A

Q.2 a) Explain the principles of management given by Henry Fayol 10
    b) Management of a modern business organization is a complex process. What are the various functions performed by the Management? 10

Q.3 Define the concept of planning. Elaborate various steps involved in the planning process. What are the factors which act as barriers to effective planning? 20

Q.4 Why organizational Structure is needed for an organization? Explain the different type of organizational structure that the companies generally used. 20

PART-B

Q.5 "The recruitment is a process of attracting individuals on a timely basis, in sufficient numbers and with appropriate qualifications, to apply for jobs with an organization”. Explain the recruitment and selection Techniques used by the organizations. 20

Q.6 What are the essential elements of any controlling process? Explain Controlling and Decision Making based on MIS. 20

Q.7 Why strategies are important for an organization? Explain its scope with a suitable example. 20
End Semester Examination, May 2019
MCA — First Semester
PROGRAMMING IN ‘C’ (MCA-103A (CB))

Time: 3 hrs. Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 a) ‘C’ language was developed in the year ___________.
   i) 1970  ii) 1975  iii) 1980  iv) 1985
b) # include <stdio.h> is called ___________.
   i) Preprocessor directive
   ii) Inclusive of directive
   iii) None
c) What is the work of break keyword?
   i) Halt execution of program.
   ii) Exit from loop or switch statement.
   iii) None of the above.
d) By default, a real number is treated as a
   i) Float  ii) Double  iii) None of these.
e) The && and || operators:
   i) Compare two numeric values.
   ii) Compare two Boolean values.
   iii) None of the above.

State True or False:
f) If a = 8, b = 3, C = -5 are integers, then value of a*b/c is -4.
g) The result of a relational operator is always either True or False.
h) Long data type in the return type of ftell function.
i) Define Identifier.
j) Define File.

2x10

PART-A

Q.2 a) List and explain various data types available in ‘C’.
     10
b) Discuss various input-output functions with example.
     10

Q.3 a) What is operator? What is operant? Discuss various types of operator in ‘C’ language.
     10
b) Compare the following:
   i) While and do while.
   ii) If and switch.
     10

Q.4 a) Write different types of array. Give example of each.
     10
b) Write short note on Recursion.
     10

PART-B

Q.5 a) What do you understand by Dynamic memory allocation? Explain with an example.
     15
b) Discuss why pointers are required in ‘C’ language?
     5

Q.6 a) Write a program to showcase the use of array of structure.
     10
b) Define structures. How structures are created and initiated in 'C'? Give examples. 10

Q.7 What do you understand by File? Discuss why files are used? Explain the syntax and purpose of various file functions. Give example of each function. 20
End Semester Examination, May 2019
MCA - First Semester
MATHEMATICS FOR COMPUTING (MCA-106(CB))

Time: 3 hrs
Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from Part-A and TWO questions from Part-B. Each question carries equal marks.

Q.1 Answer the following questions:
   a) Define Terminating Decimals.
   b) Define a Quadratic equation.
   c) What is the general term of a Arithmetic Progressions?
   d) Write Distance Formula.
   e) Give slope Intercept form of a straight-line.
   f) \( \sin^2 \theta + \_ = 1 \)
   g) \( \sin(90^\circ - q) = ? \)
   h) \( \frac{d}{dx} \left[ \frac{u}{v} \right] = ? \)
   i) State Maclaurin’s Theorem.
   j) \( \int e^x \cdot dx = ? \)

\[ \begin{align*}
\text{PART-A} \\
Q.2 & \quad a) \text{Prove that } \sqrt{2} \text{ is an irrational number.} & 10 \\
& \quad b) \text{State and prove Fundamental Theorem of Arithmetic.} & 10 \\
Q.3 & \quad a) \text{Solve:} \begin{align*}
& x^2 + y^2 = 25 \\
& x + y = 7 
\end{align*} & 10 \\
& \quad b) \text{Which term of series:} \begin{align*}
& 12 + 9 + 6 + \ldots \ldots \ldots \text{is equal to} \\
& i) \ -30 \\
& ii) \ -100 
\end{align*} & 10 \\
Q.4 & \quad a) \text{Show that the points (1,-2),(3,0),(1,2) and (-1,1) are vertices of a Rectangle.} & 10 \\
& \quad b) \text{Find the equation of a straight line which is parallel to } 2x - y + 8 = 0 \text{ and having y - intercept 4.} & 10 \\
\end{align*} \]

\[ \begin{align*}
\text{PART-B} \\
Q.5 & \quad a) \text{Evaluate:} \frac{\tan 66^\circ + \tan 69^\circ}{1 - \tan 66^\circ \tan 69^\circ} & 10 \\
& \quad b) \text{Prove that:} \frac{\sin q}{1 + \cos q} + \frac{1 + \cos q}{\sin q} = 2 \csc q & 10 \\
Q.6 & \quad a) \text{Differentiate following w.r.t. } (x) \begin{align*}
& i) \left[ \frac{3+4x}{2-x} \right]^2 
\end{align*} & 
\end{align*} \]
ii) \( \frac{\sec x + \tan x}{\sec x + \tan x} \)

b) Expand \((\sin x)\) with the help of Maclaurin’s Theorem in term of \(x\)

c) State Taylor’s Theorem.

Q.7 a) Integrate: \( \int \frac{1}{\sqrt{3x+5}+\sqrt{3x+4}} \, dx \)

b) Integrate: \( \int \frac{1}{\sin^2 x \cdot \cos^2 x} \, dx \)
End Semester Examination, May 2019  
MCA — First Semester  
DIGITAL DESIGN AND COMPUTER ORGANIZATION (MCA-105A (CB))

Time: 3 hrs.  
Max Marks: 100  
No. of pages: 2  

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1  
\begin{enumerate}
\item a) A stack organization has:
   \begin{enumerate}
   \item Three-Address Instruction
   \item Two-Address Instruction
   \item One-Address Instruction
   \item Zero-Address Instruction
   \end{enumerate}
\item b) A byte is a group of 16 bits.
   \begin{enumerate}
   \item True
   \item False.
   \end{enumerate}
\item c) Three are _______ cells in 4-variable K-Map.
   \begin{enumerate}
   \item 12
   \item 16
   \item 18
   \item None of these
   \end{enumerate}
\item d) The format used to present the logic output for the various combinations of logic inputs to a gate is called a(n):
   \begin{enumerate}
   \item Input Logic Function
   \item Boolean constants
   \item Boolean variable
   \item Truth Table
   \end{enumerate}
\item e) Boolean Algebra is also called:
   \begin{enumerate}
   \item Switching Algebra
   \item Arithmetic Algebra
   \item Linear Algebra
   \item Algebra
   \end{enumerate}
\item f) To perform product of Maxterms Boolean function must be brought into:
   \begin{enumerate}
   \item AND terms
   \item OR terms
   \item NOT terms
   \item NAND terms
   \end{enumerate}
\item g) The Boolean equation for NOR function is:
   \begin{enumerate}
   \item \( X = \overline{A + B} \)
   \item \( X = \overline{A + B} \)
   \item \( X = \overline{A + B} \)
   \item \( X = \overline{A + B} \)
   \end{enumerate}
\item h) _______ is a command given to a computer to perform specified operation on some given data.
   \begin{enumerate}
   \item An instruction
   \item Command
   \item Code
   \item None of these
   \end{enumerate}
\item i) The two important fields of instruction are:
   \begin{enumerate}
   \item Opcode
   \item Operand
   \item Only (i)
   \item Both (i) and (ii)
   \end{enumerate}
\item j) In case of, zero address instruction method the operands are stored in _______.
   \begin{enumerate}
   \item Registers
   \item Accumulators
   \item Push down stack
   \item Cache
   \end{enumerate}
\end{enumerate}

\section*{PART-A}

Q.2  
\begin{enumerate}
\item a) Minimize the following logic function in POS form using Karnaugh Map
   \[ F(A, B, C, D) = \sum(0, 1, 2, 3, 5, 7, 8, 9, 11, 14) \]
   10
\item b) Draw the truth table and circuit diagram for following Boolean expression:
   \[ A(B + C) + A(\overline{B} + C)\overline{D} \]
   10
\end{enumerate}

Q.3  
\begin{enumerate}
\item a) Encode data bits 0110 into 7-bit even parity hamming code.
   5
\item b) Convert \((101011)_2\) into Gray code.
   5
\item c) Draw logic circuit diagrams and truth-table for AND, OR, NAND, NOR and Exclusive – OR gates.
   10
\end{enumerate}
Q.4  a) What is the function of Multiplexer? Explain the implementation of 8X1 Multiplexer using two 4X1 multiplexers.  
    b) What are Adders? Explain the functioning of full Address with proper circuit diagram and truth table.  

**PART-B**

Q.5  a) What are Instruction formats? Explain different types of Instruction formats with proper examples.  
    b) Explain 3-way Handshaking with examples.

Q.6  a) Explain the functioning of J-K flip-flop. What is Race around condition and what is the function of Master-Slave J-K flip flop? Explain with proper circuit diagram.  
    b) Explain the functioning of shift Register.

Q.7  a) What are different types of counters? Explain Asynchronous Counter with proper circuit diagram.  
    b) What are various addressing Modes? Explain with suitable examples.
End Semester Examination, May 2019
B. Tech. — First Semester
MATHEMATICS-I (BSC-MA-102)

Time: 3 hrs. 
Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt ANY TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer the following question:
   a) Evaluate: (a) \( \Gamma\left(-\frac{1}{2}\right) \) (b) \( B(3, 2) \).
   b) Evaluate: \( \int_{0}^{\pi} \sqrt{\cot \theta} \, d\theta \).
   c) If in Cauchy’s mean value theorem, \( f(x) = e^x \) and \( g(x) = e^{-x} \), show that \( c \) is the arithmetic mean between \( a \) and \( b \).
   d) Find the \( n \)th derivative of \( f(x) = \cos(ax+b) \).
   e) Prove that the sequence \( \left\{\frac{2n-7}{3n+2}\right\} \) is monotonically increasing.
   f) What is the half range cosine series for \( f(x) = k \) in \((0,2)\).
   g) Find Curl of the vector \( \vec{F} = (xy^2 - xz^2) \hat{i} + (2xyz - 2x^2y^2) \hat{j} + (x^2y - y^2z) \hat{k} \).
   h) Find \( \frac{\partial u}{\partial r} \) and \( \frac{\partial u}{\partial \theta} \), if \( u = r \cos(r \sin \theta) \).
   i) Find the sum and product of the Eigen values of \( \begin{bmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{bmatrix} \).
   j) Find the rank of the identity matrix of order 2.

Q.2 a) Derive an expression for the relationship between Beta and Gamma function. 10
   b) Using integration, Find the volume of the solid obtained by revolving the ellipse \( \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \) about x-axis. 10

Q.3 a) Verify Rolle’s Theorem for the function: \( f(x) = 2 + (x - 1)^{2/3}, x \in [0,2] \). 10
   b) Expand \( f(x) = e^{ax \sin bx}, \forall x \in \mathbb{R} \). 10

Q.4 a) Test for the convergence of the series: \( \sum_{n=1}^{\infty} \frac{1}{\sqrt{n} + \sqrt{(n+1)}} \). 10
   b) Find the Fourier cosine series for \( f(x) = x^3, 0 < x < L \). 10

Q.5 a) If \( u = \log(x^3 + y^3 + z^3 - 3xyz) \), show that
\[
\left( \frac{\partial}{\partial x} + \frac{\partial}{\partial y} + \frac{\partial}{\partial z} \right)^2 u = \frac{-9}{(x+y+z)^2}.
\]
   b) Find the directional derivative of the function \( f = x^2 - y^2 + 2z^2 \) at the point \( P(1,2,3) \) in the direction of the line \( PQ \) where \( Q \) is the point \((5,0,4)\). 10
Q.6  a) Test the consistency of the following system of equations and find the solution, if exist:

\[
4x_1 - x_2 = 12; \quad -x_1 + 5x_2 - 2x_3 = 0; \quad -2x_2 + 4x_3 = -8
\]

b) Find the Eigen values and Eigen vectors of the matrix: \( A = \begin{bmatrix} 4 & 2 & -2 \\ -5 & 3 & 2 \\ -2 & 4 & 1 \end{bmatrix} \)

Q.7  a) If \( u \) is a homogeneous function of \( x \) and \( y \) of degree \( n \), then prove that

\[
x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} = n(n-1)u
\]

b) Find the characteristic equation of the matrix \( A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix} \)

Also find the matrix represented by \( A^8 - 5A^7 + 7A^6 - 3A^5 + 4A^4 - 5A^3 + 8A^2 - 2A + I \)
Q.1 a) Answer the following multiple choice questions:
   i) Which of the following is not a contributing discipline of organizational behavior?
      • Anthropology.
      • Psychology.
      • Sociology.
      • Physiology. 1
   ii) Which of the following is not an example of content theory?
       • Maslow theory.
       • Herzberg’s theory.
       • Expectancy theory.
       • Alderfer’s ERG theory. 1
   iii) What does situational theory of leadership emphasis?
        • Personality traits.
        • Events.
        • Environment.
        • Political situation. 1
   iv) “Trust is the belief in the integrity, character and ability of a leader”. Explain it. 1
   v) Which of the following is not one of the leadership style identified in house’s path goal theory:
      • Participative.
      • Employee centred.
      • Directive.
      • Achievement oriented. 1

b) Fill in the blanks:
   i) Organizational behavior is the study of _________ in the organization.
   ii) __________ is the keyword in the understanding of organization structure.
   iii) The least used communication channel in an organization is __________.
   iv) People who are able to influence others and who possess managerial authority are termed _________. 1
   v) Maslow and Herzberg are two examples of ________ theories of motivation. 1×5

PART-A

Q.2 "Organizational behavior represents interaction among individuals, group and organizations”. Elucidate it. 10

Q.3 Explain the various stages in group formation. Discuss the consequences of group cohesiveness. 10

Q.4 What is change? Why employees resist for change and in such circumstances what approaches are effective in managing organizational changes? 10

PART-B

Q.5 "Corporate culture and organizational effectiveness are interrelated to each other”. Comment upon this statement. 10
Q.6 “Leadership is situational”. Discuss in detail.

Q.7 Are leaders and managers different from each other? What is the basis of trait theories? What traits are associated with leadership?
End Semester Examination, May 2019
B.Sc. (Information Technology) — Fifth Semester
INTERACTIVE COMPUTER GRAPHICS (BSCA-502)

Time: 3 hrs. Max Marks: 100
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt ANY TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer the following questions:
   a) What is the use of computer graphics in the field of simulation and virtual reality?
   b) Aliasing and anti aliasing as the problems of scan conversion.
   c) Define homogenous matrix representation of rotation having three input coordinated.
   d) Write three algorithms names for line drawing.
   e) Define “Scaling”.
   f) Differentiate between 2D and 3D transformations.
   g) Define recursive approach for boundary fill algorithm.
   h) Define “View-plane”, “View-volume” and “Clipping”.
   i) Define the step by step process of 3D viewing and clipping.
   j) What is oblique projection? Provide some example of oblique projection. 2×10

PART-A

Q.2 Describe various computer graphics software and standards with a example of each. 20

Q.3 a) Discuss the various line drawing algorithm with their algorithm. Compare them with any comment of the best algorithm. 10
   b) Take the line coordinates (2, 4) and (9, 5). Draw a line using DDA algorithm. Also plot the line for the driven coordinates. 10

Q.4 Take the line coordinates (0, 0) and (20, 10). Draw a line by obtaining the plotted pixels using Bresenham line drawing algorithm. 20

PART-B

Q.5 Obtain the new coordinated of the triangle formed by the vertices A(2, 2), B(5, 2), C(5, 5) by translating them 5 units in x direction and 3 units in y direction. Also obtain the new coordinates by rotating them at an angle of 90°. 20

Q.6 What is projection? Define perspective projection? Perspective projection has various subclasses. Define their sub-classes with basic definition and an example of each. 20

Q.7 Write short notes on the following:
   a) Window and viewports.
   b) Window to viewport mapping.
   c) Midpoint subdivision method for line clipping.
   d) Polygon clipping. 5×4
End Semester Examination, May 2019
B. Tech. — First Semester
CHEMISTRY-I (BSC-CH-101)

Time: 3 hrs.  
Max Marks: 100  
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer the following questions:
   a) Differentiate between hard and soft acid.
   b) Determine the number of unpaired electrons in $[\text{Ni(H}_2\text{O)}_6]^{2+}$.
   c) Estimate the number of radial nodes in 4s and 4d.
   d) Draw wedge dash representation of 2-chlorobutane.
   e) Predict the feasibility of reaction at 27°C if $\Delta H = 40 \text{kJ mol}^{-1}$ and $\Delta S = 108 \text{JK}^{-1}\text{mol}^{-1}$.
   f) Discuss the significance of Ellingham diagram.
   g) Write the name of 3 normal modes of vibration of CO$_2$. Which mode is IR active?
   h) Which of the following molecules show microwave rotational spectra? $\text{H}_2$, $\text{HCl}$, $\text{CH}_4$, $\text{CH}_3\text{Cl}$.
   i) Define elimination reaction and give its one example.
   j) Explain any two factors that affect the corrosion rates.  2×10

PART-A

Q.2 a) Derive an expression for the energy of the particle in 1-dimensional box.  10
   b) Compare bond order and magnetic behavior of NO and CO with the help of molecular orbital diagrams.  10

Q.3 a) Evaluate the effective nuclear charge experienced by valence electrons in three isoelectronic species ($\text{F}^-$, $\text{Ne}$ and $\text{Na}^+$). Which one has smallest radius?  10
   b) Discuss the periodic trends for ionization energy and electron affinity with examples. Differentiate between polarizing power and polarizability with example.  10

Q.4 a) Draw the conformations of ethane and cyclohexane. Which is more stable and why?  10
   b) Label Stereogenic centres with R or S.

PART-B
Q.5  a) Differentiate between ideal gas and real gas. Explain Van der Waals equation of state for a real gas and highlight the significance of Van der Waals constants.  
   b) Draw the well labeled phase diagram of water system and explain its significant features.  

Q.6  a) Name any two surface characterization techniques and compare them.  
   b) Describe the principle of vibrational spectroscopy and list various types of vibrations involved with one example in each case and write their applications. 

Q.7  a) Differentiate between SN1 and SN2 reactions with examples.  
   b) Discuss the synthesis of aspirin and write the chemical reactions involved. Comment on its solubility in aqueous medium.
End Semester Examination, May 2019
B. Tech. – Second Semester
CHEMISTRY-I (BSC-CH-101)

Time: 3 hrs.  
Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer the following questions:
  a) Define critical temperature and critical pressure of the substance.
  b) What is the difference between dry and wet corrosion?
  c) State Lambert Beer’s law.
  d) Highlight the significance of Ellingham diagram.
  e) Differentiate between enantiomers and diastereomers.
  f) Why Ionization energy of nitrogen is more than that of oxygen?
  g) Comment on the physical significance of $\psi$ and $\psi^2$.
  h) Discuss the principle of Fluorescence spectroscopy.
  i) Differentiate between $E1$ and $E2$ mechanism.
  j) How can you relate the emf of cell to free energy? 2×10

PART-A

Q.2  a) Derive an expression for the energy of the particle in 1-dimensional box. 10
  b) Compare bond order and magnetic behaviour of CO and NO with the help of molecular orbital diagram. 10

Q.3  a) How is polarising power linked with the covalent character of an ionic band? Discuss the periodic trends for electron affinity and atomic radii. Explain with examples. 10
  b) Calculate $Z_{eff}$ for $2p$ electron in Sodium and $3s$ electron in Magnesium. 10

Q.4  a) i) Label stereogenic centres with R or S.

      \[ \text{COOH} \]
      \[ \text{CH}_3 \]

      \[ \text{COOH} \]
      \[ \text{HO} \]

    ii) Name each compound by E-Z system.

      \[ \text{H} \]
      \[ \text{C} = \text{C} \]
      \[ \text{Cl} \]
      \[ \text{Cl} \]

      \[ \text{F} \]
      \[ \text{C} = \text{C} \]
      \[ \text{Cl} \]
      \[ \text{H} \]
      \[ \text{B} \]
      \[ \text{Cl} \]
      \[ \text{H} \]

  b) Draw the different conformers of ethane and cyclohexane. Comment on their stability. 5x2

PART-B

Q.5  a) Differentiate between ideal gas and real gas? Explain Vander Waal’s equation of state for a real gas and write the significance of Vander Waal’s constants. 10
  b) Draw and explain the phase diagram of water system. 10

Q.6  a) Discuss the principle of SEM and AFM and discuss the differences between them. Write their applications in different fields. 10
b) Differentiate between absorption and emission spectroscopy? Describe the principle and list out various types of transitions involved in electronic spectroscopy with one example in each case. 

Q.7  a) Discuss the procedure and chemical reactions involved in the synthesis of Aspirin.  
b) Differentiate between $SN_1$ and $SN_2$ reactions. Explain them with suitable examples.
End Semester Examination, May 2019
MCA — Sixth Semester
PROGRAMMING IN .NET (MCA-602 CB)

Time: 3 hrs.  Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Multiple choice questions:
a) Which of the following is part of an object?
   i) Methods  ii) Properties  iii) Instances  iv) Both i) and ii)
b) Which statement about objects is true?
   i) One object is used to create one class.
   ii) One class is used to create one object.
   iii) One object can create many classes.
   iv) One class can create many objects.
c) Properties are used to represent:
   i) Actions  ii) Classes
   iii) Data  iv) Events
d) Which is not an integer data type?
   i) Single  ii) Byte
   iii) Short  iv) Integer
   v) Long
e) Which statement is true?
   i) A base class inherits some of the properties of a derived class.
   ii) A base class inherits all of the properties of a derived class.
   iii) A derived class inherits some of the properties of a base class.
   iv) A derived class inherits all of the properties of a base class.
f) Which is not an ADO.NET DataAdapter object?
   i) OleDbDataAdapter  ii) SqlDataAdapter
   iii) QueryDataAdapter  iv) Both i) and ii).
g) The first step of configuring a DataAdapter is to select:
   i) An adapter object.  ii) A connection object.
   iii) A database object.  iv) A dataset object.
   v) None of the above.
h) A postback occurs when:
   i) A browser posts a form to the server.
   ii) A user's action activates the handing of a server event.
   iii) A server posts a form to the client.
   iv) Both i) and ii).
   v) All of the above.
i) Which is the file extension used for an ASP.NET file?
   i) asn  ii) asp
   iii) aspn  iv) aspx
j) Where do cookies store information?
   i) HTML source  ii) Text file
   iii) URL  iv) Both i) and ii).

PART-A

Q.2 Write short notes on the following:
a) Common language specifications.
b) Common types systems.
c) Garbage collection.
d) Base class libraries.
Q.3 What is a delegate? What is it used for? What are the steps involved in creating and using a delegate? Give an example to support your answer.  

Q.4 Explain “Inheritance in C#”. How is runtime polymorphism implemented in C#? Give suitable example to support your answer.  

**PART-B**

Q.5  
a) Differentiate between ‘server side event’ and ‘client side event’.  
b) State management in ASP.NET page.  

Q.6 Write short notes on the following:  
a) Web service.  
b) XML  
c) COM  

Q.7 Write a program to match the username and password from controls in a login form and match them to a database record. (DB Table details and form fields are given below)  

Login Name field: txtName  
Password field : txtPassword  
Table Schema : CREATE TABLE [dbo].[tbl_UserMaster](  
[UserId] int NOT NULL IDENTITY (1001,1),  
[FName] nvarchar(30) NOT NULL,  
[LName] nvarchar(30) NOT NULL,  
[LoginName] nvarchar(30) NOT NULL,  
[Email] nvarchar(30) NOT NULL,  
[Password] nvarchar(30) NOT NULL  
)
End Semester Examination, May 2019
MCA – Second Semester
PROGRAMMING IN C++ (MCA-203A (CB))

Time: 3 hrs. Max Marks: 100
No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.

**Q.1** Answer the following questions in brief:
- a) Why do we need preprocessor directive `#include <iostream>`?
- b) Define the application of scope resolution operator :: in C++.
- c) Give the significance of overloading of a function.
- d) How does a C++ structure differ from a C++ class?
- e) List the merits of friend function.
- f) List some of the special properties of constructor functions.
- g) In what situation we make a virtual function “pure”?
- h) Write a function in C++ to find factorial of a number.
- i) In which order are the constructors and destructors called when an object of the derived class is created?
- j) How can a file be opened for both reading and writing?

**PART-A**

**Q.2**
- a) Differentiate object oriented programming and procedure oriented programming. 10
- b) Discuss nested class and local class by taking suitable example. 10

**Q.3** What are strings? Are they standard or derived data types? Write an interactive program to check whether a given string is palindrome or not. 20

**Q.4**
- a) Can inline function be recursive? Justify your answer. 8
- b) Describe use of functions in C++ by taking suitable example. 12

**PART-B**

**Q.5** Discuss the role of constructors and destructors in a class. State the rules associated with them. Use examples wherever required. 20

**Q.6** Describe operator overloading. Write a program in C++ to overload unary operator for processing the objects of a class called counter. 20

**Q.7**
- a) Illustrate the different forms of inheritance supported by C++.
- b) Write a program to demonstrate the use of throw within and outside a function.
End Semester Examination, May 2019
MCA – Fourth Semester
DATA COMMUNICATION (MCA-405A (CB))

Time: 3 hrs. 
Max Marks: 100

No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Multiple choice questions:
   a) The __________ is the physical path over which a message travels.
      i) Protocol ii) Medium iii) Signal iv) All of above
   b) Which topology requires a multipoint connection?
      i) Bus ii) Star iii) Mesh iv) Ring
   c) A __________ is a set of rules that governs data communication.
      i) protocol ii) forum iii) standard iv) None of the above
   d) __________ is the protocol suite for the current Internet.
      i) UNIX ii) NCP iii) TCP/IP iv) ACM
   e) __________ can impair a signal.
      i) Noise ii) Attenuation iii) Distortion iv) All of the above
   f) Which multiplexing technique transmits digital signals?
      i) WDM ii) FDM iii) TDM iv) None of the above
   g) In PCM, an analog to __________ conversion occurs.
      i) Analog ii) Digital iii) QAM iv) Differential
   h) In __________, the stations share the bandwidth of the channel with respect to time.
      i) FDMA ii) CDMA iii) TDMA iv) None of the above
   i) ARQ stands for __________.
      i) Acknowledge repeat request ii) Automatic retransmission request
      iii) Automatic repeat quantization iv) Automatic repeat request
   j) Transmission media lie below the __________ layer.
      i) Application ii) Transport iii) Network iv) Physical

PART-A

Q.2 a) Explain Data Communication and its basic component. Explain its characteristics?  
   b) What is network topology? Explain the different network topologies. 10×2

Q.3 What do you mean by switching? What are the three fundamental switching methods explain? Which is better packet switching or circuit switching? 20

Q.4 a) What are transmission impairments? Explain each briefly. Which transmission media is superior in communication channel and why?
   b) Explain the OSI reference model with neat diagram. 10×2

PART-B
Q.5 Explain various data encoding techniques and also discuss its requirement in data communication. Draw various digital to digital data encoding techniques for the given data:
   a) 111010100
   b) 001110101
   c) 111100011
   d) 110000111

Q.6 a) Given the data word a 101001111 and the divisor 1011, show the generation of CRC Codeword at the sender site.
   b) What is the main function of transport layer? Explain the mechanism of fault handling in this layer.

Q.7 a) Explain IEEE 802.11 standard with its architecture and its working process in detail. Describe the function of Logic Link Control.
   b) Write short notes on the following.
      i) HDLC
      ii) Asynchronous Transfer Mode
End Semester Examination, May 2019
B. Sc. (Information Technology) – Second Semester
DATABASE ENGINEERING-I (7.104)

Time: 3 hrs.  Max Marks: 50
No. of pages:  1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from
PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Explain the following:
a) Define is third normal form.
b) List down E.F. codd rules.
c) Discuss DDL and DML.
d) Define schema.
e) What is data independence? Discuss.  2×5

PART-A

Q.2 Explain the following:
a) Primary key
b) Foreign key
c) Generalization
d) Specialization
e) Composite key  2×5

Q.3 What is meant by normalization? Why do we normalize database? Explain the
similarities and dissimilarities between 3NF and BCNF.  10

Q.4 Explain the similarities and dissimilarities between hierarchical, network and relational
model.  10

PART-B

Q.5 Explain the following with syntax and example:
a) Group by clause.
b) Union and Difference.  5×2

Q.6 What are SQL constraints? How do we define it during the creation of table? Explain
various types of constraints with example.  10

Q.7 Discuss all the control structures used in PL/SQL with their syntax and examples.  10
Q.1 Explain the following:
   a) Role of database administrator.
   b) E.F. codd rules.
   c) Differentiate traditional file system and database system.  

   

PART-A

Q.2 What is normalization? Explain 4th and 5th normal forms. Why 5NF is also known as PJNF.  

Q.3 What is E-R diagram? Draw all the symbols used in E-R diagram. Draw the E-R diagram of Library Management System.  

Q.4 Explain the following:
   a) Data dictionary
   b) Cartesian product
   c) Participation constraint  

PART-B

Q.5 Explain 10 SQL functions with syntax and suitable example.  

Q.6 Differentiate between function and procedure. What is the syntax to create store procedure? Explain with suitable example.  

Q.7 a) Differentiate primary key and unique key.
   b) Differentiate union and intersection clause with example.
   c) Differentiate group by and order by with example.
Q.1  a) Common Language Specification (CLS):  
    i) is an execution engine for all .NET application. 
    ii) is similar to JVM as in java. 
    iii) defines standard rules for defining .NET compatible languages. 
    iv) is a compiler.  

b) __________ is not a .NET compatible language.  

c) Which data type should be more preferred for storing a simple number like 35 to 
   improve execution speed of the program?  
   i) Sbyte  
   ii) Short  
   iii) Int  
   iv) Long  

d) Obdb connection object works with __________.  

e) The default property for a text box control is __________.  

f) Debugging is the process of finding and removing errors. (True/False)  

g) The __________ enables us to pass data between a program and a class.  

h) A __________ variable is one that is declared inside a procedure.  

i) MDI stands for __________.  

j) Variant is a default data type in VB.NET. (True/False)  

1½×10

PART-A

Q.2  What are the advantages of VB.Net over traditional Visual Basic? Discuss important 
    features of VB.NET in context to windows programming.  

15

Q.3  What are the different database components in context to ADO.NET? Explain its 
    components in detail.  

15

Q.4  Make a calculator in VB.NET showing the following operations: 
    a) Addition  
    b) Subtraction  
    c) Multiplication  
    d) Division  

15

PART-B

Q.5  Explain the features of object oriented programming in detail. How OOPs concept helps 
    in building strong and secure programs?  

15

Q.6  Explain the following (any three):  
    a) Data grid  
    b) Data set  
    c) Fill(   )  
    d) List box control  

5×3

Q.7  a) Differentiate between procedure and function with the help of example.  
    b) List out steps need to be incorporated while implementing the access database 
    connectivity in VB.NET.  

7  

8
End Semester Examination, May 2019
MCA – Sixth Semester
SOCIAL MEDIA NORMS AND ETIQUETTE (CA-GE-56)

Time: 3 hrs. Max Marks: 50

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1  
a) Facebook was originally targeted at which demographic of users?
b) What is the largest global social network?
c) When snapchat was created, the app was called picaboo. (True/False)  
d) Which social network does not allow you to post photos via a desktop computer?  
e) Which of the below is not a social network?  
   i) Weibo  
   ii) Ektorp  
   iii) Instagram  
   iv) Renren  
f) Best protocol to invite a facebook friend to an event is __________.  
g) Technological convergence and the rise of mobile technology is a central issue in social media. (True/False)
h) Who holds the title of most retweeted tweet ever?  
i) In present scenario, the most popular social networking site is __________.  
j) Facebook is a trusty source of social media. (True/False)  

1×10

PART-A

Q.2  
Write short notes on (any five):
   a) Google.  
   b) Friend feed.  
   c) LinkedIn.  
   d) Social media culture.  
   e) Email Etiquettes.  
   f) Social networking privacy.  

2×5

Q.3  
Discuss in detail the negative impact of social media on social propriety.  

10

Q.4  
Explain the role of social media in the following areas:
   a) Job search.  
   b) Marketing.  
   c) Business decision making.  

10

PART-B

Q.5  
What do you understand by identity and reputation of social capital in social media? How social media trends can be analyzed through this? Explain through an example.  

10

Q.6  
Differentiate the following (any two):
   a) Cyber law and cyber bullying.  
   b) Harassment and stalking.  
   c) Government and social media vs organizations and social media.  

5×2

Q.7  
What do you understand by the domains of social media? Explain all domains of social media with relevant examples.  

10
Q.1 Define the following in brief:
   a) E-R diagram.
   b) Logical view of database.
   c) DBMS.
   d) Candidate key.
   e) Functional dependency.
   f) Anomaly in database.
   g) Transaction.
   h) DBA.
   i) Define ‘triggers’
   j) What is data dictionary?

   2×10

PART-A

Q.2 a) List five differences between file system and database management system. 10
   b) Why DBMS has become a lifeline for today's business? Justify your answer with five reasons. 10

Q.3 a) Explain the importance of physical, logical and view level of DBMS design. Draw architecture of a database system. 10
   b) Write 12 Codd’s rule and explain their usefulness for a database design. 10

Q.4 a) What are the limitations of 2nd normal form? Give an example to justify your answer. What are the advantages of 3rd normal form? 10
   b) Differentiate between 3rd normal form and BCNF? Explain with examples. 10

PART-B

Q.5 a) Differentiate between DCL, DML and DDL with examples. 10
   b) Differentiate between having, group by and where clause used in SQL. Write syntax of command also. 10

Q.6 Employee (person-name, street, city) works (person-name, company-name, salary) company (company-name, city) manages (person-name, manager-name).
   Explain in relational algebra:
   a) Find name of all employees who work for company.
   b) Find the name of employees who are managed by manager.
   c) Find the employee-name and salary.
   d) Find name of employees having salary more than ₹20,000. 5×4

Q.7 a) What is a transaction in database? Write all the stages of a transaction. 10
   b) What are the issues of concurrent transactions? How to handle such issues? 10
End Semester Examination, May 2019
MCA – Second Semester
OPERATING SYSTEM (MCA-204A (CB))

Time: 3 hrs.  
Max Marks: 100  
No. of pages: 2

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.

Q.1 Explain the following in brief:
a) Multiprogramming operating systems.  
b) Types of schedules.  
c) Resource allocation graph.  
d) Real world example of deadlock.  
e) Dynamic loading.  
f) Compaction.  
g) Two algorithms used in contiguous memory allocation technique.  
h) File and directory relationship.  
i) Swapping.  
j) Turnaround time.

**PART-A**

Q.2 Consider the following set of processes with the length of the CPU burst time given in milliseconds.

<table>
<thead>
<tr>
<th>Process</th>
<th>Burst Time</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>P₁</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>P₂</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>P₃</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>P₄</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Draw Gantt charts and calculate average turn-around time and waiting time for FCFS, SJF, priority and Pound-Robin (7Q = 4 ms) scheduling algorithms.

Q.3 What are the essential properties of a good operating system? Explain various functions performed by an operating system.

Q.4 What is a process? Describe the components of PC8. Draw state transition diagram and explain various stages of a process.

**PART-B**

Q.5 Consider the following snapshot of a system:

<table>
<thead>
<tr>
<th>Process</th>
<th>Allocation</th>
<th>More</th>
<th>Available</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A B C D A B C D A B C D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P₀</td>
<td>0 0 1 2 0 0 1 2 1 5 2 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P₁</td>
<td>1 0 0 0 1 7 5 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P₂</td>
<td>1 3 5 4 2 3 5 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P₃</td>
<td>0 6 3 2 0 6 5 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P₄</td>
<td>0 0 1 4 0 6 5 6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Answer the following using Banker’s algorithms:
a) What is the content of need matrix?  
b) Is the system in a safe state? If yes, then find the safe sequence for processes.

Q.6 Given memory partitions of 100 kB, 200 kB, 400 kB and 300 kB (in order), how would each of the First-Fit, Best-Fit, Worst-Fit algorithm places processes of 150 k, 250 k, 90 k and 350 k (in order)? Which algorithm makes the most efficient use of memory?
Q.7 Define seek time and latency time for disk drive data transfer. Explain various disk scheduling algorithms with suitable examples and clean diagrams.
End Semester Examination, May 2019
B. Sc. (Information Technology) – Fourth Semester
INFORMATION SYSTEM SECURITY (7.209/7.209A)

Time: 3 hrs.  Max Marks: 40
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Differentiate between the following:
   a) Vulnerability and threat.
   b) Cyber law and cyber ethics.
   c) Hub and switch.
   d) Risk identification and risk control.  2×4

PART-A

Q.2 What is information technology Act 2000? Why it has become important in current era?  8

Q.3 What is risk management? Why is the identification of risks and vulnerabilities important in risk management?  8

Q.4 How issue-specific-policy helps in making the cyber operations secure? Give example of email-issue-specific-policy for an organisation.  8

PART-B

Q.5 How intrusion detection and prevention system enhance organizational security? Justify your answer with an example.  8

Q.6 a) What is the importance of public key infrastructure?  4
    b) Why encryption is required for data communication?  4

Q.7 What are the different physical security controls implemented by an organization?  8
End Semester Examination, May 2019
MCA – Fourth Semester
DATA MINING AND WAREHOUSING (MCA-408 (CB))

Time: 3 hrs. Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 a) Give two characteristics of a data warehouse. 2
   b) Data mart is a subset of __________. 1
   c) Data cube represents __________ model of data warehouse. 1
   d) Three schemas of data warehouse are __________, __________ and __________. 3
   e) Three types of OLAP servers are __________, __________ and __________. 3
   f) KDD stands for __________. 1
   g) Give an algorithm for association rule mining. (Name the algorithm) 1
   h) Data preprocessing is done to remove __________, __________ and __________ from data. 3
   i) Give two applications of data mining. 2
   j) Two measures of association rules to predict its significance are __________ and __________. 2
   k) Decision tree is an example of __________ technique. 1

PART-A

Q.2 a) Differentiate the following:
   i) Database and Data warehouse. 5
   ii) OLTP and OLAP 5
   b) “Data warehousing is a viable means to resolve the information crisis and to provide strategic information”. Justify the statement. 10

Q.3 Explain the following in relation to data mart:
   a) Reasons for creating data mart. 5
   b) Advantages of data mart. 5
   c) Limitations of data mart. 5
   d) Co-existence of data mart and data warehouse. 5x4

Q.4 a) Explain the snowflake schema with its advantages and disadvantages. Also make a comparison between star schema and snowflake schema. 10
   b) What are Aggregate Fact tables? Why are they required? Justify your answer with the help of an example. 10

PART-B

Q.5 a) Explain all the steps of knowledge discovery from the transactional databases. 10
   b) Give applications of data mining in the field of:
      i) Healthcare 5x2
      ii) Education

Q.6 Using Apriori algorithm, generate frequent itemsets of the following dataset taking minimum support value as 3.

<table>
<thead>
<tr>
<th>Transition</th>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bread, Milk</td>
</tr>
<tr>
<td>2</td>
<td>Bread, diaper, bear, eggs</td>
</tr>
<tr>
<td>3</td>
<td>Milk, diaper, bear, coke</td>
</tr>
<tr>
<td>4</td>
<td>Bread, milk, diaper, bear</td>
</tr>
</tbody>
</table>
Q.7  
a) Differentiate the following:
   i) Classification and clustering.
   ii) Hierarchical and partitional method of clustering.

b) Apply k-means algorithm to generate two clusters for the following dataset:

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Subject 1</th>
<th>Subject 2</th>
<th>Subject 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>55</td>
<td>60</td>
<td>55</td>
</tr>
<tr>
<td>2</td>
<td>57</td>
<td>58</td>
<td>59</td>
</tr>
<tr>
<td>3</td>
<td>99</td>
<td>100</td>
<td>95</td>
</tr>
<tr>
<td>4</td>
<td>98</td>
<td>99</td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>56</td>
<td>57</td>
<td>59</td>
</tr>
<tr>
<td>6</td>
<td>60</td>
<td>62</td>
<td>64</td>
</tr>
</tbody>
</table>

Table: Datasets of marks of students.
End Semester Examination, May 2019  
B. Sc. (Information Technology) – Second Semester  
FUNDAMENTALS OF COMPUTER PROGRAMMING (7.103)

Time: 3 hrs.  
Max Marks: 100  
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 a) Differentiate between procedure oriented programming languages and object oriented programming language.
   b) Define terms: High level programming languages, low level programming language and Middle level programming language.
   c) Define syntax error. Also differentiate it from run time error.
   d) Write an example of pseudocode.
   e) Define string variable. Write five string functions.
   f) Differentiate between relational operator and logical operators.
   g) Define array and its types.
   h) What is recursion? Give an example.
   i) What is error handling?
   j) Differentiate between user defined functions and input functions. 2×10

PART-A

Q.2 a) What are objective and principles of a programming language? What are different paradigms of programming? What are the issues for programming languages? 10
   b) Write a python program to calculate factorial of a number along with the syntax rules of a python program. 10

Q.3 a) Draw a flowchart to find the Fibonacci series till term ≤ 1000. 10
   b) Write an algorithm to determine whether a temperature is below or above the freezing point. 10

Q.4 a) Why data type conversion is required in programming language? Support your answer with the help of suitable program. 10
   b) Explain different types of data types and operators in python. 10

PART-B

Q.5 a) Write a python program to show difference between call by value and call by reference of function parameters. 10
   b) Differentiate between while loop and do while loop. Support your answer with suitable examples. 10

Q.6 a) Write a program to access and modify the text file contents? 10
   b) How array is initialized in python? Write a suitable example for the same. Also apply Sort( ) function to sort the elements in ascending order. 10

Q.7 Write short notes on the following:
   a) Keyboard events.
   b) Data validation.
   c) Recursive procedures
   d) Error handling. 5x4
End Semester Examination, May 2019  
MCA – Second Semester  
DISCRETE MATHEMATICS AND FINITE AUTOMATA (MCA-208 (CB))

Time: 3 hrs.  
Max Marks: 100  
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1  
a) Define the following:  
i) Power set  
ii) Degree of recurrence relation  
iii) Equivalent sets  
iv) Binary tree  
v) Distributive lattice  

b) What is DNF of Boolean function?  
c) Explain particular solution of a recurrence equation.  
d) What do you mean by spanning trees?  
e) What is DFA?  
f) Name one algorithm which is applicable to find minimum spanning trees.

PART-A

Q.2  
a) State and prove distributive law.  

b) Let \( P = \{x, y, z, u\} \) and \( Q = \{a, b, c, d\} \).  
and \( f : P \rightarrow Q \), such that  
\( f = \{(x, a), (y, b), (z, c), (u, c)\} \).  
Find the domain, co-domain and range of function.

c) A survey of 550 television watches produced the following information. 285 watch football games, 195 watch hockey games, 115 watch baseball games 45 watch football and baseball games, 70 watch football and hockey games, 50 watch hockey and baseball games, 100 do not watch any of the three games.  
i) How many people in the survey watch all three games?  
ii) How many people watch exactly one of the three games?

Q.3  
a) Prove that:  
\[ 1^2 + 2^2 + 3^2 + \cdots + n^2 = \frac{n(n+1)(2n+1)}{6} \]  
b) Prove that the statement \( (P \rightarrow q) \leftrightarrow (\sim q \rightarrow \sim P) \) is a tautology.

Q.4  
a) Draw the Hasse diagram of the Partial order having directed graph as shown in the figure:

b) If \( f(x, y, z) = (x \vee y) \land (x \vee y') \land (x' \vee z) \) be a given Boolean function. Determine its DN from.
**PART-B**

Q.5  
a) Explain non-homogeneous linear difference equations.  
b) Solve the difference equation  
\[ a_n - 4a_{n-1} + 4a_{n-2} = 0 \]  
and find the particular solution given that \( a_0 = 1 \) and \( a_1 = 6 \).  

Q.6  
a) Write short notes on the following:  
i) Eulerain path  
ii) Bipartite graphs  
b) Find the shortest path between K and L in the graph shown by using Dijkstra's algorithm.

Q.7  
a) i) Explain transition diagrams.  
   ii) Explain Deterministic Finite Automaton (DFA).  
b) Let \( M_1 \) be a Mealy machine whose transition table is given below:  

<table>
<thead>
<tr>
<th>S/I</th>
<th>f</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>01</td>
<td>01</td>
</tr>
<tr>
<td>S_0</td>
<td>S_3, S_1</td>
<td>01</td>
</tr>
<tr>
<td>S_1</td>
<td>S_1, S_2</td>
<td>10</td>
</tr>
<tr>
<td>S_2</td>
<td>S_2, S_3</td>
<td>00</td>
</tr>
<tr>
<td>S_3</td>
<td>S_3, S_0</td>
<td>00</td>
</tr>
</tbody>
</table>

Find equivalent Moore machine \( M_2 \).
End Semester Examination, May 2019
B. Sc. (Information Technology) – Fourth Semester
OPERATING SYSTEM (7.221/7.221A)

Time: 3 hrs.  Max Marks: 40
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer the following:
a) What is dispatcher?
b) Define the problem occurred in FIFO page replacement algorithm.
c) Give a real life example of deadlock.
d) What is a process?
e) What is swapping?
f) Discuss the haming conventions in file system.
g) Name two types of fragmentation.
h) Define basic disk architecture.

PART-A

Q.2 Consider the following set of processes, with the length of CPU burst time given in milliseconds.

<table>
<thead>
<tr>
<th>Process</th>
<th>Burst time</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>P2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>P3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>P4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>P5</td>
<td>5</td>
<td>2</td>
</tr>
</tbody>
</table>

Draw Gantt charts, calculate average turnaround time and average waiting time for FCFS, SJF, priority and Round-Robin (TQ = 2ms) scheduling algorithms.

Q.3 List four functions of operating system and describe them.

Q.4 Differentiate between program and process. Explain various states of a process with the help of a state transition diagram.

PART-B

Q.5 Explain the various steps of a page fault with the help of a suitable diagram.

Q.6 Consider a system with five processes \{P_0, P_1, P_2, P_3, P_4\} and three resources \{A = 12, B = 7, C = 8\}. At a given point of time snapshot of the system is:

<table>
<thead>
<tr>
<th>Process</th>
<th>Allocation</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>P0</td>
<td>0 1 0</td>
<td>7</td>
</tr>
<tr>
<td>P1</td>
<td>4 1 0</td>
<td>4</td>
</tr>
<tr>
<td>P2</td>
<td>3 0 2</td>
<td>9</td>
</tr>
<tr>
<td>P3</td>
<td>2 1 1</td>
<td>2</td>
</tr>
<tr>
<td>P4</td>
<td>0 0 2</td>
<td>4</td>
</tr>
</tbody>
</table>

Available is

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

a) What will be the contents of need matrix?
b) Whether the system is in safe state? If yes, then find out the safe sequence.
Q.7 Consider a disk queue with requests of I/O to blocks on cylinders: 34, 98, 354, 2, 7
Assume current head position is at cylinder 15 and total cylinder on the disk drive is 500. What is the total distance that the disk arm moves to satisfy all the pending requests for each of the following disk-scheduling algorithms?

a) FCFS,
b) SSTF,
c) SCAN,
d) C-SCAN
End Semester Examination, May 2019
B. Tech. – Second Semester
MATHEMATICS-II (BSC-MA-202)

Time: 3 hrs.  Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from
PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1  
a) Change the order of integration \( \int_{0}^{\infty} \int_{0}^{x} \frac{e^{-y}}{y} dy \, dx \).

b) Find the value of \( \lambda \), for the exact differential equation \((xy^2 + \lambda x^2 y)dx + (x + y)x^2 dy = 0.2\)

c) Solve \( x^2 = 1 + p^2 \).

d) Solve \( p = \log(px - y) \)

\[ \frac{d^2 y}{dx^2} - 4y = 0 \]

e) Solve:

f) Find Particular Integral in the following Differential Equation:

\[ \frac{d^2 y}{dx^2} + 3 \frac{dy}{dx} + 2y = 4\cos^2 x. \]

g) Determine \( a, b, c, d \) so that the function \( f(z) = (x^2 + axy + by^2) + i(cx^2 + dxy + y^2) \) is analytic.

h) Define Analytic function and write Cauchy Riemann equation in polar form.

i) Evaluate: \( \text{li}(z \to 1+i) \frac{z^2-1}{z^2-1} \)

j) Find the singularities of the following functions:

i) \( f(z) = \frac{1}{z^4 + 1} \)

ii) \( f(z) = \sin \frac{1}{z} \)  \(2 \times 10\)

PART-A

Q.2  
a) Evaluate \( \int_{0}^{\infty} \int_{0}^{\infty} e^{x+y+z} \, dx \, dy \, dz \)

b) Verify Green’s theorem for \( \int_{C} \left((3x^2 - 8y^2)dx + (4y - 6x)dy\right) \), where \( C \) is bounded by \( x = 0, y = 0 \) and \( y + x = 1 \).

Q.3  
a) Solve: \( xdx + ydy = \frac{a^2(xdy - ydx)}{x^2 + y^2} \)

b) Solve \( \frac{dy}{dx} + \frac{1}{x} \tan y = \frac{1}{x^2} \tan y \sin y \).

c) Solve differential equation \( y \log y \, dx + (x - \log y) \, dy = 0 \)

Q.4  
a) Solve \( x^2 \frac{d^2 y}{dx^2} + 4x \frac{dy}{dx} + 2y = e^x \)

b) Solve: \( \frac{d^2 y}{dx^2} + 4y = x \sin x \).

c) Show that: \( \int x J_0^2(x) \, dx = \frac{1}{2} x^2 \left[J_0^2(x) + J_1^2(x)\right] \)

PART-B
Q.5  
  a) If $f(z)$ is a regular function of $z$, prove that
     \[
     \left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right) |f(z)|^2 = 4|f'(z)|^2.
     \]
  b) Determine analytic function $f(z) = u + iv$, where: $u - v = e^y (\cos y - \sin y)$.

Q.6  
  a) State and prove the Cauchy’s integral formula and use it to evaluate:
     \[
     \int_{c} \frac{e^z}{z(z-1)(z-2)^2} \, dz, \quad \text{where} \quad c \text{ is the circle } |z| = 3.
     \]
  b) Solve:
     \[
     \int_{-\infty}^{\infty} \frac{dx}{1 + x^4}.
     \]

Q.7  
  a) For the conformal transformation $w = z^2$, show that the coefficient of magnification at $z = 1 + i$ is $2\sqrt{2}$.
  b) Expand the function in Laurent’s Series $f(z) = \frac{1}{z^2 - 4z + 3}$ for $1 < |z| < 3$. 
End Semester Examination, May 2019
B. Tech. – Second Semester
MATHEMATICS-II (FOR CSE ONLY) (BSC-MA-201)

Time: 3 hrs. Max Marks: 100
No. of pages: 5

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1  
a) Six cards are selected from a well-shuffled deck of playing cards. Given that all the six cards are black, find the probability that they are all from the same suit? 3
b) Five men in a company of 20 are graduates. If 3 men are picked out of 20 at random. What is the probability that:
   i) they all are graduates?
   ii) at least one is graduates? 3
c) Compute the variance of sum obtained when 10 independent rolls of a fair die are made. 3
d) Is the function defined as follows a probability density function?

\[
f(x) = \begin{cases} 
0 & \text{if } x < 2 \\
\frac{1}{18} (3 + 2x) & \text{if } 2 < x < 4 \\
0 & \text{otherwise}
\end{cases}
\]

Find the probability that a variate having density will fall in the interval 2 < x < 3 3
e) Determine the binomial distribution whose mean is 9 and S.D. is 3/2. 3
f) What are the Sheppard's corrections for the first four moments? 2
g) Determine the value of median from the following series:

<table>
<thead>
<tr>
<th>Marks</th>
<th>No. of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–10</td>
<td>7</td>
</tr>
<tr>
<td>10–15</td>
<td>5</td>
</tr>
<tr>
<td>15–20</td>
<td>8</td>
</tr>
<tr>
<td>20–25</td>
<td>38</td>
</tr>
<tr>
<td>25–30</td>
<td>42</td>
</tr>
</tbody>
</table>

Q.2  
a) A drawer contains 50 bolts and 150 nuts. Half of the bolts of the nuts are rusted. If one item is chosen at random, what is the probability that it is rusted or a bolt? 7
b) A man is known to speak truth 3 times out of 4 times. He throws a die and reports that it is a six. Find the probability that it is actually a six. 7
c) Three coins are tossed simultaneously. Consider the event E ‘three heads or three tails’, F ‘at least two heads’ and G ‘at most two heads’. Of the pairs (E, F), (E, G) and (F, G), which are independent? 6

Q.3  
a) A random variable X has the following density function

\[
f(x) = \begin{cases} 
\frac{k}{1+x^2} & \text{if } -\infty < x < \infty \\
0 & \text{otherwise}
\end{cases}
\]

Determine k and the distribution function. 10
b) In a normal distribution, 31% of the items are under 45 and 8% are over 64. Find the mean and standard deviation of the distribution. 10

Q.4  
a) An insurance company supposes that the number of accidents that each of its policyholders will have in a year is Poisson distributed, with the mean of the Poisson depending on the policyholder. If the Poisson mean of a randomly chosen
policyholder has a gamma distribution with density function \( g(\lambda) = \lambda e^{-\lambda}, \lambda \geq 0 \).

What is the probability that a randomly chosen policyholder has exactly \( n \) accidents next year?

b) Find the moment generating function of the exponential distribution

\[ f(x) = \frac{1}{c} e^{-\frac{x}{c}}, \quad 0 < x < c, \quad c > 0 \]. Hence find its mean and S.D.

**PART-B**

Q.5  

a) Ten students got the following percentage of marks in Economics and Statistics. Calculate the Coefficient of Correlation.

<table>
<thead>
<tr>
<th>Marks in Economics</th>
<th>78</th>
<th>36</th>
<th>98</th>
<th>25</th>
<th>75</th>
<th>82</th>
<th>90</th>
<th>62</th>
<th>65</th>
<th>39</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marks in Statistics</td>
<td>84</td>
<td>51</td>
<td>91</td>
<td>60</td>
<td>68</td>
<td>62</td>
<td>86</td>
<td>58</td>
<td>53</td>
<td>47</td>
</tr>
</tbody>
</table>

b) Find the Kurtosis based on moments for the following distribution:

<table>
<thead>
<tr>
<th>Marks</th>
<th>0–10</th>
<th>10–20</th>
<th>20–30</th>
<th>30–40</th>
<th>40–50</th>
<th>50–60</th>
<th>60–70</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of students</td>
<td>8</td>
<td>12</td>
<td>20</td>
<td>30</td>
<td>15</td>
<td>10</td>
<td>5</td>
</tr>
</tbody>
</table>

Q.6  

a) Using the principle of least squares, find an equation of the form \( y = ab^x \) that fits the following data:

<table>
<thead>
<tr>
<th>( x )</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y(\times) )</td>
<td>0.5</td>
<td>2.0</td>
<td>4.5</td>
<td>8.0</td>
<td>12.5</td>
</tr>
</tbody>
</table>

b) In a Hospital 475 females and 525 males were born in a week. Do these figures confirm the hypothesis that males and females are born in equal numbers.

Q.7  

a) A survey of 320 families with 5 children each revealed the following information:

<table>
<thead>
<tr>
<th>No. of boys</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of girls</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>No. of families</td>
<td>14</td>
<td>56</td>
<td>110</td>
<td>88</td>
<td>40</td>
<td>12</td>
</tr>
</tbody>
</table>

Is this result consistent with the hypothesis that male and female birth are equally probable.

b) The 9 items of a sample have the following values 45, 47, 50, 52, 48, 47, 49, 53, 51. Does the mean of these values differ significantly from the assumed mean 47.5? Apply t-test.
Table 1: NORMAL TABLE
AREAS UNDER THE STANDARD NORMAL

\[ \text{CURVE} = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{z} e^{-\frac{z^2}{2}} \, dz \]

<table>
<thead>
<tr>
<th>z</th>
<th>.00</th>
<th>.01</th>
<th>.02</th>
<th>.03</th>
<th>.04</th>
<th>.05</th>
<th>.06</th>
<th>.07</th>
<th>.08</th>
<th>.09</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>0.000</td>
<td>0.040</td>
<td>0.080</td>
<td>0.120</td>
<td>0.160</td>
<td>0.199</td>
<td>0.239</td>
<td>0.279</td>
<td>0.319</td>
<td>0.359</td>
</tr>
<tr>
<td>0.1</td>
<td>0.398</td>
<td>0.438</td>
<td>0.478</td>
<td>0.517</td>
<td>0.557</td>
<td>0.596</td>
<td>0.636</td>
<td>0.675</td>
<td>0.714</td>
<td>0.754</td>
</tr>
<tr>
<td>0.2</td>
<td>0.793</td>
<td>0.832</td>
<td>0.871</td>
<td>0.910</td>
<td>0.948</td>
<td>0.987</td>
<td>1.026</td>
<td>1.064</td>
<td>1.103</td>
<td>1.141</td>
</tr>
<tr>
<td>0.3</td>
<td>1.179</td>
<td>1.217</td>
<td>1.255</td>
<td>1.293</td>
<td>1.331</td>
<td>1.368</td>
<td>1.406</td>
<td>1.443</td>
<td>1.480</td>
<td>1.517</td>
</tr>
<tr>
<td>0.4</td>
<td>1.554</td>
<td>1.591</td>
<td>1.628</td>
<td>1.664</td>
<td>1.700</td>
<td>1.736</td>
<td>1.772</td>
<td>1.808</td>
<td>1.844</td>
<td>1.879</td>
</tr>
<tr>
<td>0.5</td>
<td>1.915</td>
<td>1.950</td>
<td>1.985</td>
<td>2.019</td>
<td>2.054</td>
<td>2.088</td>
<td>2.123</td>
<td>2.157</td>
<td>2.190</td>
<td>2.224</td>
</tr>
<tr>
<td>0.6</td>
<td>2.257</td>
<td>2.291</td>
<td>2.324</td>
<td>2.357</td>
<td>2.389</td>
<td>2.422</td>
<td>2.454</td>
<td>2.485</td>
<td>2.517</td>
<td>2.549</td>
</tr>
<tr>
<td>0.7</td>
<td>2.580</td>
<td>2.611</td>
<td>2.642</td>
<td>2.673</td>
<td>2.704</td>
<td>2.734</td>
<td>2.764</td>
<td>2.794</td>
<td>2.823</td>
<td>2.852</td>
</tr>
<tr>
<td>0.8</td>
<td>2.881</td>
<td>2.910</td>
<td>2.939</td>
<td>2.967</td>
<td>2.995</td>
<td>3.023</td>
<td>3.051</td>
<td>3.078</td>
<td>3.106</td>
<td>3.133</td>
</tr>
</tbody>
</table>
Table 3: CHI-SQUARE ($\chi^2$)

Significant Values $\chi^2 (\alpha)$ of $\chi^2$ Distribution Right Tail Areas

for Given Probability $\alpha$,

$$P = P_r (\chi^2 > \chi^2 (\alpha)) = \alpha$$

And is Degrees of Freedom (d.f.)

<table>
<thead>
<tr>
<th>Degree of freedom (v)</th>
<th>Probability (Level of Significance)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$0 = .99$</td>
</tr>
<tr>
<td>1</td>
<td>0.00157</td>
</tr>
<tr>
<td>2</td>
<td>0.0201</td>
</tr>
<tr>
<td>3</td>
<td>0.115</td>
</tr>
<tr>
<td>4</td>
<td>0.297</td>
</tr>
<tr>
<td>5</td>
<td>0.554</td>
</tr>
<tr>
<td>6</td>
<td>0.872</td>
</tr>
<tr>
<td>7</td>
<td>1.239</td>
</tr>
<tr>
<td>8</td>
<td>1.646</td>
</tr>
<tr>
<td>16</td>
<td>5.812</td>
</tr>
<tr>
<td>17</td>
<td>6.408</td>
</tr>
<tr>
<td>18</td>
<td>7.015</td>
</tr>
<tr>
<td>19</td>
<td>7.633</td>
</tr>
<tr>
<td>21</td>
<td>8.897</td>
</tr>
<tr>
<td>23</td>
<td>10.196</td>
</tr>
<tr>
<td>24</td>
<td>10.856</td>
</tr>
<tr>
<td>25</td>
<td>11.524</td>
</tr>
<tr>
<td>26</td>
<td>12.198</td>
</tr>
<tr>
<td>27</td>
<td>12.879</td>
</tr>
<tr>
<td>28</td>
<td>13.565</td>
</tr>
<tr>
<td>29</td>
<td>14.256</td>
</tr>
<tr>
<td>30</td>
<td>14.933</td>
</tr>
</tbody>
</table>

Note. For degrees of freedom (v) greater than 30, the quantity $\sqrt{2\chi^2} - \sqrt{2v-1}$ may be used as a normal variate with unit variance.
End Semester Examination, May 2019
B. Sc. (Information Technology) — Second Semester
BUSINESS ENVIRONMENT (7.106)

Time: 3 hrs. 
Max Marks: 50
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Explain the following:
a) Role of business in society.
b) Organization culture.
c) Relationship between demand and supply.
d) International business environment.
e) Foreign direct investment.

PART-A

Q.2 "Every business organization operates in a distinctive environment, as it can’t exist in isolation”. How does such an environment influence business and gets affected by its activities.

Q.3 How to do environmental analysis for business? Prepare an analysis report on the different product lines of big brands flourishing in the domestic or international markets.

Q.4 "If a business wants to be successful in the marketplace, it is necessary for them to understand which internal factors exert impact on the development of their company”. Explain the internal factors that affect the business.

PART-B

Q.5 The external environment can be broken down into two types: the micro environment and the macro environment. Explain the two in detail.

Q.6 What do you mean by the global context of business? Explain the various issues which should be considered by a business owner functioning globally.

Q.7 "Technological advancements” is an important tool for the successful growth of a business. Justify your answer with the help of an example.
Q.1  **Multiple choice question:**
   a) An association between three entities is called:
      i) Binary Relationship      b) Ternary Relationship
      ii) Recursive Relationship   d) None of these.
   b) What are components of E-R model?
      i) Entity                  ii) Attribute     iii) Relationship
      iv) All of these.
   c) 2NF is always in:
      i) 1 NF                     ii) BCNF         iii) NVD
      iv) None of these.
   d) The normalization process was developed by:
      i) E.F. Codd                ii) R.F. Boyce
      iii) R. Fagin              iv) Collin white.
   e) The expansion of BCNF is:
      i) Boyd-Codd normal form.   ii) Bounce Coromwell normal form.
      iii) BoyceCodd normal form  iv) None of these.

**Fill in the blanks:**
   f) SQL stands for ________________________________.
   g) DML stands for ________________________________.
   h) Two types of data dictionaries are ___________ and ____________.
   i) Command to delete table is _________________________.
   j) Key used for uniquely identify the table _________________.

**PART-A**

Q.2  a) Compare file oriented and database management systems with pros and cons.  
     ________________
     b) Explain three tier architecture of database management system with proper 
        example.  
     ____________________________

Q.3  a) Differentiate Hierarchial, Network and Relational data models with suitable 
     examples.  
     ____________________________
     b) What is the role of data dictionary in DBMS?  
     ____________________________

Q.4  a) Differentiate primary key, foreign key and unique key taking an example of 
     employee database.  
     ____________________________
     b) Differentiate between generalization and specialization.  
     ____________________________
     c) Write a command to edit and delete the records in the table.  
     ____________________________

**PART-B**

Q.5  What is Concurrency? How locks can be implemented to control the concurrency? 
     Discuss two phase locking protocol to remove the inconsistency.  
     ____________________________

Q.6  What is normalization? Why do we use it? Discuss 1 NF, 2 NF and 3 NF taking suitable 
     examples.  
     ____________________________

Q.7  a) What is the concept of data security and recovery? Differentiate authorization and 
     authentication taking suitable examples.  
     ____________________________
     b) Write a short note on ‘distributed database’.  
     ____________________________
End Semester Examination, May 2019
MCA – Fourth Semester
ANALYSIS AND DESIGN OF ALGORITHM (MCA-507A (CB))

Time: 3 hrs. Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Multiple choice questions:
   a) The worst case occur in linear search algorithm when:
      i) Item is somewhere in the middle of the array.
      ii) Item is not in the array at all.
      iii) Item is the last element in the array.
      iv) Item is the last element in the array or is not there at all.
   b) The Average case occur in linear search algorithm.
      i) When item is somewhere in the middle of the array.
      ii) When item is not in the array at all.
      iii) When item is the last element in the array.
      iv) When item is the last element in the array or is not there at all.
   c) The complexity of the average case of an algorithm is:
      i) Much more complicated to analyze than that of worst case.
      ii) Much more simpler to analyze than that of worst case.
      iii) Sometimes more complicated and some other times simpler than that of worst case.
      iv) None of above
   d) __________ is conceptually a top down approach for solving problems.
      i) Divide
      ii) Backtracking
      iii) Dynamic programming
      iv) Divide and Conquer
   e) According to Strassen’s method, the complexity of matrix multiplication is __________.

Short answer type questions:
   f) Define backtracking.
   g) How knapsack problem can be solved using greedy method?
   h) Explain the concept of travelling salesman problem.
   i) What are various strategies of branch and bound?
   j) Differentiate between trees and graphs.

PART-A

Q.2 a) What do you mean by Disjoint Set Union? Explain its algorithm with an example. 10
   b) Solve the knapsack problem using greedy method with no of inputs and capacity of bag 15. Profits and Weights are given below:
      \( n = 7 \ m = 15 \)
      \( (p_1, p_2, p_3, p_4, p_5, p_6, p_7) = (10, 5, 15, 7, 6, 18, 3) \)
      \( (w_1, w_2, w_3, w_4, w_5, w_6, w_7) = (2, 3, 5, 7, 1, 4, 1) \) 10

Q.3 a) Write the algorithm for Binary search. Analyze its complexity. 10
   b) Design the state space tree for merge sort with given list:
      23, 34, 12, 16, 17, 19, 2 10

Q.4 Explain Strassen’s matrix multiplication method. Also analyze its complexity. 20

PART-B
Q.5  a) Explain the algorithm of dynamic programming. Why dynamic programming is better than greedy method?  
    b) Create the ordered set for 0/1 knapsack problem using dynamic programming with \( n = 4 \) \( m = 6 \).

<table>
<thead>
<tr>
<th>Profit</th>
<th>1</th>
<th>2</th>
<th>5</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Q.6  a) Write the algorithm for Hamiltonian cycle and also explain its concept.  
    b) State and prove Cook's theorem.  

Q.7  How branch and bound is optimal to solve 0/1 knapsack? Generate the state space tree for both UFO and LC for the following data:

\[
\begin{align*}
N &= 4 & M &= 15 \\
P1 &= 10 & w1 &= 2 \\
P2 &= 10 & w2 &= 4 \\
P3 &= 12 & w3 &= 6 \\
P4 &= 18 & w4 &= 9 \\
\end{align*}
\]
End Semester Examination, May 2019
B. Sc. (Information Technology) – Sixth Semester
MOBILE COMMUNICATION (BSCA-602)

Time: 3 hrs.  Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Multiple choice questions.
   a) The process of transferring a mobile station from one base station to another is:
      i) MSC ii) Roamer
      iii) Hand off iv) Forward channel
   b) In ________ frequency Spectrum is divided into smaller spectra and is allocated to
      each user.
      i) TDMA ii) CDMA
      iii) FDMA iv) FGMA
   c) The shape of the cellular region for maximum radio coverage is:
      i) Circular ii) Square
      iii) Oval iv) Hexagon
   d) Which multiple access technique is used by IEEE 802.11 standard for wireless LAN?
      i) CDMA ii) CSMA/CA
      iii) ALOHA iv) None of the mentioned
   e) Co-channel reuse ratio depends upon
      i) Radius of the cell
      ii) Distance between the centers of the co channel cells
      iii) Frequency allocation of nearest cells
      iv) Both a and b
   f) In wireless LAN, there are many hidden stations so we cannot detect the
      i) Frames ii) Collision
      iii) Signal iv) Data
   g) IEEE 802.11 have three categories of:
      i) Frames ii) Fields
      iii) Signals iv) Sequences
   h) Wireless LANs implement security measures in the.
      i) Session Layers ii) Data Link Layers
      iii) Sub Layers iv) Application Layers
   i) The basic GSM is based on __________ traffic channels.
      i) Connection oriented. ii) Connection less.
      iii) Packet switching. iv) Circuit switching.
   j) In wireless ad-hoc network.
      i) access point is not required ii) access point is must
      iii) nodes are not required iv) None of these

PART-A

Q.2 a) Explain the working of wireless communication with the help of block diagram? Also
   discuss various generations of wireless communication. 6
   b) What are cellular networks? Explain with diagrams. 8
   c) Compare various multiple access schemes for cellular system. 6

Q.3 Explain GSM architecture in detail. What are main subsystems of GSM architecture? Also
   list the advantages and disadvantages of GSM communication. 20

Q.4 Write short notes on:
   a) Medium access control
b) VHR
   c) GPRS
   d) Radio interference

PART-B

Q.5  a) What is wireless LAN? Also discuss various advantages of LAN. 6
     b) Differentiate between Ad-hoc and Infrastructure networks. 6
     c) What are IEEE 802.11 wireless networks? Explain the architecture of IEEE 802.11 in detail. 8

Q.6  a) What is wireless application protocol? Explain its architecture in detail. 10
     b) Write short notes on:
        i) Palm OS.
        ii) Wireless markup language. 5×2

Q.7  a) What is kernel? Explain its features. Explain the process of memory management in detail. 10
     b) Illustrate the working of memory management? Describe its functionality in detail. 10
End Semester Examination, May 2019  
MCA – Fourth Semester  
CLOUD COMPUTING (MCA-406A (CB))

Time: 3 hrs.  
Max Marks: 100

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Multiple choice questions:

a) __________ refers to the location and management of the cloud infrastructures.
   i) Service  
   ii) Application  
   iii) Deployment  
   iv) All of the above

b) Which of the following cloud concept is related to pooling and sharing of resources?
   i) Virtualization  
   ii) Abstraction  
   iii) Polymorphism  
   iv) Sourcing

c) Cloud computing is __________ system and it is necessarily unidirectional in nature
   i) Stateless  
   ii) Stateful  
   iii) Reliable  
   iv) None of the above

d) If operating system and application stack is added to the cloud, then the model is called.
   i) IaaS  
   ii) PaaS  
   iii) SaaS  
   iv) All of the above

e) __________ serves as a PaaS vendor within Google App Engine system.
   i) Google  
   ii) Amazon  
   iii) Microsoft

f) Amazon Elastic cloud computing is a facility for quickly providing virtual servers. This is an example of:
   i) IaaS  
   ii) PaaS  
   iii) SaaS  
   iv) None of the above

Fill in the blanks:

g) Pods are aggregated into pools within an IaaS region or site called an __________ zone.

h) An example of public cloud is __________.

i) VIM is a management tool of __________.

j) Onion Encryption model helps in providing __________ to the cloud system.  
   2×10

PART-A

Q.2 Explain the following concepts of clouds:

a) Virtualization  

b) Abstraction  

c) SOA  

d) Characteristics of cloud  
   5×4

Q.3 a) Compare SaaS, PaaS and IaaS with respect to following factors:
   i) Consumers  
   ii) Services offered  
   iii) Service coverage  
   iv) Customization  
   2½×4

b) Compare public, private and hybrid cloud on the basis of services, cost, security and reliability.  
   10

Q.4 a) Explain the fundamental components introduced in cloud reference model. Also discuss the architecture of IaaS model with a suitable example.  
   12

b) What are the various ways through which we can connect to a cloud?  
   8

PART-B
Q.5  a) What is the use of onion Encryption layer in cloud computing? How is it useful in maintaining trust and reputation in cloud computing?  
    b) What is the use of homomorphic encryption? How crypt DB helps in the security concerns of a cloud.

Q.6  a) Write short notes on:
    i) Google App Engine 
    ii) Hadoop
    b) Compare AWS and Azure on the basis of following parameters:
    i) Compute 
    ii) Storage and databases 
    iii) Pricing 
    iv) Trouble shooting and monitoring 
    v) Uptime

Q.7  Explain (any two) application areas of cloud computing in detail.
    a) Scientific applications. 
    b) Business applications. 
    c) Consumer application.
End Semester Examination, May 2019
MCA – Fourth Semester
ARTIFICIAL INTELLIGENCE (MCA-404A (CB))

Time: 3 hrs. Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 a) List the steps of natural language processing.
b) Will depth first search algorithm always finds the optimal result? Why or why not?
c) Draw a neat diagram of knowledge pyramid.
d) Discuss the need of Bayesian Network.
e) Give an example of declarative knowledge.
f) What is a fuzzy set? Give example.
g) Mention the criteria for evaluation of search strategy.
h) Consider the following production rule:
   IF green THEN walk
   i) What is the antecedent of this rule?
   ii) What is the consequent of this rule?
i) Which blind search algorithm takes less memory (DFS/BFS)? Mention its space complexity also.
j) Give examples where machine learning can be applied. 2×10

PART-A

Q.2 a) Which of the following search algorithms are complete and which are optimal?
   • C = complete but not optimal
   • O = optimal but not complete
   • B = both complete and optimal
   • N = neither complete nor optimal
   i) ________ breadth-first search.
   ii) ________ depth-first search.
   iii) ________ best first search.
   iv) ________ hill climbing search. 10
b) Explain the state space with the use of 8 puzzle problem. 10

Q.3 Explain major inference rules in propositional calculus with the help of suitable examples. 20

Q.4 Consider the following sentences:
   • Tennis is a game and chess is a game.
   • John and Steve are students.
   • John plays tennis.
   • Steve plays everything that John plays.
   • Students who play tennis do not play chess.
Translate the above sentences into formulas in predicate logic. 20

PART-B

Q.5 Suppose you have a production system with the three rules:
R1: IF A, THEN E
R2: IF B AND F, THEN G
R3: IF C AND E, THEN F
and you have four initial facts: A, B, C, D.
a) Explain what is meant by “backward chaining” and show explicitly how it can be used to determine the truth, or otherwise, of fact G?
b) Explain what is meant by “forward chaining”, and show explicitly how it can be used in this case to determine new facts?

Q.6) Explain the following with reference to expert system:
   a) Expert system shell.
   b) Knowledge acquisition.  

Q.7) Discuss following:
   a) Procedural and declarative knowledge.
   b) Fuzzy logic.
   c) Machine learning.
   d) Neural network.

5×4
Q.1 Answer the following multiple choice questions/short answer questions:

a) To create your application on a remote server, which option will you choose in ASP.Net?
   i) File system ii) FTP iii) HTTPS iv) None of these

b) It is possible to display picture (i.e images) in HTML specification by using this tag:
   i) <GR src = Picture file> ii) <PIC src = Picture file> iii) <IMG src = Picture file> iv) <GIF src = Picture file>

c) File extension used for ASP.NET files:
   i) .Web ii) .ASP iii) .ASPX iv) None of these.

d) What is the correct HTML for making a checkbox?
   i) <checkbox> ii) <input type = “check box”/> iii) <input type = “check”/> iv) <check>

e) A web application can contain ___________.

f) If a user wants to create controls at runtime, which event should be used to write code?
   i) Preload ii) Load iii) Init iv) PreInit

g) Ajax stands for _____________.

h) _______ and _________ are key web service technologies.

i) _______ and _________ are the types of cookies in ASP.NET.

j) How can you open a link in a new browser window?
   i) <a href = “url” new> ii) <a href = “url” target “new”>
   iii) <a href = “url” target “blank”> iv) <a href = “url” target = “”> 1½x10

PART-A

Q.2 “Microsoft ASP.NET is an open source server side technology that enables programmers to build dynamic web files, web applications and web services.” Explain ASP.NET in detail along with its architecture. What are its 5 components? Explain with examples. 15

Q.3 a) Compare and contrast between server control and HTML control. 7

b) Write short notes on:
   i) Master Page.
   ii) Ajax. 4x2

Q.4 Explain the steps of connecting any control with the data source. 15

PART-B

Q.5 a) Create a webpage about the course details of a college:
   ABC Information Technology College,
Course details:
i) Complete course:
   - Basic computer training.
   - Diploma in computer application.

ii) Crash course:
   - Accounting course.
   - E-banking course.

iii) Other course:
   - Secretariat training
   - Photography training.

For more details visit abc college.com (create a link for abc college.com).

b) Differentiate between external and internal linking of a web page. Illustrate with the help of an example.

Q.6 Write short notes on:
   a) Grid view control.
   b) Detail view.
   c) Form view control.

Q.7 a) How to secure a website? Give various measures to secure a website.
   b) Differentiate between authentication and authorization.
End Semester Examination, May 2019  
BCA – Fourth Semester  
LEGAL AWARENESS RELATING TO IT (CA-GE-05(A))

Time: 2 hrs.  
Max Marks: 50  
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from Part-A and TWO questions from Part-B. Marks are indicated against each question.

Q.1 State whether the following statements are true or false. Give reasons:
   a) Can all the devices be hacked in today’s scenarios?
   b) Recognizing the right to access cyberspace is important.
   c) Avoid Trademark Infringement when you choose a domain.
   d) Cyber-crimes: are they extraditable offences?
   e) Computer and its impact on the society in increasing the rate of cybercrimes. 2x5

PART-A

Q.2 State the importance of cyber laws. Discuss its jurisprudence at International and Indian level. 10

Q.3 a) Differentiate between Intellectual Copyright and Patent. 5
    b) State the objectives of International telecommunication Union. 5

Q.4 Explain the IT Act 2000 write its salient features and the offences under IT Act, 2000. 10

PART-B

Q.5 How computer can be used as a weapon for spreading cybercrime? Explain the different types of cybercrimes. 10

Q.6 Write short notes on the following:
   a) Commonwealth of Nations. 5x2
   b) Asia pacific Economic Cooperation.

Q.7 Discuss the several constitutional and human right issues in cyberspace. What provisions are required to enforce them? 10
End Semester Examination, May 2019
B. Sc. (Information Technology) - Sixth Semester
PROGRAMMING WITH JAVA (BSCA-603)

Time: 3 hrs Max Marks: 100
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from Part-A and TWO questions from Part-B. Each question carries equal marks.

Q.1 Multiple choice questions:
   a) What is the O/P of relational operators?
      i) Integer   ii) Boolean   iii) Character   iv) Double.
   b) Which of these are relation statements in Java?
      i) For   ii) If   iii) Continue   iv) Break
   c) The while loop repeats a set of code while the condition is not met?
      i) True   ii) False.
   d) Which of the following classes can catch all exception which cannot be caught?
      i) Runtime   ii) Error   iii) Exception   iv) None.
   e) Which method is part of AWT?
      i) Display   ii) Paint   iii) Drawstring   iv) None.
   f) Which keyword can be used to prevent method overriding?
      i) Static   ii) Constant   iii) Protected   iv) Final
   g) What is the return types of a method that does not return any value?
   h) “Basic java language functions are stored in java language”.
   i) “Start ( ) method is used to begin the execution of thread”.
   j) “++ symbol has highest precedence”.

State whether the following statements are true or false:

h) “Basic java language functions are stored in java language”.
   i) “Start ( ) method is used to begin the execution of thread”.
   j) “++ symbol has highest precedence”.

PART-A

Q.2 a) Differentiate between Java, C and C++.
   b) Why java is called platform independent language?
   c) Write short note on JVM.

Q.3 a) Explain various Repetitive statements available in Java. Give examples of each.
   b) Write a program in java to find sum of natural numbers.

Q.4 a) What are constructors? Discuss its features. Also write java program for parameterized constructor.
   b) Write short note on static member.

PART-B

Q.5 Define ‘Inheritance’. Discuss various types of Inheritance available in Java. Give a suitable example of each type.

Q.6 Define 'Multithreading'. What is the need of it? Discuss thread life cycle in detail with block diagram.

Q.7 a) What is the difference between Applet and Application?
   b) Write short notes on the following:
      i) Parameters to applet.
      ii) Paint ( ) method.
End Semester Examination, May 2019
B. Tech. – Second Semester
PHYSICS (INTRODUCTION TO ELECTROMAGNETIC THEORY)
(BSC-PH-101)

Time: 3 hrs. Max Marks: 100
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer the following questions:
   a) Define electric field intensity and electric potential.
   b) Write Poisson's and Laplace equations.
   c) Differentiate between dielectrics and insulators.
   d) Explain free charges and bound charges in polarization.
   e) Explain the term magnetostatics.
   f) What is the origin of magnetic vector potential?
   g) What is meant by linear magnetic materials?
   h) Derive relation between magnetic susceptibility and relative permeability.
   i) Write Maxwell's equations in vacuum.

PART-A

Q.2 a) Derive the expression for divergence of electrostatic field and give it's physical significance.
   b) Determine the electric field and electric potential due to a point charge above a grounded conducting plane using method of images.
   c) Explain why potential gradient is a vector quantity.

Q.3 a) Calculate the electric potential and electric field intensity due to a dipole at a point inclined at some angle.
   b) Derive the boundary conditions for static electric field across a boundary separated by two different dielectric media.

Q.4 a) Calculate the value of magnetic field at a point due to a long current carrying wire using Bio-savart's law.
   b) State and derive the divergence of static magnetic field.
   c) Derive magnetic vector potential in terms of current densities.

PART-B

Q.5 a) Define magnetization. Derive an expression for vector potential in terms of surface bound current and volume bound current.
   b) Write a note explaining Faraday's law, Lenz's law and motional emf.

Q.6 a) Derive the continuity equation for charge conservation. What does it signifies?
   b) State and prove Poynting theorem. Explain the term poynting vector.

Q.7 a) Calculate reflection and transmission coefficients for electromagnetic wave, when it travels from one medium to another provided the mediums are nonmagnetic.
   b) Solve Maxwell's equations to obtain electromagnetic wave equations for E and B in free space.
   c) Show that the electromagnetic waves are transverse in nature.
End Semester Examination, May 2019
B. Tech. – Second Semester
SEMICONDUCTOR PHYSICS (BSC-PH-104)

Time: 3 hrs.  Max Marks: 100
No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

**Q.1**
  a) What is density of states?
  b) Give one example of direct and indirect band gap semiconductor.
  c) Where is the Fermi level located in n-type semiconductor at OK?
  d) What is the order of the forbidden energy gap in case of silicon and germanium?
  e) Differentiate between spontaneous and stimulated emission.
  f) Give the full form of SLED and ELED.
  g) Distinguish between photoemissive and photoconductive type photodetectors.
  h) Define the term photoconductivity.
  i) What for DLTS is used?
  j) Give the uses of capacitance voltage method.

**PART-A**

**Q.2**
  a) Derive the expression for conductivity of metals on the basis of Drude’s model.  10
  b) Draw E-K diagram and bring out its useful information.  6
  c) Write short notes on occupation probability.  4

**Q.3**
  a) Derive an expression for the intrinsic carriers concentration in an intrinsic semiconductor.  12
  b) Why are some semiconductor materials suitable for optoelectronic devices? Explain in detail.  8

**Q.4**
  a) Derive an expression for the density of states for photons.  10
  b) If light is incident on a semiconductor, obtain the conditions for optical loss and gain.  10

**PART-B**

**Q.5**
  a) Differentiate between radiative and non-radiative recombination.  6
  b) Discuss homo junction Light Emitting Diode (LED) giving the reasons for losses of emitted photons.  10
  c) List the figure of merits of light emitting diode.  4

**Q.6**
  a) Explain the structure, working principle and characteristics PIN diode.  10
  b) What is a solar cell? Describe its construction, working and characteristics.  10

**Q.7**
  a) Derive suitable expression and explain the Van der Pauw and four-point probe measurement for the carrier density of a semiconductor.  10
  b) What do you mean by band gap? How we can find out the band gap of semiconductor using UV-Vis spectroscopy?  10
End Semester Examination, May 2019
BCA – Sixth Semester
SOCIAL MEDIA NORMS AND ETIQUETTES (CA-GE-07A)

Time: 3 hrs. Max Marks: 50
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Write short answer questions:
   a) Use of social media in job search.
   b) E-mail etiquettes.
   c) Role of social media analytics.
   d) Social networking crimes.
   e) Usage of youtube as a social media platform. 2×5

PART-A

Q.2 Discuss various social media platforms. 10
Q.3 Give an introduction of social networking. How will you differentiate social networking from social media? 10
Q.4 Write short notes on:
   a) E-mail etiquettes.
   b) Professional etiquettes. 5×2

PART-B

Q.5 Many social media crimes prevail the social world today. Name the common types of social media crimes. How do they affect the professional and personal life of a person? 10
Q.6 Social Networking laws in India are regulated by the information technology Act, 2000. As per IT Act 2000, explain online copyright violations in India and cyber due diligence in India. 10
Q.7 Write short notes on the following:
   a) Social media monitoring for brands.
   b) Social media measurement. 5×2
End Semester Examination, May 2019
B. Sc. (Information Technology) – Sixth Semester
SOCIAL MEDIA NORMS AND ETIQUETTES (CA-GE-31)

Time: 3 hrs
Max Marks: 50
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from Part-A and TWO questions from Part-B. Each question carries equal marks.

Q.1 Explain the following concepts of social media (Attempt any two):
   a) Blogging.
   b) Social networking.
   c) Social media etiquettes.
   d) Cyber media advertisement.
      5x2

PART-A

Q.2 a) Differentiate social customer service environment from social marketing environment? Support your answer with example.
     5
   b) Discuss strategies for listening and talking within outline communities with suitable example.
     5

Q.3 a) “Social media is becoming threat an social propriety”. Justify this statement with logic and facts.
     5
   b) Differentiate social networking from social media.
     5

Q.4 “You have started a business and you want to do publicity on social media.” Which social media option you will use for it twitter, Facebook, LinkedIn, integral, Google+ or any other and why? Support your answer with real time facts.
     10

PART-B

Q.5 a) Suggest some good tools for marketing on social media.
     5
   b) Discuss online copyright infringement liability limitations Act. (OCILLA).
     5

Q.6 a) What are different social media measurement tools? Give example.
     5
   b) How to monitor social media for different brands?
     5

Q.7 Write short notes on:
   a) Social networking crime.
   b) FB edgerank.
      5x2
Q.1 a) Expand $\cos x$ in powers of $x$. 

b) If $x = r \cos \theta$ and $y = r \sin \theta$, show that $\frac{\partial (x, y)}{\partial (r, \theta)} = r$.

c) Evaluate $\Gamma\left(-\frac{1}{2}\right)$.

d) Evaluate: $\int_0^x \cos^4 x \, dx$.

e) Give the negation of the following statements.
   i) $p : 2 + 3 > 1$
   ii) $q : \text{It is cold}$

f) The truth value of given statement is:
   '4 + 3 = 7 or 5 is not prime'.
   i) False  ii) True

g) If $A = \{a, e, i, o, u\}$ and $B = \{i, a, o, e, u\}$. Is $A \subseteq B$ or $B \subseteq A$ or both?

h) Let $A = \{3, -6\}$ and $B = \{x : x^2 + 3x - 18 = 0\}$. Is $A = B$?

**PART-A**

Q.2 a) Find the graph that has the following adjacency matrix:

\[
\begin{bmatrix}
0 & 0 & 1 & 1 \\
1 & 0 & 2 & 0 \\
2 & 1 & 0 & 0 \\
1 & 1 & 0 & 0
\end{bmatrix}
\]

b) Find the complement of the graph shown below:

![Graph Diagram]

Q.3 Find the shortest path from $s$ to $t$ and its length for the given below:

![Path Diagram]
Q.4  
(a) Show that the argument
\[ p \rightarrow q \] is valid.
\[ \therefore q \]  
(b) Form the disjunction of \( p \) and \( q \) for each of the following:

i) \( p : 2 \) is a positive integer \( q : \sqrt{2} \) is a rational number

ii) \( p : 2 + 3 = 5 \) \( q : \) London is capital of France

Q.5  
Find truth value of each proposition if and only if \( p \) and \( r \) true and \( q \) is false.

(a) \( p \lor q \lor r \)  
(b) \( p \land (\lnot q \lor \lnot r) \)

**PART-B**

Q.6  
(a) Test the function \( f(x, y) = x^3 y^2 (6 - x - y) \) for maximum and minimum for points not at the origin.  
(b) If \( x^r + y^r = a^b \) find \( \frac{dy}{dx} \).

Q.7  
(a) Expand \( f(x, y) = \tan^{-1} \left( \frac{y}{x} \right) \) in the neighborhood of \((1, 1)\) upto third degree terms.  
Hence compute \( f(1.1, 0.9) \) approximately.  
(b) If \( u = xyz, v = xy + yz + zx, w = x + y + z \) compute \( \frac{\partial (u, v, w)}{\partial (x, y, z)} \).

Q.8  
(a) Evaluate \( \int\int x^2 y^2 \, dx \, dy \) over the circle \( x^2 + y^2 \leq 1 \).

(b) Change the order of integration \( \int_0^1 \int_y \sqrt{y} \, dx \, dy \).

Q.9  
(a) Find the volume of the sphere \( x^2 + y^2 + z^2 = 1 \) by double integration.

(b) Prove that \( \beta(m, n) = 2 \int_0^{\pi/2} \sin^{2m-1} \theta \cos^{2n-1} \theta \, d\theta \).
End Semester Examination, May 2019  
BCA – Fifth Semester  
DATA COMMUNICATION AND NETWORKING (BCA-501 (CB))

Time: 3 hrs.  
Max Marks: 100  
No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

**Q.1** Multiple choices questions/short answer questions:

a) MIME stands for _________.

b) A set of rules that govern all aspect of information communication is called ______.

c) A bridge can:
   i) Filter a frame
   ii) Forward a frame
   iii) Extend a LAN
   iv) All of these.

d) ______ is often used for navigation purpose.
   i) AMPS
   ii) IS-95
   iii) Iridium
   iv) GPS

e) Which is a legal port address?
   i) 0
   ii) 513
   iii) 65,535
   iv) All of the these

f) IP header six is:
   i) 20 to 60 byte long
   ii) 20 byte long
   iii) 60 byte long
   iv) Depends on MTU

g) The ______ layer is closest to transmission medium.

h) If the bandwidth of a signal is 5 khz and the lowest frequency is 52 khz. What is the highest frequency?
   i) 5 Khz
   ii) 10 KHz
   iii) 47 KHz
   iv) 57 KHz

i) Limitation of star topology is __________.

j) CRS stands for __________.  

**2x10**

**PART-A**

**Q.2**

a) Define the term topology. Explain the advantages and disadvantages of each topology in detail.  

b) What are the advantages of digital transmission? How digital to analog modulations can be accomplished?  

**Q.3**

Why OSI model is called as open system Interconnection? Explain the function of each layer of OSI model in detail.  

**Q.4**

a) Explain the major classes of guided media. Also discuss how guided media differs from unguided media?

b) Define Multiplexing. Explain the various multiplexing techniques that allow the transmission of multiplex signals across a single data link.  

**PART-B**

**Q.5**

Write short notes on:

a) Telnet  
b) POP  
c) SMTP  
d) DNS  

**5x4**

**Q.6**

a) Explain the architecture of IEEE 802.11.  

b) How communication can be achieved from one point on the earth to another? Justify.  

**Q.7**

a) Explain IPV6 addressing mechanism in detail.

b) Explain the architecture of Bluetooth with the help of a diagram.  

**10**
End Semester Examination, May 2019
BCA (Bachelor of Computer Application) – Fifth Semester
JAVA PROGRAMMING (BCA-5002)

Time: 3 hrs.                                Max Marks: 75
Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from
Part-A and TWO questions from Part-B. Marks are indicated against each question.

Q.1 Give short answers to the following:
a) What is the relevance of triple shift operator?
b) What is the difference between protected and default?
c) What is polymorphism?
d) What is importance of creating static functions?
e) Explain function overriding.

PART-A

Q.2 With suitable illustration, discuss the following:
a) Selection control structures. 
b) Repetition control structures.

Q.3 What is an object? Explain the importance of methods in object oriented programming.
Describe the general form of a class and declaring objects.

Q.4 a) What are the differences between a constructor and parameterized constructor?
b) Write short notes on access protection.

PART-B

Q.5 Write short notes on the following:
a) Try-catch. 
b) Throws. 
c) Throw.

Q.6 What is a package? How are package important? Write a program to import a class from another package.

Q.7 Explain the life cycle of an Applet in details. Create an Applet and write html code to display it.
End Semester Examination, May 2019  
BCA – Fifth Semester  
DATA COMMUNICATION AND NETWORKING (BCA-501A (CB))

Time: 3 hrs.  
Max Marks: 100  
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from Part-A and TWO questions from Part-B. Each question carries equal marks.

Q.1 Multiple choice questions:

a) Most packet switches use this principle:
   i) Stop and Wait.
   ii) Store and forward.
   iii) Both Stop and wait and store and forward.
   iv) None of the mentioned.

b) In ___________ resources are allocated on demand.
   i) Packet switching.  
   ii) Circuit switching.
   iii) Line switching.  
   iv) Frequency switching.

c) In IPv4 Addresses, classful addressing in replaced with:
   i) Classless Addressing.
   ii) Classful Addressing.
   iii) Classful Advertising.
   iv) Classless Advertising.

d) ATM uses the:
   i) Asynchronous frequency division multiplexing.
   ii) Asynchronous time division multiplexing.
   iii) Asynchronous space division multiplexing.
   iv) None of the mentioned.

e) Frame relay has error detection at the:
   i) Physical layer. 
   ii) Data link layer.
   iii) Network layer.
   iv) Transport layer.

f) Two broad categories of congestion control are:
   i) Open-loop and Closed-loop.
   ii) Open-control and Closed-control.
   iii) Active control and Passive control.
   iv) None of the mentioned.

g) Two devices are in network if:
   i) A process in one device is able to exchange information with a process in another device.
   ii) A process is running on both devices.
   iii) PIDs of the processes running of different devices are same.
   iv) None of the mentioned.

h) In the layer hierarchy as the data packet moves from the upper to the lower layers, headers are:
   i) Added.  
   ii) Removed.  
   iii) Rearranged.  
   iv) Modified.

i) Physical layer provides:
   i) Mechanical specifications of electrical connectors and cables.
   ii) Electrical specification of transmission line signal level.
   iii) Specification for IR over optical fiber.
   iv) All of the mentioned.

j) Application layer offers ___________ service.
   i) End to end.
   ii) Process to process.
   iii) Both End to end and Process to process.
   iv) None of the mentioned.

Write short notes of following:

k) Framing.
Bluetooth technology.

PART-A

Q.2
a) How topologies help in setting a network? Explain any five topologies with the help of a diagram.

b) What do you mean by data communication? Explain its components and characteristics of data communication.

Q.3
a) Explain different type of switching techniques.

b) Write short note on the following:
   i) Cable TV Networks
   ii) Guided and Unguided Medium.

Q.4
a) Explain TCP/IP model. How it is different from OSI mode. Explain.

b) Data is transmitted as 1011110 and received as 1011100. Using haming code detects the error and gives method for obtaining correct sequence.

PART-B

Q.5
a) Differentiate between following:
   i) IPV4 and IPV6

b) Write short note on following:
   i) User Datagram Protocol
   ii) Congestion Control.

Q.6
Explain token bus. How token is being passed in token ring architecture? Also explain the frame format of the token bus.

Q.7
Write short note on following:
   a) ALOHA
   b) Frame Relay
   c) CSMA/CD
   d) Standard Ethernet.
Q.1 Multiple choice / shorts answer questions:
   a) Which of the following is not a major component of any information system?
      i) Applications ii) Information Technology iii) People iv) The Company
   b) Which of the following are operating systems and which are applications: Microsoft Excel, Google Chrome, Junes, windows, Android, Angry Birds.
   c) Which came first, the Internet or the World Wide Web?
   d) What is an ERP system?
   e) How is data organized in a spreadsheet?
      i) Lines and spaces ii) Layers and planes iii) Rows and columns iv) Height and width
   f) Which one is not a part of a computer system?
      i) Motherboard ii) CPU iii) Keyboard iv) Scanner
   g) Dot Matrix is a type of ___________.
   h) State two characteristic of Database.
      i) _______ and ________ types of Database systems.
   j) State any two ethical issues related to Information system. 2X10

PART-A

Q.2 "An information system is a system that comprises a set of interrelated elements that transform data into information” with the help of which resources, does an information system collect and organize the information? Do they face any risks? Name a certain specialized information systems. 20

Q.3 Write short notes on:
   a) Light pen and touch screen.
   b) Secondary storage devices.
   c) System units used in measurement of memory.
   d) Ports and various types. 5x4

Q.4 a) “Telecommunications is the exchange of information over significant distances by electronic means”. Explain the process telling how telecommunication takes place. What are the basic elements of telecommunications? 10
   b) “Multiplexing is the set of technique that allow the simultaneous transmission of multiple signals”. Write a note on multiplying and its various types. 10

PART-B

Q.5 a) Differentiate between traditional commerce and E-commerce. 10
   b) “ERP systems have been widely adopted in large organizations to store critical knowledge used to make the decisions that drive the organization’s performance.” Explain ERP with its benefits and limitations. 10

Q.6 Differentiate between data and Data management systems. What are the various types of database systems? 20

Q.7 What does the term Intellectual Property mean? What are the major forms of IP? Explain any two in detail. 20
End Semester Examination, May 2019
B. Tech. – First Semester
MATHEMATICS-I (BSC-MA-102)

Time: 3 hrs.
Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt ANY TWO questions from
PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1  a) Evaluate: \[
\int_0^{\frac{\pi}{2}} \sin^3 x \cos^2 x \, dx
\]

b) Evaluate: \[
\int_0^{\frac{\pi}{2}} \sqrt{\tan \theta} \, d\theta
\]

c) Find the maximum and minimum value of the function: \( f(x) = x^3 - 3x + 2 \).

d) If in Cauchy’s mean value theorem, \( f(x) = e^x \) and \( g(x) = e^{-x} \), show that \( c \) is the
arithmetic mean between \( a \) and \( b \).

e) Test the convergence of the series: \[
\sum_{n=1}^{\infty} (-1)^n \frac{n}{n^2 + 1}
\]

f) What is the half range sine series for \( f(x) = k \) in \((0, 2)\)

g) If the vector \( \vec{F} = \left(ax^2 + yz\right)\hat{i} + \left(xy^2 - xz^2\right)\hat{j} + \left(2xyz - 2x^2y^2\right)\hat{k} \) is solenoidal, find
the value of \( a \). Find also the curl of this solenoidal vector.

h) If \( u = \sin^{-1}\left(\frac{x + 2y + 3z}{\sqrt{x^2 + y^2 + z^2}}\right) \), show that \( x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} + z \frac{\partial u}{\partial z} + 3\tan u = 0 \).

i) Find the sum and product of the Eigen values of
\[
\begin{pmatrix}
1 & 2 & 3 \\
2 & 4 & 6 \\
3 & 6 & 9 \\
4 & 8 & 12 \\
5 & 10 & 15 \\
-1 & -2 & -3
\end{pmatrix}
\]

j) Find the rank of the matrix:
\[
\begin{pmatrix}
1 & 2 & 3 \\
2 & 4 & 6 \\
3 & 6 & 9 \\
4 & 8 & 12 \\
5 & 10 & 15 \\
-1 & -2 & -3
\end{pmatrix}
\]

PART-A

Q.2  a) Derive an expression for the relationship between Beta and Gamma function.

b) Find the volume of the solid obtained by revolving the ellipse \( \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \) about
x-axis.

Q.3  a) Find the maximum and minimum values of \( 10x^6 - 24x^5 + 15x^4 - 40x^3 + 108 \).

b) Expand \( f(x) = \log(1 + x), \forall x \in [-1, 1] \).
Q.4  
a) Test for the convergence of the series: \( \sum_{n=2}^{\infty} \frac{\sqrt{n}}{n^2 + 1} \).  

b) Obtain a half-range sine series for: 
\[
 f(x) = \begin{cases} 
 x, & 0 \leq x \leq \frac{\pi}{2} \\
 \pi - x, & \frac{\pi}{2} \leq x \leq \pi
\end{cases}
\]

**PART-B**

Q.5  
a) If \( \frac{x^2}{a^2 + u} + \frac{y^2}{b^2 + u} + \frac{z^2}{c^2 + u} = 1 \), prove 
\[
 \left( \frac{\partial u}{\partial x} \right)^2 + \left( \frac{\partial u}{\partial y} \right)^2 + \left( \frac{\partial u}{\partial z} \right)^2 = 2 \left( x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} + z \frac{\partial u}{\partial z} \right).
\]

b) Find the directional derivative of the function \( f = x^2 - y^2 + 2z^2 \) at the point \( P(1, 2, 3) \) in the direction of the line PQ where Q is the point \( (5, 0, 4) \).

Q.6  
a) Investigate the value of \( \lambda \) and \( \mu \) so that the equations:
\( x + y + z = 6; x + 2y + 3z = 10; x + 2y + \lambda z = \mu \)
have
i) No solution,
ii) Unique solution and
iii) An infinite number of solutions.

b) Find the Eigen values and Eigen vectors of the matrix: 
\[
 A = \begin{bmatrix} 
 4 & 2 & -2 \\
 -5 & 3 & 2 \\
 -2 & 4 & 1 
\end{bmatrix}
\]

Q.7  
a) Let \( r^2 = x^2 + y^2 + z^2 \) and \( V = r^m \), prove that \( V_{xx} + V_{yy} + V_{zz} = m(m+1)r^{m-2} \).

b) Find the characteristic equation of the matrix \( A = \begin{bmatrix} 
 2 & 1 & 1 \\
 0 & 1 & 0 \\
 1 & 1 & 2 
\end{bmatrix} \). Also find the matrix representation.
End Semester Examination, May 2019
B. Tech. — First Semester
MATHEMATICS-I (BSC/MA/CS-103)

Time: 3 hrs.
Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt ANY TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer the following questions:

a) Evaluate the improper integral \( \int_{a}^{1} e^{x}dx \).

b) Prove that \( \int_{0}^{1} = \sqrt{p} \).

c) Determine \( \lim_{x \to a} (x - a) \).

d) Find \( n^{th} \) derivation of \( y = \log(ax + b) \).

e) Find inverse of \( A = \begin{bmatrix} 1 & 0 & \hat{u} \\ \hat{e} & 3 & 4 \hat{u} \end{bmatrix} \).

f) Find rank of \( A = \begin{bmatrix} 2 & 3 \hat{u} \\ \hat{e} & 2 & \hat{u} \end{bmatrix} \).

g) Prove that \( L : R^{2} \otimes R \) defined by \( L(x,y) = x_{1} + x_{2} \) is linear transformation.

h) Prove that \( \{ v \} \) is L.D. iff \( v = 0 \).

i) Prove that product of two orthogonal matrices is again orthogonal.

j) Explain composition of two maps.

\[ 2\times10 \]

PART-A

Q.2 a) Show that \( B(m,n) = \int_{0}^{1} \frac{e^{x}}{(1+x)^{m+n}} dx. \)

b) Obtain the surface area of a sphere of radius “a”.

c) Find the volume of a solid obtained by revolving an arc of the cycloid

\[ B(m,n) = \int_{0}^{1} \frac{x^{m-1}}{(1+x)^{m+n}} \] about x-axis.

\[ 6 \]

Q.3 a) Verify Rolle’s theorem for \( f(x) = x(x + 3)e^{-x} \) in \([ 3, 0]\).

b) Investigate for maximum and minimum values of the function given by

\[ y = \sin x + \cos 2x. \]

\[ 7 \]

c) Show that \( g \in R; \) \( \cos x = 1 - \frac{x^2}{21} + \frac{x^4}{41} - \cdots (-1)^{n+1} \frac{x^{2n}}{(2n)!}(\frac{1}{2x+1})\sin (qx). \]

\[ 7 \]

Q.4 a) Determine for what values of \( l \) and \( m \) the following equations have no solution, a unique solution and infinite solutions:

\[ x + y + z = 6, \quad x + 2y + 3z = 10, \]

\[ x + 2y + l z = m \]

\[ 10 \]

b) Solve by Gauss Jordan method:

\[ x + y + z = 2, \quad 2x + y - 3z = 5, \]

\[ x + y + 2z = 3 \]

\[ 10 \]

PART-B
Q.5  
   a) Show that \( B = \{(1, 2, 1), (1, -1, 1), (0, 1, 1)\} \) is a basis of \( \mathbb{R}^3 \).
   
   b) Verify rank nullity theorem for linear transformation \( T: \mathbb{R}^2 \oplus \mathbb{R}^3 \) defined by
   \[ T(x, y) = (x + y, x - y, y). \]

Q.6  
   a) Find the distance from the point \( y = (0, 0, 0, 1) \) to the subspace \( \mathbb{R}^4 \) spanned by vectors \( x_1 = (1, -1, 1, -1) \), \( x_2 = (1, 1, 3, -1) \) and \( x_3 = (-3, 7, 1, 3) \) by Gram Schmidt Orthogonalization process.
   
   b) Find all Eigen values and Eigen vectors of the matrix
   \[
   \begin{pmatrix}
   4 & 2 & -2 & 0 \\
   -5 & 3 & 2 & 0 \\
   -2 & 4 & 1 & 0 \\
   \end{pmatrix}
   \]

Q.7  
   a) Prove that the system of vectors \( \{(1,2, -3), (1, -3, 2), (2, -1, 5)\} \) of \( V_3(\mathbb{R}) \) is linearly independent.
   
   b) Prove that sum of two symmetric matrices is also a symmetric matrix.
Q.1 Answer the following questions:
   a) With the help of a diagram, discuss the concept of spontaneous emission of radiation?
   b) Population inversion in Laser plays an important role. How it can be achieved in practice.
   c) Optical fibres have more merits than copper cables. Justify your answer.
   d) In an optical fibre, give the importance of V-number.
   e) Explain the gain factor of a photoconductor.
   f) Silicon solar cell is illuminated with light, the value of $V_m/V_{OC}=.90$ and $I_{SC}=2mA$. If the fill factor of the solar cell is 075, calculate the value of $I_m$.
   g) Draw the planes for given Miller Indices (111), (110), (020), (101).
   h) With the help of a diagram explain primitive cell?
   i) Out of X-rays and light rays, which one are used to detect crystal structure and why?
   j) For building nanomaterials, describe top-down and bottom-up approaches

**PART-A**

Q.2 a) Briefly explain Einstein’s coefficients and derive the relations between them.  
   b) Holography is different than photography. How? Discuss the process of construction of a hologram.

Q.3 a) Optical fibres can be classified on the basis of the refractive index and modes of propagation. Discuss this classification in details.
   b) Discuss different types of losses in an optical fibre.
   c) A glass cladding fibre is made with the core glass of refractive index 1.5 and the cladding is doped to give a fractional index difference of 0.0005. Determine the cladding index and numerical aperture.

Q.4 a) State the principle of photoconductive cell. Describe its construction, working and applications.
   b) Discuss the modified model to show the effect of traps on the photoconductivity.

**PART-B**

Q.5 a) Distinguish between amorphous and crystalline materials. Show that c/a ratio for HCP crystal structure is $(8/3)^{1/2}$.
   b) What is packing fraction? Calculate packing fraction of sc, bcc, fcc and hcp structures.

Q.6 a) X-rays are one of the very important electromagnetic radiations. Describe their origin, production and properties.
   b) Briefly explain Raman Spectroscopy.
   c) The angle of reflection of monochromatic X-rays for a crystal whose atomic spacing is $2.0\text{Å}$ is $30^0$. Calculate the wavelength of X-rays.

Q.7 a) Describe chemical vapour deposition and Ball milling methods for fabrication of nano materials.
b) Differentiate between single and double walled carbon nanotubes. Give any six applications of nanotubes.
Q.1 a) Is scalar quantity changed under the rotation transformation?
b) Write the expression for velocity in spherical polar coordinates.
c) Give two examples each of conservative and non-conservative forces.
d) What are central forces?
e) What do you understand by non-inertial frames of reference?
f) What is Foucault pendulum?
g) What do you mean by simple harmonic motion?
h) Write the equation of motion of forced damped oscillator.
i) Is the velocity of a particle under uniform rotational motion constant?
j) Explain the three-dimensional motion of a rigid body.

PART-A

Q.2 a) Discuss the Newton’s laws and its completeness in describing particle motion. 8
b) Explain the invariance of Newton’s second law. 8
c) Write short note on constraints. 4

Q.3 a) Show that for a conservative force field \( \mathbf{F}(r) \), i.e. \( \nabla \cdot \mathbf{F} = 0 \), we can define a scalar function \( V(r) \) such that \( \mathbf{F} = -\nabla V \). 8
b) Write a short note on the law of conservation of angular momentum and its importance in Physics. 6
c) Explain in detail about elliptical orbit 6

Q.4 a) Calculate the fictitious acceleration of the sun relative to a reference frame fixed on the surface of the earth. 10
b) Discuss in detail about weather systems. 6
c) Write short note on Coriolis force. 4

PART-B

Q.5 a) Write differential equation for a damped harmonic oscillator. Solve the differential equation and discuss the case of under damped (low damping) 16
b) Discuss the sharpness of resonance. 4

Q.6 a) What is the difference between rectilinear and rotational motion? 4
b) Show that for a rigid body the angular momentum about the axis of rotation is equal to the product of moment of Inertia about that axis and angular velocity. 10
c) Discuss the Kinematic of rigid body motion. 6

Q.7 a) Evaluate the expression for rate of change of a vector rotating with angular velocity. 10
b) Calculate the components of angular momentum by taking the rigid body to be rotating in the principal axes frame frozen temporarily at a given instant. 10
Q.1 Multiple choice questions:
   a) VGA is:
      i) Video graphics array
      ii) Volatile graphics array
      iii) Visual graphics array
      iv) Video graphics adapter
   b) Where the programme and data are stored, when the processor uses them.
      i) Main memory
      ii) Disk memory
      iii) Secondary memory
      iv) Programme memory
   c) Which part of the computer performs arithmetic calculations?
      i) ALU
      ii) Registers
      iii) Logic bus.
   d) Which of the following is not an application software?
      i) Word processor
      ii) Spread sheet
      iii) Operating system
      iv) Browser
   e) A computer program the converts assembly language to machine language:
      i) Compiler
      ii) Interpreter
      iii) Assembler
      iv) Comparator
   f) A nibble is of:
      i) One bit
      ii) Four bit
      iii) Eight bit
      iv) Ten bit
   g) A laser printer does not use:
      i) A print head
      ii) A laser beam
      iii) A photo conductive drum
      iv) None of the above.
   h) A computer can only understand machine language and no other language.
      i) True
      ii) False
   i) Logical errors are defected by compliers.
      i) True
      ii) False
   j) Operating system is an application software.
      i) True
      ii) False

Q.2
   a) Differentiate between UVEPROM and EEPROM.  
   b) In terms of hardware, discuss what are the components that can be responsible to speed up your computer systems.

Q.3
   a) Compare the features of C, C++ and Java languages.
   b) What do you understand by pure object oriented languages and its importance.

Q.4
   a) Write a short note:
      i) User Authentication.
      ii) Open Source Software.
      iii) Encryption Techniques.
b) Which is good to convert source code to machine code, an interpreter or compiler? Justify.

**PART-B**

Q.5  a) Differentiate between program testing and program debugging.  
     b) What do you understand by program designing approach? What are the advantages of a good program designing.

Q.6  Differentiate between an algorithm and a flow chart. Write an algorithm for a problem in which N numbers are read and it is desired to pick the largest of them.

Q.7  a) In your opinion, which approach is better, a top down approach or a bottom up approach? Explain by comparing both.
     b) What is structured programming and how a programmer can achieve it?
End Semester Examination, May 2019
MCA—First Semester
PRINCIPLE OF MANAGEMENT (MCA-107CB)

Time: 3 hrs. Max Marks: 100
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer the following questions:
   a) Explain any four roles of manager
   b) “Staffing is a part of human resource management.” Comment on the given statement.
   c) “Though management is a science, it is not an exact science like physics; chemistry etc. It is a social science.” Do you agree with this statement? Give your opinion.
   d) What are the factors that affect the controlling process? 4×5

PART-A

Q.2 a) Explain the principles of management given by Henry Fayol 10
   b) Management of a modern business organization is a complex process. What are the various functions performed by the Management? 10

Q.3 Define the concept of planning. Elaborate various steps involved in the planning process. What are the factors which act as barriers to effective planning? 20

Q.4 Why organizational Structure is needed for an organization? Explain the different type of organizational structure that the companies generally used. 20

PART-B

Q.5 “The recruitment is a process of attracting individuals on a timely basis, in sufficient numbers and with appropriate qualifications, to apply for jobs with an organization”. Explain the recruitment and selection Techniques used by the organizations. 20

Q.6 What are the essential elements of any controlling process? Explain Controlling and Decision Making based on MIS. 20

Q.7 Why strategies are important for an organization? Explain its scope with a suitable example. 20
End Semester Examination, May 2019
MCA — First Semester
PROGRAMMING IN ‘C’ (MCA-103A (CB))

Time: 3 hrs.  Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 a) ‘C’ language was developed in the year ___________.
i) 1970 ii) 1975 iii) 1980 iv) 1985
b) # include <stdio.h> is called ___________.
i) Preprocessor directive ii) Inclusive of directive iii) None
c) What is the work of break keyword?
i) Halt execution of program. ii) Exit from loop or switch statement. iii) None of the above.
d) By default, a real number is treated as a
i) Float ii) Double iii) None of these.
e) The && and || operators:
i) Compare two numeric values. ii) Compare two Boolean values. iii) None of the above.

State True or False:
f) If a = 8, b = 3, C = -5 are integers, then value of a*b/c is -4.
g) The result of a relational operator is always either True or False.
h) Long data type in the return type of ftell function.
i) Define Identifier.
j) Define File.

2x10

PART-A

Q.2 a) List and explain various data types available in ‘C’. 10
b) Discuss various input-output functions with example. 10

Q.3 a) What is operator? What is operant? Discuss various types of operator in ‘C’ language. 10
b) Compare the following:
i) While and do while. ii) If and switch. 10

Q.4 a) Write different types of array. Give example of each. 10
b) Write short note on Recursion. 10

PART-B

Q.5 a) What do you understand by Dynamic memory allocation? Explain with an example. 15
b) Discuss why pointers are required in ‘C’ language? 5

Q.6 a) Write a program to showcase the use of array of structure. 10
b) Define structures. How structures are created and initiated in 'C'? Give examples. 10

Q.7 What do you understand by File? Discuss why files are used? Explain the syntax and purpose of various file functions. Give example of each function. 20
End Semester Examination, May 2019  
MCA- First Semester  
MATHEMATICS FOR COMPUTING (MCA-106(CB))

Time: 3 hrs  
Max Marks: 100  
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from Part-A and TWO questions from Part-B. Each question carries equal marks.

Q.1  Answer the following questions:
   a) Define Terminating Decimals.
   b) Define a Quadratic equation.
   c) What is the general term of a Arithmetic Progressions?
   d) Write Distance Formula.
   e) Give slope Intercept form of a straight-line.
   f) \( \sin^2 \theta + \ldots = 1 \)
   g) \( \sin(90^\circ - q) = ? \)
   h) \( \frac{d}{dx} \left[ \frac{u}{v} \right] = \frac{?}{v^2} \)
   i) State Maclaurin’s Theorem.
   j) \( \int e^x \cdot dx = \ldots \)  

PART-A

Q.2  a) Prove that \( \sqrt{2} \) is an irrational number.  
   b) State and prove Fundamental Theorem of Arithmetic.  

Q.3  a) Solve:  
   \[ x^2 + y^2 = 25 \]
   \[ x + y = 7 \]
   b) Which term of series:  
   \[ 12 + 9 + 6 + \ldots \ldots \ldots \] is equal to  
   iii) -30  
   iv) -100

Q.4  a) Show that the points \((1,-2),(3,0),(1,2)\) and \((-1,1)\) are vertices of a Rectangle.  
   b) Find the equation of a straight line which is parallel to \( 2x - y + 8 = 0 \) and having \( y \)-intercept 4.

PART-B

Q.5  a) Evaluate:  
   \[ \frac{\tan 66^\circ + \tan 69^\circ}{1 - \tan 66^\circ \tan 69^\circ} \]
   b) Prove that:  
   \[ \frac{\sin q}{1 + \cos q} + \frac{1 + \cos q}{\sin q} = 2 \sec q \]

Q.6  a) Differentiate following w.r.t. \( x \)  
   i) \( \left[ \frac{3+4x}{2-x} \right]^2 \)
ii) \( \frac{\sec x + \tan x}{\sec x + \tan x} \)

b) Expand \((\sin x)\) with the help of Maclaurin’s Theorem in term of \((x)\)

c) State Taylor’s Theorem.

Q.7  

a) Integrate: \( \int \frac{1}{\sqrt{3x+5}+\sqrt{3x+4}} \, dx \)

b) Integrate: \( \int \frac{1}{\sin^2 x \cos^2 x} \, dx \)
End Semester Examination, May 2019
MCA — First Semester
DIGITAL DESIGN AND COMPUTER ORGANIZATION (MCA-105A (CB))

Time: 3 hrs. Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1  a) A stack organization has:
   i) Three-Address Instruction
   ii) Two-Address Instruction
   iii) One-Address Instruction
   iv) Zero-Address Instruction

   b) A byte is a group of 16 bits.
   i) True
   ii) False.

   c) Three are _______ cells in 4-variable K-Map.
   i) 12
   ii) 16
   iii) 18
   iv) None of these

   d) The format used to present the logic output for the various combinations of logic inputs to a gate is called a(n):
   i) Input Logic Function
   ii) Boolean constants
   iii) Boolean variable
   iv) Truth Table

   e) Boolean Algebra is also called:
   i) Switching Algebra
   ii) Arithmetic Algebra
   iii) Linear Algebra
   iv) Algebra

   f) To perform product of Maxterms Boolean function must be brought into:
   i) AND terms
   ii) OR terms
   iii) NOT terms
   iv) NAND terms

   g) The Boolean equation for NOR function is:
   i) \( X = A + \overline{B} \)
   ii) \( X = A + B \)
   iii) \( X = A + B \)
   iv) \( X = A + \overline{B} \)

   h) _____ is a command given to a computer to perform specified operation on some given data.
   i) An instruction
   ii) Command
   iii) Code
   iv) None of these

   i) The two important fields of instruction are:
   i) Opcode
   ii) Operand
   iii) Only (i)
   iv) Both (i) and (ii)

   j) In case of, zero address instruction method the operands are stored in ______.
   i) Registers
   ii) Accumulators
   iii) Push down stack
   iv) Cache

2x10

PART-A

Q.2  a) Minimize the following logic function in POS form using Karnaugh Map
   \[ F(A,B,C,D) = \sum(0,1,2,3,5,7,8,9,11,14) \] 10

   b) Draw the truth table and circuit diagram for following Boolean expression:
   \[ A \left( B + \overline{C} \right) + A \left( \overline{B} + C \right) \cdot \overline{D} \] 10

Q.3  a) Encode data bits 0110 into 7-bit even parity hamming code. 5

   b) Convert \((101011)_2\) into Gray code. 5

   c) Draw logic circuit diagrams and truth-table for AND, OR, NAND, NOR and Exclusive–OR gates. 10
Q.4  a) What is the function of Multiplexer? Explain the implementation of 8X1 Multiplexer using two 4X1 multiplexers.
    b) What are Adders? Explain the functioning of full Address with proper circuit diagram and truth table.

**PART-B**

Q.5  a) What are Instruction formats? Explain different types of Instruction formats with proper examples.
    b) Explain 3-way Handshaking with examples.

Q.6  a) Explain the functioning of J-K flip-flop. What is Race around condition and what is the function of Master-Slave J-K flip flop? Explain with proper circuit diagram.
    b) Explain the functioning of shift Register.

Q.7  a) What are different types of counters? Explain Asynchronous Counter with proper circuit diagram.
    b) What are various addressing Modes? Explain with suitable examples.
End Semester Examination, May 2019
B. Tech. — First Semester
MATHEMATICS-I (BSC-MA-102)

Time: 3 hrs.  
Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt ANY TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer the following question:
   a) Evaluate: (a) \( \Gamma \left( \frac{1}{2} \right) \)  
      (b) \( B(3, 2) \).
   b) Evaluate: \( \int_0^\pi \sqrt{\cot \theta} \, d\theta \).
   c) If in Cauchy’s mean value theorem, \( f(x) = e^x \) and \( g(x) = e^{-x} \), show that \( c \) is the arithmetic mean between \( a \) and \( b \).
   d) Find the \( n \)th derivative of \( f(x) = \cos(ax+b) \).
   e) Prove that the sequence \( \left\{ \frac{2n-7}{3n+2} \right\} \) is monotonically increasing.
   f) What is the half range cosine series for \( f(x) = k \) in \((0,2)\).
   g) Find Curl of the vector \( \vec{F} = (2x^2y + yz)\hat{i} + (xy^2 - xz^2)\hat{j} + (2xyz - 2x^2y^2)k \).
   h) Find \( \frac{\partial u}{\partial r} \) and \( \frac{\partial u}{\partial \theta} \), if \( u = r \cos(r \sin \theta) \).
   i) Find the sum and product of the Eigen values of \( \begin{bmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{bmatrix} \).
   j) Find the rank of the identity matrix of order 2.

2x10

PART-A

Q.2 a) Derive an expression for the relationship between Beta and Gamma function.  
   b) Using integration, Find the volume of the solid obtained by revolving the ellipse \( \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \) about x-axis.

10

10

Q.3 a) Verify Rolle’s Theorem for the function: \( f(x) = 2 + (x - 1)^{2/3}, x \in [0,2] \).
   b) Expand \( f(x) = e^{ax} \sin bx, \forall x \in \mathbb{R} \).

10

Q.4 a) Test for the convergence of the series: \( \sum_{n=1}^{\infty} \frac{1}{\sqrt{n + \sqrt{(n+1)}}} \)
   b) Find the Fourier cosine series for \( f(x) = x^3, 0 < x < L \)

10

Q.5 a) If \( u = \log(x^3 + y^3 + z^3 - 3xyz) \), show that
   \[ \left( \frac{\partial}{\partial x} + \frac{\partial}{\partial y} + \frac{\partial}{\partial z} \right)^2 u = \frac{-9}{(x + y + z)^2} \]
   b) Find the directional derivative of the function \( f = x^2 - y^2 + 2z^2 \) at the point \( P(1,2,3) \) in the direction of the line \( PQ \) where \( Q \) is the point \( (5,0,4) \).

10

10
Q.6  
\[ a) \text{ Test the consistency of the following system of equations and find the solution, if exist:} \]
\[ 4x_1 - x_2 = 12; \quad -x_1 + 5x_2 - 2x_3 = 0; \quad -2x_2 + 4x_3 = -8 \]
\[ b) \text{ Find the Eigen values and Eigen vectors of the matrix:} \ A = \begin{bmatrix} 4 & 2 & -2 \\ -5 & 3 & 2 \\ -2 & 4 & 1 \end{bmatrix} \]

Q.7  
\[ a) \text{ If } u \text{ is a homogeneous function of } x \text{ and } y \text{ of degree } n, \text{ then prove that} \]
\[ x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} = n(n - 1)u \]
\[ b) \text{ Find the characteristic equation of the matrix } A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix} \]
\[ \text{Also find the matrix represented by } A^8 - 5A^7 + 7A^6 - 3A^5 + A^4 - 5A^3 + 8A^2 - 2A + I \]
End Semester Examination, May 2019
MCA — Fifth Semester
LEADERSHIP AND ORGANIZATIONAL BEHAVIOR (MCA-004CB)

Time: 3 hrs. 
Max Marks: 50
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt ANY TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 a) Answer the following multiple choice questions:
   i) Which of the following is not a contributing discipline of organizational behavior?
      • Anthropology.
      • Psychology.
      • Sociology.
      • Physiology.
   ii) Which of the following is not an example of content theory?
      • Maslow theory.
      • Herzberg’s theory.
      • Expectancy theory.
      • Alderfer’s ERG theory.
   iii) What does situational theory of leadership emphasis?
      • Personality traits.
      • Events.
      • Environment.
      • Political situation.
   iv) “Trust is the belief in the integrity, character and ability of a leader”. Explain it.
   v) Which of the following is not one of the leadership style identified in house’s path goal theory:
      • Participative.
      • Employee centred.
      • Directive.
      • Achievement oriented.

   b) Fill in the blanks:
   i) Organizational behavior is the study of ________ in the organization.
   ii) ________ is the keyword in the understanding of organization structure.
   iii) The least used communication channel in an organization is ________.
   iv) People who are able to influence others and who possess managerial authority are termed ________.
   v) Maslow and Herzberg are two examples of ________ theories of motivation. 1×5

   PART-A

Q.2 "Organizational behavior represents interaction among individuals, group and organizations". Elucidate it.

Q.3 Explain the various stages in group formation. Discuss the consequences of group cohesiveness.

Q.4 What is change? Why employees resist for change and in such circumstances what approaches are effective in managing organizational changes?

   PART-B

Q.5 "Corporate culture and organizational effectiveness are interrelated to each other". Comment upon this statement.
Q.6  “Leadership is situational”. Discuss in detail.

Q.7  Are leaders and managers different from each other? What is the basis of trait theories? What traits are associated with leadership?
End Semester Examination, May 2019
B.Sc. (Information Technology) — Fifth Semester
INTERACTIVE COMPUTER GRAPHICS (BSCA-502)

Time: 3 hrs.  
Max Marks: 100
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt ANY TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer the following questions:
   a) What is the use of computer graphics in the field of simulation and virtual reality?
   b) Aliasing and anti aliasing as the problems of scan conversion.
   c) Define homogenous matrix representation of rotation having three input coordinated.
   d) Write three algorithms names for line drawing.
   e) Define “Scaling”.
   f) Differentiate between 2D and 3D transformations.
   g) Define recursive approach for boundary fill algorithm.
   h) Define “View-plane”, “View-volume” and “Clipping”.
   i) Define the step by step process of 3D viewing and clipping.
   j) What is oblique projection? Provide some example of oblique projection.  

PART-A

Q.2 Describe various computer graphics software and standards with a example of each. 20

Q.3 a) Discuss the various line drawing algorithm with their algorithm. Compare them with any comment of the best algorithm. 10
   b) Take the line coordinates (2, 4) and (9, 5). Draw a line using DDA algorithm. Also plot the line for the driven coordinates. 10

Q.4 Take the line coordinates (0, 0) and (20, 10). Draw a line by obtaining the plotted pixels using Bresenham line drawing algorithm. 20

PART-B

Q.5 Obtain the new coordinated of the triangle formed by the vertices A(2, 2), B(5, 2), C(5, 5) by translating them 5 units in x direction and 3 units in y direction. Also obtain the new coordinates by rotating them at an angle of 90°. 20

Q.6 What is projection? Define perspective projection? Perspective projection has various subclasses. Define their sub-classes with basic definition and an example of each. 20

Q.7 Write short notes on the following:
   a) Window and viewports.
   b) Window to viewport mapping.
   c) Midpoint subdivision method for line clipping.
   d) Polygon clipping. 5×4
End Semester Examination, May 2019
B. Tech. — First Semester
CHEMISTRY-I (BSC-CH-101)

Time: 3 hrs.  
Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1  Answer the following questions:

a) Differentiate between hard and soft acid.
b) Determine the number of unpaired electrons in \([\text{Ni(H}_2\text{O)}_6]^{2+}\).
c) Estimate the number of radial nodes in 4s and 4d.
d) Draw wedge dash representation of 2-chlorobutane.
e) Predict the feasibility of reaction at 27°C if \(DH = 40\text{KJmol}^{-1}\) and \(D_S = 108\text{JK}^{-1}\text{mol}^{-1}\).
f) Discuss the significance of Ellingham diagram.
g) Write the name of 3 normal modes of vibration of CO\(_2\). Which mode is IR active?
h) Which of the following molecules show microwave rotational spectra? \(\text{H}_2, \text{HCl, CH}_4, \text{CH}_3\text{Cl}\).
i) Define elimination reaction and give its one example.
j) Explain any two factors that affect the corrosion rates.

\(2\times 10\)

\(\text{PART-A}\)

Q.2  a) Derive an expression for the energy of the particle in 1-dimensional box. \(10\)

b) Compare bond order and magnetic behavior of \(\text{NO}\) and \(\text{CO}\) with the help of molecular orbital diagrams. \(10\)

Q.3  a) Evaluate the effective nuclear charge experienced by valence electrons in three isoelectronic species \((\text{F}^-, \text{Ne and Na}^+)\). Which one has smallest radius? \(10\)

b) Discuss the periodic trends for ionization energy and electron affinity with examples. Differentiate between polarizing power and polarizability with example. \(10\)

Q.4  a) Draw the conformations of ethane and cyclohexane. Which is more stable and why? \(10\)

b) Label Stereogenic centres with R or S.

\(\text{PART-B}\)

\[\text{HO-CH}_3\]
\[\text{HO-CH}_3\]
\[\text{Cl} \]
\[\text{Cl} \]
\[\text{Br} \]
\[\text{Br} \]
\[\text{CH}_2\text{Br} \]
\[\text{CH}_2\text{Br} \]
\[\text{CH}_3 \]
\[\text{CH}_3 \]
\[\text{Cl} \]
\[\text{Cl} \]
Q.5  
a) Differentiate between ideal gas and real gas. Explain Van der Waals equation of state for a real gas and highlight the significance of Van der Waals constants.  
b) Draw the well labeled phase diagram of water system and explain its significant features.  

Q.6  
a) Name any two surface characterization techniques and compare them.  
b) Describe the principle of vibrational spectroscopy and list various types of vibrations involved with one example in each case and write their applications.

Q.7  
a) Differentiate between SN1 and SN2 reactions with examples.  
b) Discuss the synthesis of aspirin and write the chemical reactions involved. Comment on its solubility in aqueous medium.
End Semester Examination, May 2019
B. Tech. – Second Semester
CHEMISTRY-I (BSC-CH-101)

Time: 3 hrs. Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer the following questions:
   a) Define critical temperature and critical pressure of the substance.
   b) What is the difference between dry and wet corrosion?
   c) State Lambert Beer’s law.
   d) Highlight the significance of Ellingham diagram.
   e) Differentiate between enantiomers and diastereomers.
   f) Why Ionization energy of nitrogen is more than that of oxygen?
   g) Comment on the physical significance of $\psi$ and $\psi^2$.
   h) Discuss the principle of Fluorescence spectroscopy.
   i) Differentiate between $E_1$ and $E_2$ mechanism.
   j) How can you relate the emf of cell to free energy?

   \[ \text{PART-A} \]

Q.2 a) Derive an expression for the energy of the particle in 1-dimensional box.
   b) Compare bond order and magnetic behaviour of CO and NO with the help of molecular orbital diagram.

Q.3 a) How is polarising power linked with the covalent character of an ionic band? Discuss the periodic trends for electron affinity and atomic radii. Explain with examples.
   b) Calculate $Z_{eff}$ for $2p$ electron in Sodium and $3s$ electron in Magnesium.

Q.4 a) i) Label stereogenic centres with R or S.
   ![Chemical structures]
   ii) Name each compound by E-Z system.

   ![Chemical structures]

   b) Draw the different conformers of ethane and cyclohexane. Comment on their stability.

   \[ \text{PART-B} \]

Q.5 a) Differentiate between ideal gas and real gas? Explain Vander Waal’s equation of state for a real gas and write the significance of Vander Waal’s constants.
   b) Draw and explain the phase diagram of water system.

Q.6 a) Discuss the principle of SEM and AFM and discuss the differences between them. Write their applications in different fields.
b) Differentiate between absorption and emission spectroscopy? Describe the principle and list out various types of transitions involved in electronic spectroscopy with one example in each case.

Q.7 a) Discuss the procedure and chemical reactions involved in the synthesis of Aspirin. 10
b) Differentiate between $SN_1$ and $SN_2$ reactions. Explain them with suitable examples. 10
End Semester Examination, May 2019  
MCA — Sixth Semester  
PROGRAMMING IN .NET (MCA-602 CB)

Time: 3 hrs.  
Max Marks: 100  
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1  Multiple choice questions:

a) Which of the following is part of an object?
   i) Methods
   ii) Properties
   iii) Instances
   iv) Both i) and ii)

b) Which statement about objects is true?
   i) One object is used to create one class.
   ii) One class is used to create one object.
   iii) One object can create many classes.
   iv) One class can create many objects.

c) Properties are used to represent:
   i) Actions
   ii) Classes
   iii) Data
   iv) Events

d) Which is not an integer data type?
   i) Single
   ii) Byte
   iii) Short
   iv) Integer
   v) Long

e) Which statement is true?
   i) A base class inherits some of the properties of a derived class.
   ii) A base class inherits all of the properties of a derived class.
   iii) A derived class inherits some of the properties of a base class.
   iv) A derived class inherits all of the properties of a base class.

f) Which is not an ADO.NET DataAdapter object?
   i) OleDbDataAdapter
   ii) SqlDataAdapter
   iii) QueryDataAdapter
   iv) Both i) and ii).

g) The first step of configuring a DataAdapter is to select:
   i) An adapter object.
   ii) A connection object.
   iii) A database object.
   iv) A dataset object.
   vii) None of the above.

h) A postback occurs when:
   i) A browser posts a form to the server.
   ii) A user's action activates the handing of a server event.
   iii) A server posts a form to the client.
   iv) Both i) and ii).
   v) All of the above.

i) Which is the file extension used for an ASP.NET file?
   i) asn
   ii) asp
   iii) aspn
   iv) aspx

j) Where do cookies store information?
   i) HTML source
   ii) Text file
   iii) URL
   iv) Both i) and ii).

PART-A

Q.2  Write short notes on the following:

a) Common language specifications.

b) Common types systems.

c) Garbage collection.

d) Base class libraries.

2×10 5×4
Q.3 What is a delegate? What is it used for? What are the steps involved in creating and using a delegate? Give an example to support your answer. 20

Q.4 Explain “Inheritance in C#”. How is runtime polymorphism implemented in C#? Give suitable example to support your answer. 20

**PART-B**

Q.5 a) Differentiate between ‘server side event’ and ‘client side event’.  
     b) State management in ASP.NET page. 10×2

Q.6 Write short notes on the following:
     a) Web service. 7
     b) XML 7
     c) COM 6

Q.7 Write a program to match the username and password from controls in a login form and match them to a database record. (DB Table details and form fields are given below)

   Login Name field: txtName
   Password field : txtPassword
   Table Schema : CREATE TABLE [dbo].[tbl_UserMaster](
     [UserId] int NOT NULL IDENTITY (1001,1),
     [FName] nvarchar(30) NOT NULL,
     [LName] nvarchar(30) NOT NULL,
     [LoginName] nvarchar(30) NOT NULL,
     [Email] nvarchar(30) NOT NULL,
     [Password] nvarchar(30) NOT NULL
   ) 20
End Semester Examination, May 2019
MCA – Second Semester
PROGRAMMING IN C++ (MCA-203A (CB))

Time: 3 hrs.  
Max Marks: 100

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions in brief:
   a) Why do we need preprocessor directive `#include <iostream>`?
   b) Define the application of scope resolution operator `::` in C++.
   c) Give the significance of overloading of a function.
   d) How does a C++ structure differ from a C++ class?
   e) List the merits of friend function.
   f) List some of the special properties of constructor functions.
   g) In what situation we make a virtual function “pure”?
   h) Write a function in C++ to find factorial of a number.
   i) In which order are the constructors and destructors called when an object of the derived class is created? 2×10

**PART-A**

Q.2 a) Differentiate object oriented programming and procedure oriented programming. 10
b) Discuss nested class and local class by taking suitable example. 10

Q.3 What are strings? Are they standard or derived data types? Write an interactive program to check whether a given string is palindrome or not. 20

Q.4 a) Can inline function be recursive? Justify your answer. 8
b) Describe use of functions in C++ by taking suitable example. 12

**PART-B**

Q.5 Discuss the role of constructors and destructors in a class. State the rules associated with them. Use examples wherever required. 20

Q.6 Describe operator overloading. Write a program in C++ to overload unary operator for processing the objects of a class called counter. 20

Q.7 a) Illustrate the different forms of inheritance supported by C++. 10
b) Write a program to demonstrate the use of throw within and outside a function. 10
End Semester Examination, May 2019  
MCA – Fourth Semester 
DATA COMMUNICATION (MCA-405A (CB))

Time: 3 hrs.  
Max Marks: 100 
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Multiple choice questions:

a) The __________ is the physical path over which a message travels.
   i) Protocol  
   ii) Medium  
   iii) Signal  
   iv) All of above

b) Which topology requires a multipoint connection?
   i) Bus  
   ii) Star  
   iii) Mesh  
   iv) Ring

c) A __________ is a set of rules that governs data communication.
   i) protocol  
   ii) forum  
   iii) standard  
   iv) None of the above

d) __________ is the protocol suite for the current Internet.
   i) UNIX  
   ii) NCP  
   iii) TCP/IP  
   iv) ACM

e) __________ can impair a signal.
   i) Noise  
   ii) Attenuation  
   iii) Distortion  
   iv) All of the above

f) Which multiplexing technique transmits digital signals?
   i) WDM  
   ii) FDM  
   iii) TDM  
   iv) None of the above

g) In PCM, an analog to __________ conversion occurs.
   i) Analog  
   ii) Digital  
   iii) QAM  
   iv) Differential

h) In __________, the stations share the bandwidth of the channel with respect to time.
   i) FDMA  
   ii) CDMA  
   iii) TDMA  
   iv) None of the above

i) ARQ stands for __________.
   i) Acknowledge repeat request  
   ii) Automatic retransmission request  
   iii) Automatic repeat quantization  
   iv) Automatic repeat request

j) Transmission media lie below the __________ layer.
   i) Application  
   ii) Transport  
   iii) Network  
   iv) Physical

PART-A

Q.2 a) Explain Data Communication and its basic component. Explain its characteristics?  
   b) What is network topology? Explain the different network topologies.  

Q.3 What do you mean by switching? What are the three fundamental switching methods explain? Which is better packet switching or circuit switching?

Q.4 a) What are transmission impairments? Explain each briefly. Which transmission media is superior in communication channel and why?  
   b) Explain the OSI reference model with neat diagram.

PART-B
Q.5 Explain various data encoding techniques and also discuss its requirement in data communication. Draw various digital to digital data encoding techniques for the given data:
   a) 111010100
   b) 001110101
   c) 111100011
   d) 110000111

Q.6 a) Given the data word a 10100111 and the divisor 1011, show the generation of CRC Codeword at the sender site.
   b) What is the main function of transport layer? Explain the mechanism of fault handling in this layer.

Q.7 a) Explain IEEE 802.11 standard with its architecture and its working process in detail. Describe the function of Logic Link Control.
   b) Write short notes on the following:
      i) HDLC
      ii) Asynchronous Transfer Mode
End Semester Examination, May 2019
B. Sc. (Information Technology) – Second Semester
DATABASE ENGINEERING-I (7.104)

Time: 3 hrs.  
Max Marks: 50  
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Explain the following:
   a) Define is third normal form.
   b) List down E.F. codd rules.
   c) Discuss DDL and DML.
   d) Define schema.
   e) What is data independence? Discuss.  2×5

PART-A

Q.2 Explain the following:
   a) Primary key
   b) Foreign key
   c) Generalization
   d) Specialization
   e) Composite key  2×5

Q.3 What is meant by normalization? Why do we normalize database? Explain the similarities and dissimilarities between 3NF and BCNF.  10

Q.4 Explain the similarities and dissimilarities between hierarchical, network and relational model.  10

PART-B

Q.5 Explain the following with syntax and example:
   a) Group by clause.
   b) Union and Difference.  5×2

Q.6 What are SQL constraints? How do we define it during the creation of table? Explain various types of constraints with example.  10

Q.7 Discuss all the control structures used in PL/SQL with their syntax and examples.  10
Q.1 Explain the following:
   a) Role of database administrator.
   b) E.F. codd rules.
   c) Differentiate traditional file system and database system.  

PART-A

Q.2 What is normalization? Explain 4th and 5th normal forms. Why 5NF is also known as PJNF.

Q.3 What is E-R diagram? Draw all the symbols used in E-R diagram. Draw the E-R diagram of Library Management System.

Q.4 Explain the following:
   a) Data dictionary
   b) Cartesian product
   c) Participation constraint  

PART-B

Q.5 Explain 10 SQL functions with syntax and suitable example.

Q.6 Differentiate between function and procedure. What is the syntax to create store procedure? Explain with suitable example.

Q.7 a) Differentiate primary key and unique key.
    b) Differentiate union and intersection clause with example.
    c) Differentiate group by and order by with example.
End Semester Examination, May 2019  
B. Sc. (Information Technology) – Fourth Semester  
DESKTOP APPLICATION DEVELOPMENT (7.206A)

Time: 3 hrs.  
Max Marks: 75  
No. of pages: 1  

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

**Q.1**  
a) Common Language Specification (CLS):  
i) is an execution engine for all .NET application.  
ii) is similar to JVM as in java.  
iii) defines standard rules for defining .NET compatible languages.  
iv) is a compiler.  
b) __________ is not a .NET compatible language.  
c) Which data type should be more preferred for storing a simple number like 35 to improve execution speed of the program?  
i) Sbyte  
ii) Short  
iii) Int  
iv) Long  
d) Obdb connection object works with __________.  
e) The default property for a text box control is __________.  
f) Debugging is the process of finding and removing errors. **(True/False)**  
g) The __________ enables us to pass data between a program and a class.  
h) A __________ variable is one that is declared inside a procedure.  
i) MDI stands for __________.  
j) Variant is a default data type in VB.NET. **(True/False)**  

**PART-A**

**Q.2**  
What are the advantages of VB.Net over traditional Visual Basic? Discuss important features of VB.NET in context to windows programming.  
15

**Q.3**  
What are the different database components in context to ADO.NET? Explain its components in detail.  
15

**Q.4**  
Make a calculator in VB.NET showing the following operations:  
a) Addition  
b) Subtraction  
c) Multiplication  
d) Division  
15

**PART-B**

**Q.5**  
Explain the features of object oriented programming in detail. How OOPs concept helps in building strong and secure programs?  
15

**Q.6**  
Explain the following (any three):  
a) Data grid  
b) Data set  
c) Fill(    )  
d) List box control  
5×3

**Q.7**  
a) Differentiate between procedure and function with the help of example.  
b) List out steps need to be incorporated while implementing the access database connectivity in VB.NET.  
7

8
End Semester Examination, May 2019
MCA – Sixth Semester
SOCIAL MEDIA NORMS AND ETIQUETTE (CA-GE-56)

Time: 3 hrs. 
Max Marks: 50
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 a) Facebook was originally targeted at which demographic of users?
b) What is the largest global social network?
c) When snapchat was created, the app was called picaboo. (True/False)
d) Which social network does not allow you to post photos via a desktop computer?
e) Which of the below is not a social network?
   i) Weibo
   ii) Ektorp
   iii) Instagram
   iv) Renren
f) Best protocol to invite a facebook friend to an event is __________.
g) Technological convergence and the rise of mobile technology is a central issue in social media. (True/False)
h) Who holds the title of most retweeted tweet ever?
i) In present scenario, the most popular social networking site is __________.
j) Facebook is a trusty source of social media. (True/False) 1×10

PART-A

Q.2 Write short notes on (any five):
a) Google.
b) Friend feed.
c) LinkedIn.
d) Social media culture.
e) Email Etiquette.
f) Social networking privacy. 2×5

Q.3 Discuss in detail the negative impact of social media on social propriety. 10

Q.4 Explain the role of social media in the following areas:
a) Job search.
b) Marketing.
c) Business decision making. 10

PART-B

Q.5 What do you understand by identity and reputation of social capital in social media? How social media trends can be analyzed through this? Explain through an example. 10

Q.6 Differentiate the following (any two):
a) Cyber law and cyber bullying.
b) Harassment and stalking.
c) Government and social media vs organizations and social media. 5×2

Q.7 What do you understand by the domains of social media? Explain all domains of social media with relevant examples. 10
End Semester Examination, May 2019
B. Sc. (Information Technology) – Second Semester
DATABASE ENGINEERING-I (7.104)

Time: 3 hrs.  Max Marks: 100
Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.

Q.1 Define the following in brief:
   a) E-R diagram.
   b) Logical view of database.
   c) DBMS.
   d) Candidate key.
   e) Functional dependency.
   f) Anomaly in database.
   g) Transaction.
   h) DBA.
   i) Define ‘triggers’
   j) What is data dictionary? 2×10

**PART-A**

Q.2 a) List five differences between file system and database management system. 10
   b) Why DBMS has become a lifeline for today’s business? Justify your answer with five reasons. 10

Q.3 a) Explain the importance of physical, logical and view level of DBMS design. Draw architecture of a database system. 10
   b) Write 12 Codd’s rule and explain their usefulness for a database design. 10

Q.4 a) What are the limitations of 2nd normal form? Give an example to justify your answer. What are the advantages of 3rd normal form? 10
   b) Differentiate between 3rd normal form and BCNF? Explain with examples. 10

**PART-B**

Q.5 a) Differentiate between DCL, DML and DDL with examples. 10
   b) Differentiate between having, group by and where clause used in SQL. Write syntax of command also. 10

Q.6 Employee (person-name, street, city) works (person-name, company-name, salary) company (company-name, city) manages (person-name, manager-name).
   Explain in relational algebra:
   a) Find name of all employees who work for company.
   b) Find the name of employees who are managed by manager.
   c) Find the employee-name and salary.
   d) Find name of employees having salary more than ₹20,000. 5×4

Q.7 a) What is a transaction in database? Write all the stages of a transaction. 10
   b) What are the issues of concurrent transactions? How to handle such issues? 10
End Semester Examination, May 2019
MCA – Second Semester
OPERATING SYSTEM (MCA-204A (CB))

Time: 3 hrs. 

Max Marks: 100

No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Explain the following in brief:
   a) Multiprogramming operating systems.
   b) Types of schedules.
   c) Resource allocation graph.
   d) Real world example of deadlock.
   e) Dynamic loading.
   f) Compaction.
   g) Two algorithms used in contiguous memory allocation technique.
   h) File and directory relationship.
   i) Swapping.
   j) Turnaround time.

\[ 2 \times 10 \]

**PART-A**

Q.2 Consider the following set of processes with the length of the CPU burst time given in milliseconds.

<table>
<thead>
<tr>
<th>Process</th>
<th>Burst Time</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>P_1</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>P_2</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>P_3</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>P_4</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Draw Gantt charts and calculate average turn-around time and waiting time for FCFS, SJF, priority and Pound-Robin (7Q = 4 ms) scheduling algorithms.

\[ 20 \]

Q.3 What are the essential properties of a good operating system? Explain various functions performed by an operating system.

\[ 20 \]

Q.4 What is a process? Describe the components of PC8. Draw state transition diagram and explain various stages of a process.

\[ 20 \]

**PART-B**

Q.5 Consider the following snapshot of a system:

<table>
<thead>
<tr>
<th>Process</th>
<th>Allocation</th>
<th>More</th>
<th>Available</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>P_0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>P_1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>P_2</td>
<td>1</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>P_3</td>
<td>0</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>P_4</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Answer the following using Banker’s algorithms:

a) What is the content of need matrix?

b) Is the system in a safe state? If yes, then find the safe sequence for processes.

\[ 20 \]

Q.6 Given memory partitions of 100 kB, 200 kB, 400 kB and 300 kB (in order), how would each of the First-Fit, Best-Fit, Worst-Fit algorithm places processes of 150 k, 250 k, 90 k and 350 k (in order)? Which algorithm makes the most efficient use of memory?

\[ 20 \]
Q.7 Define seek time and latency time for disk drive data transfer. Explain various disk scheduling algorithms with suitable examples and clean diagrams.
End Semester Examination, May 2019
B. Sc. (Information Technology) – Fourth Semester
INFORMATION SYSTEM SECURITY (7.209/7.209A)

Time: 3 hrs. Max Marks: 40
No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Differentiate between the following:
   a) Vulnerability and threat.
   b) Cyber law and cyber ethics.
   c) Hub and switch.
   d) Risk identification and risk control.  

   **PART-A**

Q.2 What is information technology Act 2000? Why it has become important in current era?  

Q.3 What is risk management? Why is the identification of risks and vulnerabilities important in risk management?  

Q.4 How issue-specific-policy helps in making the cyber operations secure? Give example of email-issue-specific-policy for an organisation.  

   **PART-B**

Q.5 How intrusion detection and prevention system enhance organizational security? Justify your answer with an example.  

Q.6 a) What is the importance of public key infrastructure?  
   b) Why encryption is required for data communication?  

Q.7 What are the different physical security controls implemented by an organization?
End Semester Examination, May 2019
MCA – Fourth Semester
DATA MINING AND WAREHOUSING (MCA-408 (CB))

Time: 3 hrs.  Max Marks: 100
No. of pages:  2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1  a) Give two characteristics of a data warehouse.  
    b) Data mart is a subset of __________.  
    c) Data cube represents _________ model of data warehouse.  
    d) Three schemas of data warehouse are _________, _________ and _________.  
    e) Three types of OLAP servers are _________, _________ and _________.  
    f) KDD stands for _________.
    g) Give an algorithm for association rule mining. (Name the algorithm)  
    h) Data preprocessing is done to remove __________, __________ and __________ from data.  
    i) Give two applications of data mining.  
    j) Two measures of association rules to predict its significance are _________ and _________.
    k) Decision tree is an example of _________ technique.

Q.2  a) Differentiate the following:  
    i) Database and Data warehouse.  
    ii) OLTP and OLAP  
    b) “Data warehousing is a viable means to resolve the information crisis and to provide strategic information”. Justify the statement.

Q.3  Explain the following in relation to data mart:  
a) Reasons for creating data mart.  
b) Advantages of data mart.  
c) Limitations of data mart.  
d) Co-existence of data mart and data warehouse. 5×4

Q.4  a) Explain the snowflake schema with its advantages and disadvantages. Also make a comparison between star schema and snowflake schema.  
b) What are Aggregate Fact tables? Why are they required? Justify your answer with the help of an example.

Q.5  a) Explain all the steps of knowledge discovery from the transactional databases.  
b) Give applications of data mining in the field of:  
   i) Healthcare  
   ii) Education 5×2

Q.6  Using Apriori algorithm, generate frequent itemsets of the following dataset taking minimum support value as 3.

<table>
<thead>
<tr>
<th>Transition</th>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bread, Milk</td>
</tr>
<tr>
<td>2</td>
<td>Bread, diaper, bear, eggs</td>
</tr>
<tr>
<td>3</td>
<td>Milk, diaper, bear, coke</td>
</tr>
<tr>
<td>4</td>
<td>Bread, milk, diaper, bear</td>
</tr>
</tbody>
</table>
Q.7  

a) Differentiate the following:
   i) Classification and clustering.  
   ii) Hierarchical and partitional method of clustering.  

b) Apply k-means algorithm to generate two clusters for the following dataset:

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Subject 1</th>
<th>Subject 2</th>
<th>Subject 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>55</td>
<td>60</td>
<td>55</td>
</tr>
<tr>
<td>2</td>
<td>57</td>
<td>58</td>
<td>59</td>
</tr>
<tr>
<td>3</td>
<td>99</td>
<td>100</td>
<td>95</td>
</tr>
<tr>
<td>4</td>
<td>98</td>
<td>99</td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>56</td>
<td>57</td>
<td>59</td>
</tr>
<tr>
<td>6</td>
<td>60</td>
<td>62</td>
<td>64</td>
</tr>
</tbody>
</table>

Table: Datasets of marks of students.
End Semester Examination, May 2019
B. Sc. (Information Technology) – Second Semester
FUNDAMENTALS OF COMPUTER PROGRAMMING (7.103)

Time: 3 hrs. Max Marks: 100
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 a) Differentiate between procedure oriented programming languages and object oriented programming language.
    b) Define terms: High level programming languages, low level programming language and Middle level programming language.
    c) Define syntax error. Also differentiate it from run time error.
    d) Write an example of pseudocode.
    e) Define string variable. Write five string functions.
    f) Differentiate between relational operator and logical operators.
    g) Define array and its types.
    h) What is recursion? Give an example.
    i) What is error handling?
    j) Differentiate between user defined functions and input functions. 2×10

**PART-A**

Q.2 a) What are objective and principles of a programming language? What are different paradigms of programming? What are the issues for programming languages? 10
    b) Write a python program to calculate factorial of a number along with the syntax rules of a python program. 10

Q.3 a) Draw a flowchart to find the Fibonacci series till term \( \leq 1000 \). 10
    b) Write an algorithm to determine whether a temperature is below or above the freezing point. 10

Q.4 a) Why data type conversion is required in programming language? Support your answer with the help of suitable program. 10
    b) Explain different types of data types and operators in python. 10

**PART-B**

Q.5 a) Write a python program to show difference between call by value and call by reference of function parameters. 10
    b) Differentiate between while loop and do while loop. Support your answer with suitable examples. 10

Q.6 a) Write a program to access and modify the text file contents? 10
    b) How array is initialized in python? Write a suitable example for the same. Also apply Sort( ) function to sort the elements in ascending order. 10

Q.7 Write short notes on the following:
   a) Keyboard events.
   b) Data validation.
   c) Recursive procedures
   d) Error handling. 5x4
End Semester Examination, May 2019  
MCA – Second Semester  
DISCRETE MATHEMATICS AND FINITE AUTOMATA (MCA-208 (CB))

Time: 3 hrs.  
Max Marks: 100  
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1  
a) Define the following:  
i) Power set  
ii) Degree of recurrence relation  
iii) Equivalent sets  
iv) Binary tree  
v) Distributive lattice

b) What is DNF of Boolean function?

c) Explain particular solution of a recurrence equation.

d) What do you mean by spanning trees?

e) What is DFA?

f) Name one algorithm which is applicable to find minimum spanning trees.

PART-A

Q.2  
a) State and prove distributive law.

b) Let $P = \{x, y, z, u\}$ and $Q = \{a, b, c, d\}$.  
and $f : P \rightarrow Q$, such that  
$f = \{(x, a), (y, b), (z, c), (u, c)\}$.  
Find the domain, co-domain and range of function.

c) A survey of 550 television watches produced the following information. 285 watch football games, 195 watch hockey games, 115 watch baseball games 45 watch football and baseball games, 70 watch football and hockey games, 50 watch hockey and baseball games, 100 do not watch any of the three games.

i) How many people in the survey watch all three games?

ii) How many people watch exactly one of the three games?

Q.3  
a) Prove that:

$$1^2 + 2^2 + 3^2 + \cdots + n^2 = \frac{n(n+1)(2n+1)}{6}$$

b) Prove that the statement  
$(P \rightarrow q) \leftrightarrow (\sim q \rightarrow \sim P)$ is a tautology.

Q.4  
a) Draw the Hasse diagram of the Partial order having directed graph as shown in the figure:

b) If $f(x, y, z) = (x \lor y) \land (x \lor y') \land (x' \lor z)$ be a given Boolean function. Determine its DN from.
PART-B

Q.5  a) Explain non-homogeneous linear difference equations.  
     b) Solve the difference equation 
        \[ a_r - 4a_{r-1} + 4a_{r-2} = 0 \] 
        and find the particular solution given that \( a_0 = 1 \) and \( a_1 = 6 \).  

Q.6  a) Write short notes on the following:  
     i) Eulerain path  
     ii) Bipartite graphs  
     b) Find the shortest path between K and L in the graph shown by using Dijkstra’s algorithm.

Q.7  a) i) Explain transition diagrams.  
     ii) Explain Deterministic Finite Automaton (DFA).  
     b) Let \( M_1 \) be a Mealy machine whose transition table is given below:

<table>
<thead>
<tr>
<th>f</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>S/I</td>
<td>01</td>
</tr>
<tr>
<td>S_0</td>
<td>S_3, S_1</td>
</tr>
<tr>
<td>S_1</td>
<td>S_1, S_2</td>
</tr>
<tr>
<td>S_2</td>
<td>S_2, S_3</td>
</tr>
<tr>
<td>S_3</td>
<td>S_9, S_0</td>
</tr>
</tbody>
</table>

Find equivalent Moore machine \( M_2 \).
End Semester Examination, May 2019  
B. Sc. (Information Technology) – Fourth Semester  
OPERATING SYSTEM (7.221/7.221A)

Time: 3 hrs.  
Max Marks: 40  
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer the following:  
a) What is dispatcher?  
b) Define the problem occurred in FIFO page replacement algorithm.  
c) Give a real life example of deadlock.  
d) What is a process?  
e) What is swapping?  
f) Discuss the haming conventions in file system.  
g) Name two types of fragmentation.  
h) Define basic disk architecture.

Q.2 Consider the following set of processes, with the length of CPU burst time given in milliseconds.

<table>
<thead>
<tr>
<th>Process</th>
<th>Burst time</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>P_1</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>P_2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>P_3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>P_4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>P_5</td>
<td>5</td>
<td>2</td>
</tr>
</tbody>
</table>

Draw Gantt charts, calculate average turnaround time and average waiting time for FCFS, SJF, priority and Round-Robin (TQ = 2ms) scheduling algorithms.

Q.3 List four functions of operating system and describe them.

Q.4 Differentiate between program and process. Explain various states of a process with the help of a state transition diagram.

PART-B

Q.5 Explain the various steps of a page fault with the help of a suitable diagram.

Q.6 Consider a system with five processes \{P_0, P_1, P_2, P_3, P_4\} and three resources \{A = 12, B = 7, C = 8\}. At a given point of time snapshot of the system is:

<table>
<thead>
<tr>
<th>Process</th>
<th>Allocation</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A  B  C</td>
<td>A  B  C</td>
</tr>
<tr>
<td>P0</td>
<td>0  1  0</td>
<td>7  5  3</td>
</tr>
<tr>
<td>P1</td>
<td>4  1  0</td>
<td>4  2  2</td>
</tr>
<tr>
<td>P2</td>
<td>3  0  2</td>
<td>9  0  2</td>
</tr>
<tr>
<td>P3</td>
<td>2  1  1</td>
<td>2  2  2</td>
</tr>
<tr>
<td>P4</td>
<td>0  0  2</td>
<td>4  3  3</td>
</tr>
</tbody>
</table>

Available is

<table>
<thead>
<tr>
<th>A  B  C</th>
</tr>
</thead>
<tbody>
<tr>
<td>3  4  3</td>
</tr>
</tbody>
</table>

a) What will be the contents of need matrix?  
b) Whether the system is in safe state? If yes, then find out the safe sequence.
Q.7 Consider a disk queue with requests of I/O to blocks on cylinders:
34, 98, 354, 2, 7
Assume current head position is at cylinder 15 and total cylinder on the disk drive is 500. What is the total distance that the disk arm moves to satisfy all the pending requests for each of the following disk-scheduling algorithms?
a) FCFS,  
b) SSTF,  
c) SCAN,  
d) C-SCAN
End Semester Examination, May 2019
B. Tech. – Second Semester
MATHEMATICS-II (BSC-MA-202)

Time: 3 hrs.  
Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1  
a) Change the order of integration \( \int_{0}^{\infty} \int_{0}^{x} (e^{-y}/y) dy dx \).

b) Find the value of \( \lambda \), for the exact differential equation \( (xy^2 + \lambda x^2 y) dx + (x + y)x^2 dy = 0.2 \).

c) Solve \( x^2 = 1 + p^2 \).

d) Solve \( p = \log(px - y) \)
\[
\frac{d^2 y}{dx^2} - 4y = 0
\]

e) Solve:

f) Find Particular Integral in the following Differential Equation:
\[
\frac{d^2 y}{dx^2} + 3 \frac{dy}{dx} + 2y = 4 \cos^2 x.
\]

g) Determine \( a, b, c, d \) so that the function \( f(z) = (x^2 + axy + by^2) + i(cx^2 + dxy + y^2) \) is analytic.

h) Define Analytic function and write Cauchy Riemann equation in polar form.

i) Evaluate: \( \text{lt} \) \( z \to 1 + i \) \( \frac{z^2 - 1}{z^2 - 1} \)

j) Find the singularities of the following functions:
   i) \( f(z) = \frac{1}{z^4 + 1} \)
   ii) \( f(z) = \sin \frac{1}{z} \)

\[2x10\]

PART-A

Q.2  
a) Evaluate \( \int_{0}^{\infty} \int_{0}^{x+y} e^{x+y-z} dx dy dz \)

b) Verify Green’s theorem for \( \int_{C} \left[ (3x^2 - 8y^2) dx + (4y - 6xy) dy \right] \), where \( C \) is bounded by \( x = 0, y = 0 \) and \( y + x = 1 \).

\[10\]

Q.3  
a) Solve: \( x dx + y dy = \frac{a^2(xdy - ydx)}{x^2 + y^2} \)

b) Solve \( \frac{dy}{dx} + \frac{1}{x} \tan y = \frac{1}{x^2} \tan y \sin y. \)

c) Solve differential equation \( y \log y dx + (x - \log y) dy = 0 \)

\[6\]

Q.4  
a) Solve \( x^2 \frac{d^2 y}{dx^2} + 4x \frac{dy}{dx} + 2y = e^x \)

b) Solve: \( \frac{d^3 y}{dx^3} + 4y = x \sin x \).

\[5\]

\[7\]

\[8\]

PART-B
Q.5  
   a) If \( f(z) \) is a regular function of \( z \), prove that  
   \[
   \left( \frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2} \right) |f(z)|^2 = 4|f'(z)|^2.
   \]
   10
   b) Determine analytic function \( f(z) = u + iv \), where: \( u - v = e^z (\cos y - \sin y) \).  
   10

Q.6  
   a) State and prove the Cauchy’s integral formula and use it to evaluate:  
   \[
   \frac{1}{c(z-1)(z-2)} \int \frac{e^z}{z} dz , \text{ where } c \text{ is the circle } |z|=3.
   \]
   10
   b) Solve:  
   \[
   \int_{-\infty}^{\infty} \frac{dx}{1+x^4}
   \]  
   10

Q.7  
   a) For the conformal transformation \( w = z^2 \), show that the coefficient of magnification at \( z=1+i \) is \( 2\sqrt{2} \).  
   10
   b) Expand the function in Laurent’s Series \( f(z) = \frac{1}{z^2 - 4z + 3} \) for \( 1<|z|<3 \).  
   10
End Semester Examination, May 2019
B. Tech. – Second Semester
MATHEMATICS-II (FOR CSE ONLY) (BSC-MA-201)

Time: 3 hrs.  
Max Marks: 100  
No. of pages: 5

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from Part-A and TWO questions from Part-B. Marks are indicated against each question.

Q.1  a) Six cards are selected from a well- shuffled deck of playing cards. Given that all the six cards are black, find the probability that they are all from the same suit? 3  
b) Five men in a company of 20 are graduates. If 3 men are picked out of 20 at random. What is the probability that:  
i) they all are graduates? 3  
ii) at least one is graduates?  
c) Compute the variance of sum obtained when 10 independent rolls of a fair die are made. 3  
d) Is the function defined as follows a probability density function?  
\[ f(x) = \begin{cases} 
0, & \text{if } x < 2 \\
\frac{1}{18} (3 + 2x), & \text{if } 2 < x < 4 \\
0, & \text{otherwise} 
\end{cases} \]  
Find the probability that a variate having density will fall in the interval \( 2 < x < 3 \) 3  
e) Determine the binomial distribution whose mean is 9 and S.D. is 3/2. 3  
f) What are the Sheppard’s corrections for the first four moments? 2  
g) Determine the value of median from the following series:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of students</td>
<td>7</td>
<td>5</td>
<td>8</td>
<td>38</td>
<td>42</td>
</tr>
</tbody>
</table>

PART-A

Q.2  a) A drawer contains 50 bolts and 150 nuts. Half of the bolts of the nuts are rusted. If one item is chosen at random, what is the probability that it is rusted or a bolt? 7  
b) A man is known to speak truth 3 times out of 4 times. He throws a die and reports that it is a six. Find the probability that it is actually a six. 7  
c) Three coins are tossed simultaneously. Consider the event E ‘three heads or three tails’, F ‘at least two heads’ and G ‘at most two heads’. Of the pairs (E, F), (E, G) and (F, G), which are independent? 6  

Q.3  a) A random variable X has the following density function  
\[ f(x) = \begin{cases} 
\frac{k}{1+x^2}, & \text{if } -\infty < x < \infty \\
0, & \text{otherwise} 
\end{cases} \]  
Determine k and the distribution function. 10  
b) In a normal distribution, 31% of the items are under 45 and 8% are over 64. Find the mean and standard deviation of the distribution. 10  

Q.4  a) An insurance company supposes that the number of accidents that each of its policyholders will have in a year is Poisson distributed, with the mean of the Poisson depending on the policyholder. If the Poisson mean of a randomly chosen
policyholder has a gamma distribution with density function \( g(\lambda) = \lambda e^{-\lambda}, \lambda \geq 0 \).

What is the probability that a randomly chosen policyholder has exactly \( n \) accidents next year?

b) Find the moment generating function of the exponential distribution \( f(x) = \frac{1}{c} e^{-\frac{x}{c}}, \ 0 < x < \infty, \ c > 0 \). Hence find its mean and S.D. 10

**PART-B**

Q.5 a) Ten students got the following percentage of marks in Economics and Statistics. Calculate the Coefficient of Correlation.

![Table of Marks](#)

<table>
<thead>
<tr>
<th>Marks in Economics</th>
<th>78</th>
<th>36</th>
<th>98</th>
<th>25</th>
<th>75</th>
<th>82</th>
<th>90</th>
<th>62</th>
<th>65</th>
<th>39</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marks in Statistics</td>
<td>84</td>
<td>51</td>
<td>91</td>
<td>60</td>
<td>68</td>
<td>62</td>
<td>86</td>
<td>58</td>
<td>53</td>
<td>47</td>
</tr>
</tbody>
</table>

b) Find the Kurtosis based on moments for the following distribution:

![Table of Marks and Students](#)

<table>
<thead>
<tr>
<th>Marks</th>
<th>0–10</th>
<th>10–20</th>
<th>20–30</th>
<th>30–40</th>
<th>40–50</th>
<th>50–60</th>
<th>60–70</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of students</td>
<td>8</td>
<td>12</td>
<td>20</td>
<td>30</td>
<td>15</td>
<td>10</td>
<td>5</td>
</tr>
</tbody>
</table>

Q.6 a) Using the principle of least squares, find an equation of the form \( y = ab^x \) that fits the following data:

<table>
<thead>
<tr>
<th>( x )</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y(x) )</td>
<td>0.5</td>
<td>2.0</td>
<td>4.5</td>
<td>8.0</td>
<td>12.5</td>
</tr>
</tbody>
</table>

b) In a Hospital 475 female and 525 male babies were born in a week. Do these figures confirm the hypothesis that males and females are born in equal numbers. 10

Q.7 a) A survey of 320 families with 5 children each revealed the following information:

<table>
<thead>
<tr>
<th>No. of boys</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of girls</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>No. of families</td>
<td>14</td>
<td>56</td>
<td>110</td>
<td>88</td>
<td>40</td>
<td>12</td>
</tr>
</tbody>
</table>

Is this result consistent with the hypothesis that male and female birth are equally probable. 10

b) The 9 items of a sample have the following values 45, 47, 50, 52, 48, 47, 49, 53, 51. Does the mean of these values differ significantly from the assumed mean 47.5? Apply t-test. 10
Table 1: NORMAL TABLE
AREAS UNDER THE STANDARD NORMAL

\[
\text{CURVE} = \frac{1}{\sqrt{2\pi}} \int_{0}^{z} e^{-\frac{z^2}{2}} \, dz
\]

<table>
<thead>
<tr>
<th>(z)</th>
<th>(0.00)</th>
<th>(0.01)</th>
<th>(0.02)</th>
<th>(0.03)</th>
<th>(0.04)</th>
<th>(0.05)</th>
<th>(0.06)</th>
<th>(0.07)</th>
<th>(0.08)</th>
<th>(0.09)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>.0000</td>
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### Table 3: CHI-SQUARE ($\chi^2$)

**Significant Values $\chi^2 (\alpha)$ of $\chi^2$ Distribution Right Tail Areas**

for Given Probability $\alpha$,

$$ P = P_r (\chi^2 > \chi^2 (\alpha)) = \alpha $$

And is Degrees of Freedom (d.f.)

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**Note.** For degrees of freedom ($v$) greater than 30, the quantity $\sqrt{2X^2 - \sqrt{2v-1}}$ may be used as a normal variate with unit variance.
Table 2: SIGNIFICANT VALUES $t_v (\alpha)$ OF t-DISTRIBUTION (TWO TAIL AREAS) $[|t| > t_v (\alpha)] = \alpha$

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End Semester Examination, May 2019  
B. Sc. (Information Technology) — Second Semester  
BUSINESS ENVIRONMENT (7.106)

Time: 3 hrs.  
Max Marks: 50  
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Explain the following:  
a) Role of business in society.  
b) Organization culture.  
c) Relationship between demand and supply.  
d) International business environment.  
e) Foreign direct investment.  

Q.2 "Every business organization operates in a distinctive environment, as it can't exist in isolation”. How does such an environment influence business and gets affected by its activities.  

Q.3 How to do environmental analysis for business? Prepare an analysis report on the different product lines of big brands flourishing in the domestic or international markets.  

Q.4 "If a business wants to be successful in the marketplace, it is necessary for them to understand which internal factors exert impact on the development of their company”. Explain the internal factors that affect the business.  

Q.5 The external environment can be broken down into two types: the micro environment and the macro environment. Explain the two in detail.  

Q.6 What do you mean by the global context of business? Explain the various issues which should be considered by a business owner functioning globally.  

Q.7 “Technological advancements” is an important tool for the successful growth of a business. Justify your answer with the help of an example.
Q.1  **Multiple choice question:**
   a) An association between three entities is called:
      i) Binary Relationship  b) Ternary Relationship
      ii) Recursive Relationship  d) None of these.
   b) What are components of E-R model?
      i) Entity  ii) Attribute  iii) Relationship  iv) All of these.
   c) 2NF is always in:
      i) 1 NF  ii) BCNF  iii) NVD  iv) None of these.
   d) The normalization process was developed by:
   e) The expansion of BCNF is:
      i) Boyd-Codd normal form.  ii) Bounce Coromwell normal form.
      iii) BoyceeCodd normal form  iv) None of these.

**Fill in the blanks:**
   f) SQL stands for ___________________________________________.
   g) DML stands for ___________________________________________.
   h) Two types of data dictionaries are _____________ and ____________.
   ii) Command to delete table is ________________________________.
   j) Key used for uniquely identify the table _______________________.  
      2x10

**PART-A**

Q.2  a) Compare file oriented and database management systems with pros and cons.  5
   b) Explain three tier architecture of database management system with proper example.  15

Q.3  a) Differentiate Hierarchial, Network and Relational data models with suitable examples.  15
   b) What is the role of data dictionary in DBMS?  5

Q.4  a) Differentiate primary key, foreign key and unique key taking an example of employee database.  10
   b) Differentiate between generalization and specialization.  5
   c) Write a command to edit and delete the records in the table.  5

**PART-B**

Q.5 What is Concurrency? How locks can be implemented to control the concurrency? Discuss two phase locking protocol to remove the inconsistency.  20

Q.6 What is normalization? Why do we use it? Discuss 1 NF, 2 NF and 3 NF taking suitable examples.  20

Q.7  a) What is the concept of data security and recovery? Differentiate authorization and authentication taking suitable examples.  15
   b) Write a short note on ‘distributed database’.  5
End Semester Examination, May 2019
MCA – Fourth Semester
ANALYSIS AND DESIGN OF ALGORITHM (MCA-507A (CB))

Time: 3 hrs. Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Multiple choice questions:
   a) The worst case occur in linear search algorithm when:
      i) Item is somewhere in the middle of the array.
      ii) Item is not in the array at all.
      iii) Item is the last element in the array.
      iv) Item is the last element in the array or is not there at all.
   b) The average case occur in linear search algorithm.  
      i) When item is somewhere in the middle of the array.
      ii) When item is not in the array at all.
      iii) When item is the last element in the array.
      iv) When item is the last element in the array or is not there at all.
   c) The complexity of the average case of an algorithm is:
      i) Much more complicated to analyze than that of worst case.
      ii) Much more simpler to analyze than that of worst case.
      iii) Sometimes more complicated and some other times simpler than that of worst case.
      iv) None of above
   d) __________ is conceptually a top down approach for solving problems.
      i) Divide
      ii) Backtracking
      iii) Dynamic programming
      iv) Divide and Conquer
   e) According to Strassen's method, the complexity of matrix multiplication is __________.

Short answer type questions:
   f) Define backtracking.
   g) How knapsack problem can be solved using greedy method?
   h) Explain the concept of travelling salesman problem.
   i) What are various strategies of branch and bound?
   j) Differentiate between trees and graphs.

PART-A

Q.2 a) What do you mean by Disjoint Set Union? Explain its algorithm with an example. 10
   b) Solve the knapsack problem using greedy method with no of inputs and capacity of bag 15. Profits and Weights are given below:
      n = 7 m = 15
      (p1, p2, p3, p4, p5, p6, p7) = (10, 5, 15, 7, 6, 18, 3)
      (w1, w2, w3, w4, w5, w6, w7) = (2, 3, 5, 7, 1, 4, 1)

Q.3 a) Write the algorithm for Binary search. Analyze its complexity.
   b) Design the state space tree for merge sort with given list: 23, 34, 12, 16, 17, 19, 2

Q.4 Explain Strassen's matrix multiplication method. Also analyze its complexity. 20

PART-B
Q.5  
  a) Explain the algorithm of dynamic programming. Why dynamic programming is better than greedy method?  
  b) Create the ordered set for 0/1 knapsack problem using dynamic programming with n = 4 m = 6.

<table>
<thead>
<tr>
<th>Profit</th>
<th>1</th>
<th>2</th>
<th>5</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Q.6  
  a) Write the algorithm for Hamiltonian cycle and also explain its concept.  
  b) State and prove Cook's theorem.

Q.7  
  How branch and bound is optimal to solve 0/1 knapsack? Generate the state space tree for both UFO and LC for the following data:

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>N</td>
<td>4</td>
<td>M</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>P1</td>
<td>10</td>
<td>w1</td>
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<td>P3</td>
<td>12</td>
<td>w3</td>
<td>6</td>
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</tr>
<tr>
<td>P4</td>
<td>18</td>
<td>w4</td>
<td>9</td>
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</tr>
</tbody>
</table>
End Semester Examination, May 2019
B. Sc. (Information Technology) – Sixth Semester
MOBILE COMMUNICATION (BSCA-602)

Time: 3 hrs.  Max Marks: 100  No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Multiple choice questions.
   a) The process of transferring a mobile station from one base station to another is:
      i) MSC  ii) Roamer
      iii) Hand off  iv) Forward channel
   b) In ________ frequency Spectrum is divided into smaller spectra and is allocated to each user.
      i) TDMA  ii) CDMA
      iii) FDMA  iv) FGMA
   c) The shape of the cellular region for maximum radio coverage is:
      i) Circular  ii) Square
      iii) Oval  iv) Hexagon
   d) Which multiple access technique is used by IEEE 802.11 standard for wireless LAN?
      i) CDMA  ii) CSMA/CA
      iii) ALOHA  iv) None of the mentioned
   e) Co-channel reuse ratio depends upon
      i) Radius of the cell
      ii) Distance between the centers of the co channel cells
      iii) Frequency allocation of nearest cells
      iv) Both a and b
   f) In wireless LAN, there are many hidden stations so we cannot detect the
      i) Frames  ii) Collision
      iii) Signal  iv) Data
   g) IEEE 802.11 have three categories of:
      i) Frames  ii) Fields
      iii) Signals  iv) Sequences
   h) Wireless LANs implement security measures in the.
      i) Session Layers  ii) Data Link Layers
      iii) Sub Layers  iv) Application Layers
   i) The basic GSM is based on _________ traffic channels.
      i) Connection oriented.  ii) Connection less.
      iii) Packet switching.  iv) Circuit switching.
   j) In wireless ad-hoc network.
      i) access point is not required  ii) access point is must
      iii) nodes are not required  iv) None of these

PART-A

Q.2 a) Explain the working of wireless communication with the help of block diagram? Also discuss various generations of wireless communication. 6
   b) What are cellular networks? Explain with diagrams. 8
   c) Compare various multiple access schemes for cellular system. 6

Q.3 Explain GSM architecture in detail. What are main subsystems of GSM architecture? Also list the advantages and disadvantages of GSM communication. 20

Q.4 Write short notes on:
   a) Medium access control
PART-B

Q.5  a) What is wireless LAN? Also discuss various advantages of LAN.  
     b) Differentiate between Ad-hoc and Infrastructure networks. 
     c) What are IEEE 802.11 wireless networks? Explain the architecture of IEEE 802.11 in detail.  

Q.6  a) What is wireless application protocol? Explain its architecture in detail.  
     b) Write short notes on:  
        i) Palm OS.  
        ii) Wireless markup language.  

Q.7  a) What is kernel? Explain its features. Explain the process of memory management in detail.  
     b) Illustrate the working of memory management? Describe its functionality in detail.
End Semester Examination, May 2019  
MCA – Fourth Semester  
CLOUD COMPUTING (MCA-406A (CB))

Time: 3 hrs.  
Max Marks: 100  
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1  Multiple choice questions:
   a) __________ refers to the location and management of the cloud infrastructures.
      i) Service
      iii) Deployment
      iv) All of the above
   b) Which of the following cloud concept is related to pooling and sharing of resources?
      i) Virtualization
      iii) Polymorphism
      iv) Sourcing
   c) Cloud computing is __________ system and it is necessarily unidirectional in nature
      i) Stateless
      iii) Reliable
      iv) None of the above
   d) If operating system and application stack is added to the cloud, then the model is called.
      i) IaaS
      iii) SaaS
      iv) All of the above
   e) __________ serves as a PaaS vendor within Google App Engine system.
      i) Google
      iii) Microsoft
   f) Amazon Elastic cloud computing is a facility for quickly providing virtual servers. This is an example of:
      i) IaaS
      iii) SaaS
      iv) None of the above

Fill in the blanks:
   g) Pods are aggregated into pools within an IaaS region or site called an __________ zone.
   h) An example of public cloud is __________.
   i) VIM is a management tool of __________.
   j) Onion Encryption model helps in providing __________ to the cloud system.  2×10

   PART-A

Q.2  Explain the following concepts of clouds:
   a) Virtualization
   b) Abstraction
   c) SOA
   d) Characteristics of cloud  5×4

Q.3  a) Compare SaaS, PaaS and IaaS with respect to following factors:
   i) Consumers
   ii) Services offered
   iii) Service coverage
   iv) Customization  2½×4
   b) Compare public, private and hybrid cloud on the basis of services, cost, security and reliability.  10

Q.4  a) Explain the fundamental components introduced in cloud reference model. Also discuss the architecture of IaaS model with a suitable example.  12
   b) What are the various ways through which we can connect to a cloud?  8
**PART-B**

Q.5  
   a) What is the use of onion Encryption layer in cloud computing? How is it useful in maintaining trust and reputation in cloud computing?  
   b) What is the use of homomorphic encryption? How crypt DB helps in the security concerns of a cloud.

Q.6  
   a) Write short notes on:
      i) Google App Engine  
      ii) Hadoop  
   b) Compare AWS and Azure on the basis of following parameters:
      i) Compute  
      ii) Storage and databases  
      iii) Pricing  
      iv) Trouble shooting and monitoring  
      v) Uptime

Q.7  
   Explain (any two) application areas of cloud computing in detail.
   a) Scientific applications.  
   b) Business applications.  
   c) Consumer application.
End Semester Examination, May 2019  
MCA – Fourth Semester 
ARTIFICIAL INTELLIGENCE (MCA-404A (CB))

Time: 3 hrs.  
Max Marks: 100  
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1  
a) List the steps of natural language processing.  
b) Will depth first search algorithm always finds the optimal result? Why or why not?  
c) Draw a neat diagram of knowledge pyramid.  
d) Discuss the need of Bayesian Network.  
e) Give an example of declarative knowledge.  
f) What is a fuzzy set? Give example.  
g) Mention the criteria for evaluation of search strategy.  
h) Consider the following production rule:
   IF green THEN walk  
   i) What is the antecedent of this rule?  
   ii) What is the consequent of this rule?  
i) Which blind search algorithm takes less memory (DFS/BFS)? Mention its space complexity also.  
j) Give examples where machine learning can be applied.  

2×10

PART-A

Q.2  
a) Which of the following search algorithms are complete and which are optimal?  
   • C = complete but not optimal  
   • O = optimal but not complete  
   • B = both complete and optimal  
   • N = neither complete nor optimal  
i) __________ breadth-first search.  
ii) __________ depth-first search.  
iii) __________ best first search.  
iv) __________ hill climbing search.  

10

b) Explain the state space with the use of 8 puzzle problem.  

10

Q.3  
Explain major inference rules in propositional calculus with the help of suitable examples.  

20

Q.4  
Consider the following sentences:  
   • Tennis is a game and chess is a game.  
   • John and Steve are students.  
   • John plays tennis.  
   • Steve plays everything that John plays.  
   • Students who play tennis do not play chess.  
Translate the above sentences into formulas in predicate logic.  

20

PART-B

Q.5  
Suppose you have a production system with the three rules:  
R1: IF A, THEN E  
R2: IF B AND F, THEN G  
R3: IF C AND E, THEN F  
and you have four initial facts: A, B, C, D.  
a) Explain what is meant by “backward chaining” and show explicitly how it can be used to determine the truth, or otherwise, of fact G?
b) Explain what is meant by “forward chaining”, and show explicitly how it can be used in this case to determine new facts?

Q.6) Explain the following with reference to expert system:
   a) Expert system shell.
   b) Knowledge acquisition.  

Q.7 Discuss following:
   a) Procedural and declarative knowledge.
   b) Fuzzy logic.
   c) Machine learning.
   d) Neural network.
Q.1 Answer the following multiple choice questions/short answer questions:
   a) To create your application on a remote server, which option will you choose in ASP.Net?
      i) File system  ii) FTP  iii) HTTPS  iv) None of these
   b) It is possible to display picture (i.e images) in HTML specification by using this tag:
      i) `<GR src = Picture file>`  ii) `<PIC src = Picture file>`  iii) `<IMG src = Picture file>`  iv) `<GIF src = Picture file>`
   c) File extension used for ASP.NET files:
      i) .Web  ii) .ASP  iii) .ASPX  iv) None of these.
   d) What is the correct HTML for making a checkbox?
      i) `<checkbox>`  ii) `<input type = “check box”/>`  iii) `<input type = “check”/>`  iv) `<check>`
   e) A web application can contain ____________.
   f) If a user wants to create controls at runtime, which event should be used to write code?
      i) Preload  ii) Load  iii) Init  iv) PreInit
   g) Ajax stands for ______________.
   h) _____ and ________ are key web service technologies.
   i) ________ and ________ are the types of cookies in ASP.NET.
   j) How can you open a link in new browser window?
      i) `<a href = “url” new>`  ii) `<a href = “url” target “new”>`  iii) `<a href = “url” target “blank”>`  iv) `<a href = “url” target = “”> 1½x10

PART-A

Q.2 “Microsoft ASP.NET is an open source server side technology that enables programmers to build dynamic web files, web applications and web services.” Explain ASP.NET in detail along with its architecture. What are its 5 components? Explain with examples. 15

Q.3 a) Compare and contrast between server control and HTML control. 7
   b) Write short notes on:
      i) Master Page.  ii) Ajax.  4x2

Q.4 Explain the steps of connecting any control with the data source. 15

PART-B

Q.5 a) Create a webpage about the course details of a college:
   ABC Information Technology College,
Course details:

i) Complete course:
   - Basic computer training.
   - Diploma in computer application.

ii) Crash course:
   - Accounting course.
   - E-banking course.

iii) Other course:
   - Secretariat training
   - Photography training.

For more details visit abc college.com (create a link for abc college.com).

b) Differentiate between external and internal linking of a web page. Illustrate with the help of an example.

Q.6 Write short notes on:
   a) Grid view control.
   b) Detail view.
   c) Form view control.

Q.7 a) How to secure a website? Give various measures to secure a website.
   b) Differentiate between authentication and authorization.
Q.1 State whether the following statements are true or false. Give reasons:
   a) Can all the devices be hacked in today’s scenarios?
   b) Recognizing the right to access cyberspace is important.
   c) Avoid Trademark Infringement when you choose a domain.
   d) Cyber-crimes: are they extraditable offences?
   e) Computer and its impact on the society in increasing the rate of cybercrimes. 2x5

PART-A

Q.2 State the importance of cyber laws. Discuss its jurisprudence at International and Indian level. 10

Q.3 a) Differentiate between Intellectual Copyright and Patent. 5
   b) State the objectives of International telecommunication Union. 5

Q.4 Explain the IT Act 2000 write its salient features and the offences under IT Act, 2000. 10

PART-B

Q.5 How computer can be used as a weapon for spreading cybercrime? Explain the different types of cybercrimes. 10

Q.6 Write short notes on the following:
   a) Commonwealth of Nations. 5x2
   b) Asia pacific Economic Cooperation.

Q.7 Discuss the several constitutional and human right issues in cyberspace. What provisions are required to enforce them? 10
Q.1 Multiple choice questions:
   a) What is the O/P of relational operators?
      i) Integer  ii) Boolean  iii) Character  iv) Double.
   b) Which of these are relation statements in Java?
      i) For     ii) If     iii) Continue  iv) Break
   c) The while loop repeats a set of code while the condition is not met?
      i) True    ii) False.
   d) Which of the following classes can catch all exception which cannot be caught?
      i) Runtime  ii) Error    iii) Exception  iv) None.
   e) Which method is part of AWT?
      i) Display  ii) Paint    iii) Drawstring  iv) None.
   f) Which keyword can be used to prevent method overriding?
      i) Static   ii) Constant  iii) Protected  iv) Final
   g) What is the return types of a method that does not return any value?

State whether the following statements are true or false:
   h) "Basic java language functions are stored in java language".
   i) "Start ( ) method is used to begin the execution of thread".
   j) "++ symbol has highest precedence".

PART-A

Q.2 a) Differentiate between Java, C and C++.

Q.3 a) Explain various Repetitive statements available in Java. Give examples of each.

Q.4 a) What are constructors? Discuss its features. Also write java program for parameterized constructor.

PART-B

Q.5 Define ‘Inheritance’. Discuss various types of Inheritance available in Java. Give a suitable example of each type.

Q.6 Define ‘Multithreading’. What is the need of it? Discuss thread life cycle in detail with block diagram.

Q.7 a) What is the difference between Applet and Application?
   b) Write short notes on the following:
      i) Parameters to applet.
      ii) Paint ( ) method.
End Semester Examination, May 2019
B. Tech. – Second Semester
PHYSICS (INTRODUCTION TO ELECTROMAGNETIC THEORY)
(BSC-PH-101)

Time: 3 hrs.                                      Max Marks: 100
Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:
   a) Define electric field intensity and electric potential.
   b) Write Poisson's and Laplace equations.
   c) Differentiate between dielectrics and insulators.
   d) Explain free charges and bound charges in polarization.
   e) Explain the term magnetostatics.
   f) What is the origin of magnetic vector potential?
   g) What is meant by linear magnetic materials?
   h) Derive relation between magnetic susceptibility and relative permeability.
   i) Write Maxwell's equations in vacuum.

**PART-A**

Q.2 a) Derive the expression for divergence of electrostatic field and give it’s physical significance.  6
   b) Determine the electric field and electric potential due to a point charge above a grounded conducting plane using method of images.  10
   c) Explain why potential gradient is a vector quantity.  4

Q.3 a) Calculate the electric potential and electric field intensity due to a dipole at a point inclined at some angle.  12
   b) Derive the boundary conditions for static electric field across a boundary separated by two different dielectric media.  8

Q.4 a) Calculate the value of magnetic field at a point due to a long current carrying wire using Bio-savart’s law.  8
   b) State and derive the divergence of static magnetic field.  6
   c) Derive magnetic vector potential in terms of current densities.  6

**PART-B**

Q.5 a) Define magnetization. Derive an expression for vector potential in terms of surface bound current and volume bound current.  12
   b) Write a note explaining Faraday's law, Lenz's law and motional emf.  8

Q.6 a) Derive the continuity equation for charge conservation. What does it signifies?  8
   b) State and prove Poynting theorem. Explain the term poynting vector.  12

Q.7 a) Calculate reflection and transmission coefficients for electromagnetic wave, when it travels from one medium to another provided the mediums are nonmagnetic.  8
   b) Solve Maxwell's equations to obtain electromagnetic wave equations for E and B in free space.  8
   c) Show that the electromagnetic waves are transverse in nature.  4
End Semester Examination, May 2019
B. Tech. – Second Semester
SEMICONDUCTOR PHYSICS (BSC-PH-104)

Time: 3 hrs.  Max Marks: 100
No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

**Q.1**  
a) What is density of states?  
b) Give one example of direct and indirect band gap semiconductor.  
c) Where is the Fermi level located in n-type semiconductor at OK?  
d) What is the order of the forbidden energy gap in case of silicon and germanium?  
e) Differentiate between spontaneous and stimulated emission.  
f) Give the full form of SLED and ELED.  
g) Distinguish between photoemissive and photoconductive type photodetectors.  
h) Define the term photoconductivity.  
i) What for DLTS is used?  
j) Give the uses of capacitance voltage method.

2×10

**PART-A**

**Q.2**  
a) Derive the expression for conductivity of metals on the basis of Drude’s model.  
b) Draw E-K diagram and bring out its useful information.  
c) Write short notes on occupation probability.

10

**Q.3**  
a) Derive an expression for the intrinsic carriers concentration in an intrinsic semiconductor.  
b) Why are some semiconductor materials suitable for optoelectronic devices? Explain in detail.

12

**Q.4**  
a) Derive an expression for the density of states for photons.  
b) If light is incident on a semiconductor, obtain the conditions for optical loss and gain.

10

**PART-B**

**Q.5**  
a) Differentiate between radiative and non-radiative recombination.  
b) Discuss homo junction Light Emitting Diode (LED) giving the reasons for losses of emitted photons.  
c) List the figure of merits of light emitting diode.

6

10

4

**Q.6**  
a) Explain the structure, working principle and characteristics PIN diode.  
b) What is a solar cell? Describe its construction, working and characteristics.

10

10

**Q.7**  
a) Derive suitable expression and explain the Van der Pauw and four-point probe measurement for the carrier density of a semiconductor.  
b) What do you mean by band gap? How we can find out the band gap of semiconductor using UV-Vis spectroscopy?
Q.1 Write short answer questions:
   a) Use of social media in job search.
   b) E-mail etiquettes.
   c) Role of social media analytics.
   d) Social networking crimes.
   e) Usage of youtube as a social media platform.  
   \[2 \times 5\]

**PART-A**

Q.2 Discuss various social media platforms.  
\[10\]

Q.3 Give an introduction of social networking. How will you differentiate social networking from social media?  
\[10\]

Q.4 Write short notes on:
   a) E-mail etiquettes.
   b) Professional etiquettes.  
   \[5 \times 2\]

**PART-B**

Q.5 Many social media crimes prevail the social world today. Name the common types of social media crimes. How do they affect the professional and personal life of a person?  
\[10\]

Q.6 Social Networking laws in India are regulated by the information technology Act, 2000. As per IT Act 2000, explain online copyright violations in India and cyber due diligence in India.  
\[10\]

Q.7 Write short notes on the following:
   a) Social media monitoring for brands.
   b) Social media measurement.  
   \[5 \times 2\]
End Semester Examination, May 2019
B. Sc. (Information Technology) – Sixth Semester
SOCIAL MEDIA NORMS AND ETIQUETTES (CA-GE-31)

Time: 3 hrs
Max Marks: 50
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from Part-A and TWO questions from Part-B. Each question carries equal marks.

Q.1 Explain the following concepts of social media (Attempt any two):
   a) Blogging.
   b) Social networking.
   c) Social media etiquettes.
   d) Cyber media advertisement.

PART-A

Q.2 a) Differentiate social customer service environment from social marketing environment? Support your answer with example.
   b) Discuss strategies for listening and talking within outline communities with suitable example.

Q.3 a) “Social media is becoming threat an social propriety”. Justify this statement with logic and facts.
   b) Differentiate social networking from social media.

Q.4 “You have started a business and you want to do publicity on social media.” Which social media option you will use for it twitter, Facebook, LinkedIn, integral, Google+ or any other and why? Support your answer with real time facts.

PART-B

Q.5 a) Suggest some good tools for marketing on social media.
   b) Discuss online copyright infringement liability limitations Act. (OCILLA).

Q.6 a) What are different social media measurement tools? Give example.
   b) How to monitor social media for different brands?

Q.7 Write short notes on:
   a) Social networking crime.
   b) FB edgerank.

5x2
End Semester Examination, May 2019  
B. Sc. (Data Science) – First Semester  
MATHEMATICAL TECHNIQUES (DS-102)  

Time: 3 hrs.  
Max Marks: 75  
No. of pages: 1  

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1  a) Expand \( \cos x \) in powers of \( x \).  
2  
b) If \( x = r \cos \theta \) and \( y = r \sin \theta \), show that \( \frac{\partial (x, y)}{\partial (r, \theta)} = r \)  
2  
c) Evaluate \( \Gamma \left( \frac{1}{2} \right) \)  
2  
d) Evaluate: \( \int_0^x \cos^4 x \, dx \)  
2  
e) Give the negation of the following statements.  
i) \( p : 2 + 3 > 1 \)  
ii) \( q : \) It is cold  
2  
f) The truth value of given statement is:  
'\( 4 + 3 = 7 \) or 5 is not prime'.  
i) False  
ii) True  
1  
g) If \( A = \{ a, e, i, o, u \} \) and \( B = \{ i, a, o, e, u \} \). Is \( A \subseteq B \) or \( B \subseteq A \) or both?  
2  
h) Let \( A = \{ 3, -6 \} \) and \( B = \{ x : x^2 + 3x - 18 = 0 \} \). Is \( A = B \)?  
2  

PART-A  

Q.2  a) Find the graph that has the following adjacency matrix:  
\[
\begin{bmatrix}
0 & 0 & 1 & 1 \\
1 & 0 & 2 & 0 \\
2 & 1 & 0 & 0 \\
1 & 1 & 0 & 0 \\
\end{bmatrix}
\]  
10  
b) Find the complement of the graph shown below:  
5  

Q.3  Find the shortest path from \( s \) to \( t \) and its length for the given below:  

---
Q.4  
   a) Show that the argument  
   \[ p \rightarrow q \]  
   is valid.  
   \[ \therefore q \]  
   b) Form the disjunction of \( p \) and \( q \) for each of the following:  
   i) \( p : 2 \) is a positive integer  
   \[ q : \sqrt{2} \] is a rational number  
   ii) \( p : 2 + 3 = 5 \)  
   \[ q : \text{London is capital of France} \]  

Q.5  
Find truth value of each proposition if and only if \( p \) and \( r \) true and \( q \) is false.  
   a) \( p \lor q \lor r \)  
   b) \( p \land (\neg q \lor \neg r) \)  

\textbf{PART-B}  

Q.6  
   a) Test the function \( f(x, y) = x^3 y^2 \left( 6 - x - y \right) \) for maximum and minimum for points not at the origin.  
   b) If \( x^r + y^r = a^h \) find \( \frac{dy}{dx} \).  

Q.7  
   a) Expand \( f(x, y) = \tan^{-1} \left( \frac{y}{x} \right) \) in the neighborhood of \((1, 1)\) upto third degree terms.  
   Hence compute \( f(1.1, 0.9) \) approximately.  
   b) If \( u = xyz, \ v = xy + yz + zx, \ w = x + y + z \) compute \( \frac{\partial (u, v, w)}{\partial (x, y, z)} \).  

Q.8  
   a) Evaluate \( \iint x^2 y^2 \, dx \, dy \) over the circle \( x^2 + y^2 \leq 1 \).  
   b) Change the order of integration \( \int_0^{\sqrt{1-y^2}} \int_y^{\sqrt{1-y^2}} \, dx \, dy \).  

Q.9  
   a) Find the volume of the sphere \( x^2 + y^2 + z^2 = 1 \) by double integration.  
   b) Prove that \( \beta(m, n) = 2 \int_0^{\pi/2} \sin^{2m-1} \theta \cos^{2n-1} \theta \, d\theta \).
End Semester Examination, May 2019  
BCA – Fifth Semester  
DATA COMMUNICATION AND NETWORKING (BCA-501 (CB))

Time: 3 hrs.  
Max Marks: 100  
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from Part-A and TWO questions from Part-B. Each question carries equal marks.

Q.1 Multiple choices questions/short answer questions:
a) MIME stands for _______.  
b) A set of rules that govern all aspect of communication is called _______.  
c) A bridge can:  
   i) Filter a frame  
   ii) Forward a frame  
   iii) Extend a LAN  
   iv) All of these.  
d) _______ is often used for navigation purpose.  
   i) AMPS  
   ii) IS-95  
   iii) Iridium  
   iv) GPS  
e) Which is a legal port address?  
   i) 0  
   ii) 513  
   iii) 65,535  
   iv) All of these  
f) IP header six is:  
   i) 20 to 60 byte long  
   ii) 20 byte long  
   iii) 60 byte long  
   iv) Depends on MTU  
g) The ________ layer is closest to transmission medium.  
h) If the bandwidth of a signal is 5 khz and the lowest frequency is 52 khz. What is the highest frequency?  
   i) 5 Khz  
   ii) 10 KHz  
   iii) 47 KHz  
   iv) 57 KHz  
i) Limitation of star topology is _________.  
j) CRS stands for _________.  

PART-A

Q.2  
a) Define the term topology. Explain the advantages and disadvantages of each topology in detail.  
   10  
b) What are the advantages of digital transmission? How digital to analog modulations can be accomplished?  
   10

Q.3  
Why OSI model is called as open system Interconnection? Explain the function of each layer of OSI model in detail.  
20

Q.4  
a) Explain the major classes of guided media. Also discuss how guided media differs from unguided media?  
   10  
b) Define Multiplexing. Explain the various multiplexing techniques that allow the transmission of multiplex signals across a single data link.  
   10

PART-B

Q.5  
Write short notes on:  
a) Telnet  
b) POP  
c) SMTP  
d) DNS  
5x4

Q.6  
a) Explain the architecture of IEEE 802.11.  
   10  
b) How communication can be achieved from one point on the earth to another? Justify.  
   10

Q.7  
a) Explain IPV6 addressing mechanism in detail.  
   10  
b) Explain the architecture of Bluetooth with the help of a diagram.  
   10
End Semester Examination, May 2019
BCA (Bachelor of Computer Application) – Fifth Semester
JAVA PROGRAMMING (BCA-5002)

Time: 3 hrs.  
Max Marks: 75

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from Part-A and TWO questions from Part-B. Marks are indicated against each question.

Q.1 Give short answers to the following:
   a) What is the relevance of triple shift operator?
   b) What is the difference between protected and default?
   c) What is polymorphism?
   d) What is importance of creating static functions?
   e) Explain function overriding.  
   3x5

**PART-A**

Q.2 With suitable illustration, discuss the following:
   a) Selection control structures.
   b) Repetition control structures.  
   7½x2

Q.3 What is an object? Explain the importance of methods in object oriented programming. Describe the general form of a class and declaring objects.  
   15

Q.4 a) What are the differences between a constructor and parameterized constructor?
   b) Write short notes on access protection.  
   7½x2

**PART-B**

Q.5 Write short notes on the following:
   a) Try-catch.
   b) Threws.
   c) Throw.  
   5x3

Q.6 What is a package? How are package important? Write a program to import a class from another package.  
   15

Q.7 Explain the life cycle of an Applet in details. Create an Applet and write html code to display it.  
   15
End Semester Examination, May 2019
BCA – Fifth Semester
DATA COMMUNICATION AND NETWORKING (BCA-501A (CB))

Time: 3 hrs.  Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from Part-A and TWO questions from Part-B. Each question carries equal marks.

Q.1 Multiple choice questions:

a) Most packet switches use this principle:
   i) Stop and Wait.
   ii) Store and forward.
   iii) Both Stop and wait and store and forward.
   iv) None of the mentioned.

b) In __________ resources are allocated on demand.
   i) Packet switching.
   ii) Circuit switching.
   iii) Line switching.
   iv) Frequency switching.

c) In IPv4 Addresses, classful addressing in replaced with:
   i) Classless Addressing.
   ii) Classful Addressing.
   iii) Classful Advertising.
   iv) Classless Advertising.

d) ATM uses the:
   i) Asynchronous frequency division multiplexing.
   ii) Asynchronous time division multiplexing.
   iii) Asynchronous space division multiplexing.
   iv) None of the mentioned.

e) Frame relay has error detection at the:
   i) Physical layer.
   ii) Data link layer.
   iii) Network layer.
   iv) Transport layer.

f) Two broad categories of congestion control are:
   i) Open-loop and Closed-loop.
   ii) Open-control and Closed-control.
   iii) Active control and Passive control.
   iv) None of the mentioned.

g) Two devices are in network if:
   i) A process in one device is able to exchange information with a process in another device.
   ii) A process is running on both devices.
   iii) PIDs of the processes running of different devices are same.
   iv) None of the mentioned.

h) In the layer hierarchy as the data packet moves from the upper to the lower layers, headers are:
   i) Added.
   ii) Removed.
   iii) Rearranged.
   iv) Modified.

i) Physical layer provides:
   i) Mechanical specifications of electrical connectors and cables.
   ii) Electrical specification of transmission line signal level.
   iii) Specification for IR over optical fiber.
   iv) All of the mentioned.

j) Application layer offers __________ service.
   i) End to end.
   ii) Process to process.
   iii) Both End to end and Process to process.
   iv) None of the mentioned.

k) Framing.
Q.2 a) How topologies help in setting a network? Explain any five topologies with the help of a diagram.  
   b) What do you mean by data communication? Explain its components and characteristics of data communication.  

Q.3 a) Explain different type of switching techniques.  
   b) Write short note on the following:  
      i) Cable TV Networks  
      ii) Guided and Unguided Medium.  

Q.4 a) Explain TCP/IP model. How it is different from OSI mode. Explain.  
   b) Data is transmitted as 1011110 and received as 1011100. Using hamming code detects the error and gives method for obtaining correct sequence.  

Q.5 a) Differentiate between following:  
      i) IPV4 and IPV6  
   b) Write short note on following:  
      i) User Datagram Protocol  
      ii) Congestion Control.  

Q.6 Explain token bus. How token is being passed in token ring architecture? Also explain the frame format of the token bus.  

Q.7 Write short note on following:  
   a) ALOHA  
   b) Frame Relay  
   c) CSMA/CD  
   d) Standard Ethernet.
End Semester Examination, May 2019
MCA — Fifth Semester
ADVANCE DATABASE SYSTEM (MCA-501(CB))

Time: 3 hrs.  
Max Marks: 100  
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer the following questions:
   a) How will you define 2nd normal form?
   b) Explain multivalued attribute with example.
   c) Discuss wild card characters in SQL.
   d) Write down the syntax of difference clause.
   e) What is multivalued dependency?
   f) Discuss horizontal fragmentation with example.
   g) Explain any two E.F. Codd rules of RDBMS.
   h) How we can issue comments in PL.SQL code? Discuss it.
   i) Define “Implicit cursors”.
   j) Discuss any two differences between procedure and function. 2×10

PART-A

Q.2 a) What is normalization? Discuss the similarities and dissimilarities between 3NF and BCNF. 10
   b) Explain E.F. Codd rules of RDBMS in detail. 10

Q.3 a) Explain the following with syntax and example:
   i) Update  ii) Views  iii) Round
   iv) Intersect.  v) Unique key. 3×5
   b) Explain the features of ORACLE. 5

Q.4 a) What are SQL constraints, how do we define it during the creation of table, explain various types of constraints with example. 10
   b) What is query processing? Explain the various phases of query processing. 10

PART-B

Q.5 a) What is database recovery? Explain log based recovery technique for recovery in detail. 15
   b) Explain the difference between system crash and media failure. 5

Q.6 What do we mean by cursor? Discuss the usage and working of cursors. Explain it with example. 20

Q.7 a) Explain the various types and layers of cloud computing in detail. 15
   b) Write a short note on “Big Data”. 5
End Semester Examination, May 2019  
MCA – Third Semester  
LINEAR ALGEBRA AND STATISTICAL TECHNIQUES (MCA-301A (CB))

Time: 3 hrs.  
Max Marks: 100  

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1  
a) Define an Abelian group.  
b) The value of Karl Pearson’s coefficient of correlation (r) lies between _________ to _________.  
c) State ‘Addition Law’ of probability.  
d) What do you mean by ‘characteristic equation’?  
e) Compute the inverse  
\[ A = \begin{bmatrix} 13 & 9 \\ 27 & -5 \end{bmatrix} \]  
f) Discuss echelon form.  
g) Linear transformation is __________.  
h) Define ‘correlation’ in statistics.  
i) Define a ‘vector space’ over the field (f).  
j) Explain ‘level of significance’.  

**PART-A**

Q.2  
a) Prove that T is linear transformation where T has been defined as:  
\[ T : V_2 \rightarrow V_2 \text{ by } T(a_1, a_2) = (a_1, 0) \]  
b) Find the inverse of the given matrix  
\[ A = \begin{bmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{bmatrix} \]

Q.3  
a) Show that the system:  
\[
\begin{align*}
x + 2y - z &= 3 \\
3x - y + 2z &= 1 \\
2x - 2y + 3z &= 2 \\
x - y + z &= -1
\end{align*}
\]  
of linear equation is consistent.  
b) Find the value of \( \lambda \) and \( \mu \) for which the system of equation.  
\[
\begin{align*}
3x + 2y + z &= 6 \\
3x + 4y + 3z &= 14 \\
6x + 10y + \lambda z &= \mu
\end{align*}
\]  
Has an unique solution.

Q.4  
a) Verify Cayley-Hamilton theorem for the matrix:  
\[ A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix} \]  
b) Find the rank of the matrix
\[
A = \begin{bmatrix}
1 & 2 & 3 \\
4 & 6 & 5 \\
8 & 7 & 1 \\
\end{bmatrix}
\]

c) Explain various steps to Diagonalize a given matrix.

**PART-B**

Q.5  
a) Write short notes on the following: 
   i) Mean of a grouped data.  
   ii) Mode of a grouped data.  
   iii) Standard deviation.  

b) Calculate the regression equations of (X and Y) and (Y on X) from the following data:

\[
x: \quad 1 \quad 2 \quad 3 \quad 4 \quad 5 \\
y: \quad 2 \quad 5 \quad 3 \quad 8 \quad 7 \\
\]

Q.6  
a) Explain the use of ‘sampling’ in statistics. Differentiate between random sampling and non-random sampling along with suitable examples.

b) Fit a binomial distribution to the following data and compare the theoretical frequencies with the actual ones:

\[
x \quad 0 \quad 1 \quad 2 \quad 3 \quad 4 \quad 5 \\
y \quad 3 \quad 10 \quad 21 \quad 35 \quad 23 \quad 9 \\
\]

Q.7  
a) Write a note on linear programming problems and discuss various steps to formulate LPP.

b) Use the simplex method to solve the problem:
   Maximize: 
   \[z = 4x_1 + 10x_2\]
   Subjected to 
   \[2x_1 + x_2 \leq 50\]
   \[2x_1 + 5x_2 \leq 100\]
   \[2x_1 + 3x_2 \leq 90\]
   and \[x_1, x_2 \geq 0\]
End Semester Examination, May 2019
BCA — First Semester
ELEMENTS OF MATHEMATICS (BCA-102 (CB))

Time: 3 hrs.        Max Marks: 75
No. of pages: 2

Note: Attempt FIVE questions in all; taking at least ONE question from each Unit. Q.1 is compulsory. Marks are indicated against each question.

Q.1 Answer the following questions:

a) If $A = \{2, 3\}, B = \{x : x$ is a root of $x^2 + 5x + 6 = 0\}$ find $A \cup B$.

b) If $G = \{7, 8\}$ and $H = \{5, 4, 2\}$ find $G \times H$.

c) If $\tan x = \sqrt{3}$ find $\sin x$.

d) Find the derivative of the function $f(x) = 2x^2 + 3x - 5$.

e) Evaluate $\lim_{x \to 1} \frac{x^2 - 1}{x - 1}$.

f) In a single throw of two dice, the probability of getting a total other than 9 or 11 is ________.

g) Find $\frac{dr}{dt}$ when $r = (1 - \cos t)i + (t - \sin t)j$.

h) Which term of A.P. 11, 17, 23, .... is 551.

i) If $f$ and $g$ are the functions such that $f : R \to R$ and $g : R \to R$ $f(x) = 4x - 1$ and $g(x) = x^2 + 2$ find $\circ f g$.

j) Write down all the such-set of $\{1, 3, 5\}$.

UNIT-I

Q.2 a) In a class of 60 boys there are 45 boys who play cards and 30 boys who play carrom. Use set operations to show:

i) How many play cards only.

ii) How many boys play carrom only.

b) Let $A = \{2, 3, 4\}$ and $B = \{3, 6, 8\}$ find $R$ where $R$ is relation 'x divides y' from set $A$ to set $B$. Also, find $R^{-1}$, Domain ($R$) and Range ($R$).

Q.3 a) Write the domain of the following function:

i) $y = \frac{x^2 - 9}{x - 3}$

ii) $y = \frac{x^2 + 3x + 5}{x^2 - 5x + 4}$

b) If $f, g : R \to R$ are defined respectively by $f(x) = x^2 + 3x + 1, g(x) = 2x - 3$. Find:

i) $\circ f g$ ii) $\circ g f$ iii) $\circ f f$

UNIT-II

Q.4 a) If $A + B = 45$; prove that $(\cot A - 1)(\cot B - 1) = 2$.

b) Prove that $\cos 20^\circ \cos 40^\circ \cos 60^\circ \cos 80^\circ = \frac{1}{16}$.

Q.5 a) Two dice are tossed once. Find probability of getting an even number on first die or a total of 8.

b) A card is drawn from a deck of cards. Find probability of getting a king or a heart or a red card.

UNIT-III
Q.6  
\( f(x) = \begin{cases} 
2x-1 & ; \ x < 2 \\
\ a & ; \ x = 2 \ \text{continuous at } x = 2 \\
x+a & ; \ x > 2 
\end{cases} \)

b) Differentiate \( \left( \frac{3x+4}{2-x} \right)^2 \) w.r.t. \( x \).

Q.7  
\( a) \ \text{If } y = x + \sqrt{x^2 - 1}, \ \text{prove that} \ (y-x) \frac{dy}{dx} - y = 0. \)

\( b) \ \text{Evaluate div} \ f \ \text{where} \ f = 2x^2z_i - xy^2z_j + 3y^3x_k \ \text{at} \ (1, 1, 1). \)

**UNIT-IV**

Q.8  
\( a) \ \text{Evaluate} \ \int \frac{x+1}{x^2+1} \ dx. \)

b) \( \int \frac{x}{\sqrt{1+x}} \ dx. \)

Q.9  
\( a) \ \text{Solve the differential equation:} \ 
(x+2) \frac{dy}{dx} = x^2 + 4x - 9 \)

b) \( \text{Show that the set I of all integers} \ldots \ldots -4, -3, -2, -1, 0, 1, 2 \ldots \ldots \ \text{is an abelian group with respect to the operation of addition of integers.} \)
End Semester Examination, May 2019  
BCA – First Semester  
BASIC MATHEMATICAL SKILLS (BCA-1004)

Time: 3 hrs.  
Max Marks: 75  
No. of pages: 2

Note: Attempt FIVE questions in all; taking at least ONE question from each UNIT. Q.1 is compulsory. All questions carry equal marks.

Q.1  Answer the following:

a) Find the values of \( x \) and \( y \) if \[
\begin{bmatrix}
    x & 5 \\
    7 & y-3
\end{bmatrix}
+ \begin{bmatrix}
    3 & -4 \\
    1 & 2
\end{bmatrix} = \begin{bmatrix}
    7 & 6 \\
    15 & 4
\end{bmatrix}.
\]

b) Evaluate \( \frac{12! - 10!}{9!} \).

c) There are 6 candidates for 3 posts. In how many ways can the posts be filled?

d) If \( \tan A = 43 \), find the value of \( \cos A \)

e) The number of terms in the A.P. 2, 5, 8,……., 59 is _______.

f) Evaluate \( 7! + 5! \).

g) If \( 4P_n = 5^4 P_3 \), find \( n \)

h) If 5\(^{th} \) term of a G.P. is 2, then find the product of first 9 term.

i) Find ‘a’ if the 17\(^{th} \) and 18\(^{th} \) terms in the expansion of \( (2 + a)^{10} \) are equal.

j) If \( A = \begin{bmatrix}
    2 & 3 \\
    4 & 7
\end{bmatrix} \), find \( f(A) \) where \( f(x) = x^3 - 5x - 2 \).

1½×10

UNIT-I

Q.2  a) Find the value of \( x \) such that
\[
\begin{vmatrix}
    1 & 3 & 2 \\
    1 & 5 & 1 \\
    15 & 3 & 2
\end{vmatrix}
= 0
\]

b) Prove that \[
\begin{vmatrix}
    x+y & x & x \\
    5x+4y & 4x & 2x \\
    10x+8y & 8x & 3x
\end{vmatrix}
= x^3
\]

UNIT-II

Q.3  a) Solve the following system of equation by Cramer’s rule:
\[
\begin{align*}
6x + y - 3z &= 5 \\
x + 3y - 2z &= 5 \\
2x + y + 4z &= 8
\end{align*}
\]

b) Find the adjoint of \( A \), where:
\[
A = \begin{bmatrix}
    1 & 2 & 3 \\
    0 & 5 & 0 \\
    2 & 4 & 3
\end{bmatrix}
\]

UNIT-II

Q.4  a) Find the middle term in the expansion of \( \left( x^2 - \frac{2}{x} \right)^{10} \).

b) How many terms of the sequence -2, 3, 8, 13, …… make the sum 568.
Q.5  a) How many three digit odd numbers can be formed from the digits 1, 2, 3, 4, 5, 6 when
i) Repition of digits is not allowed.
ii) Repition of digits is allowed.

b) Simplify $\frac{3^2 \times 27^3 \times 9^4}{3 \times (81)^4}$

UNIT-III

Q.6  a) Prove that: $\sin^4 \theta + \cos^4 \theta = 1 - 2 \sin^2 \theta \cos^2 \theta$.

b) Prove that: $\frac{\sin(A-B)}{\cos A \cos B} + \frac{\sin(B-C)}{\cos B \cos C} + \frac{\sin(C-A)}{\cos C(\cos A)} = 0$.

UNIT-IV

Q.8  If: $f(x) = x^2 + 2x^2 - 5x + 11$, find the value of $f\left(\frac{9}{10}\right)$ with the help Taylor’s series.

Q.9  a) If $f(x) = \begin{cases} \frac{x^2 - 1}{x - 1} & \text{when } x \neq 1 \\ 2 & \text{when } x = 1 \end{cases}$
Show that $f(x)$ is continuous at $x = 1$.

b) Differentiate w.r.t $(x)$: $Y = (x^2 + 1) \sqrt{2x - 5}$
Q.1 **Multiple choice questions:**

a) Which data type is used to represent the absence of parameters?
   i) int
   ii) short
   iii) void
   iv) float

b) Which of the following statements are true? [Int f (float)]
   i) f is a function taking an argument of type int and returning a floating point number
   ii) f is a function taking an argument of type float and returning an integer
   iii) f is a function of type float
   iv) None of the mentioned

c) When a language has the capability to produce new data types mean, it can be called as
   i) overloaded
   ii) extensible
   iii) encapsulated
   iv) reprehensible

d) Function overloading is also similar to which of the following?
   i) operator overloading
   ii) constructor overloading
   iii) destructor overloading
   iv) none of the mentioned

e) What will happen while using pass by reference
   i) The values of those variables are passed to the function so that it can manipulate them
   ii) The location of variable in memory is passed to the function so that it can use the same memory area for its processing
   iii) The function declaration should contain ampersand (and in its type declaration)
   iv) All of the mentioned

f) Which keyword is used to handle the exception?
   i) try
   ii) throw
   iii) catch
   iv) None of the mentioned

g) Pick out the correct statement.
   i) A derived class's constructor cannot explicitly invokes its base class's constructor
   ii) A derived class's destructor cannot invoke its base class's destructor
   iii) A derived class's destructor can invoke its base class's destructor
   iv) None of the mentioned

h) How does the string are stored in the memory?
   i) Contiguous
   ii) Non-contiguous
   iii) Null
   iv) All of the mentioned

i) What does derived class does not inherit from the base class?
   i) Constructor and destructor
   ii) friends
   iii) operator = () members
   iv) All of the mentioned

j) Which operator is having the highest precedence?
   i) postfix
   ii) unary
   iii) shift
   iv) equality

k) **Write short notes on:**
   i) Early V/s late binding.
   ii) Constructor overloading.

---

**PART-A**

1½×10

2½×2
Q.2 Distinguish between the following terms
a) Objects and classes.
b) Data abstraction and data encapsulation.
c) Inheritance and polymorphism.
d) Dynamic binding and message passing.

Q.3 a) What are strings? Are they standard or derived data types? Write an interactive program to check whether a given string is a palindrome or not.
b) What is function overloading? Write a program in C++ to find the maximum of two numbers using function overloading.

Q.4 a) What is a class? How does it accomplish data hiding? Explain with the help of an example.
b) What are the merits and demerits of using the friend function?

PART-B

Q.5 List some of the special characteristics of constructor. What are the ways in which a constructor can be called?

Q.6 What are the different forms of inheritance? Give an example of each.

Q.7 a) Define manipulators and also mention the manipulators that are used in C++.
b) What are the advantages of using exception handling mechanism in a program? Elaborate with the help of an example.
Q.1 a) __________ is a feature of OOP language.
b) __________ is a derived data type in C++
c) __________ is an example of derived data type in C++.
d) __________ and __________ are two logical operators in C++
e) __________ is an advantage of array in C++
f) Friend function is used to __________.
g) __________ is an example of conditional statement in C++
h) Abstract class helps in __________.
i) This is a _______ in C++
j) Binding means _________ in C++

2x10

PART-A

Q.2 a) Explain how OOP languages provide data security with the help of an example. 10
b) Give two applications of C++ in real life. 10

Q.3 Give two examples of each of the following with proper syntax:
a) Conditional statements in C++.
b) Looping statements in C++.
c) Function Prototyping.
d) Return a value from a function. 5x4

Q.4 a) Explain the use of array of objects using suitable examples. 10
b) “The use of Friend function risks data security in C++”. Comment. 10

PART-B

Q.5 Give two examples of each of the following with proper syntax:
a) Parameterized constructor.
b) Unary Operator overloading.
c) Zero argument constructor.
d) Constructor overloading. 5x4

Q.6 Differentiate the following:
a) Virtual base class and abstract class. 6
b) Virtual function and Pure virtual function. 6
c) Early binding and late binding. 8

Q.7 a) Explain the need of Exception Handling using suitable examples. 10
b) Explain the following terms:
   i) I/o operators
   ii) I/o manipulators 10
End Semester Examination, May 2019
BCA - First Semester
ELEMENTS OF MATHEMATICS (BCA-102 (CB))

Time: 3 hrs.                          Max Marks: 100
Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from
PART-A and TWO questions from PART-B. Each question carries equal marks.

Q.1  a) Simplify $3\sqrt{a^3} \times 2\sqrt{a^3}$

b) Find $AB$ if $A = \begin{bmatrix} 1 & 3 \\ 2 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 4 \\ -1 \end{bmatrix}$.

c) If $B = \begin{bmatrix} 2 & 3 & 0 \\ 1 & -1 & 5 \end{bmatrix}$, $C = \begin{bmatrix} 1 & -2 & 3 \\ -1 & 0 & 2 \end{bmatrix}$ find $3B+4C$.

d) Construct 2x2 matrix $A = \begin{bmatrix} a_{ij} \end{bmatrix}$ whose elements are given by $a_{ij} = i + j$.

e) If $\log_3(7x+3) = \log_3(5x+9)$; find $x$.

f) Find the value of $a$, $b$, $c$, $d$ from the matrix $\begin{bmatrix} a + 3 & 2b - 8 \\ c + 1 & 4d - 6 \end{bmatrix} = \begin{bmatrix} 0 & -6 \\ -3 & 2d \end{bmatrix}$.

g) Define rectangular matrix.

h) Evaluate: $\log(\sqrt{8})/\log(8)$

i) Find $\lim_{x \to 2} \frac{x^2 + 3x + 5}{x + 2}$.

j) Without expanding prove that the following determinant vanish.

$$A = \begin{bmatrix} 3 & 1 & 6 \\ 5 & 2 & 10 \\ 7 & 4 & 14 \end{bmatrix}$$

2x10

PART-A

Q.2  a) Find the value of $x$ such that $\begin{bmatrix} 1 & 2 & 0 \\ 2 & 0 & 1 \\ 1 & 0 & 2 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \\ x \end{bmatrix} = 0$  10

b) Solve the following equations using Cramer’s rule:

$x + y + z = 7$

$x + 2y + 3z = 16$

$x + 3y + 4z = 22$  10

Q.3  a) If $3^{x-y} = 27$ and $3^{x+y} = 243$, then find the value of $x$ and $y$.  10

b) If $x$ is positive number and equal to $\sqrt{6 + \sqrt{6 + \sqrt{6 + \ldots}}}$, where the given expression extends to an infinite number of roots, then what is the value of $X$?  10

Q.4  a) How many words can be formed from the letters of the word DAUGHTER?

i) taking all the letters together.

ii) beginning with D and ending with R.

iii) beginning with D.
iv) Vowels always being together.

b) Find the term independent of \( x \) in the expansion of \( \left( \frac{3x^2 - 1}{3x} \right)^6 \).

**PART-B**

Q.5  
\begin{enumerate}[a)]  
\item Prove that:  
\( \frac{1 - \cos \theta}{1 + \cos \theta} = \cos \theta - \cot \theta \).  
\item Prove that:  
\( \sec^2 30^\circ + \cos \sec^2 45^\circ + \cot^2 60^\circ + \sin^2 90^\circ = \frac{14}{3} \).
\end{enumerate}

Q.6  
\begin{enumerate}[a)]  
\item Differentiate w.r.t. \( x \)  
\( \frac{2(x + 1)}{x^2 + 2x - 3} \).  
\item If \( y = \sqrt{\frac{1 - x}{1 + x}} \); find \( \frac{dy}{dx} \). Hence prove that \( (1 - x^2) \frac{dy}{dx} + y = 0 \)
\end{enumerate}

Q.7  
\begin{enumerate}[a)]  
\item Expand \( \tan x \) by Maclaurin’s theorem as far as \( x^5 \) and hence find the value of \( \tan(0.81) \) upto four decimal places.  
\item If \( f(x) = x^3 + 8x^2 + 15x - 24 \), Calculate the value of \( f\left(\frac{11}{10}\right) \) by the application of Taylor’s series.
\end{enumerate}
Q.1 Fill in the blanks:
   a) Data ________ describes every data element comprehensively.
   b) In __________ processing, the data are gathered for a period and collected into a group before they are entered into a computer and processed.
   c) A ________ is the primary tool used in Structured System Development to graphically depict systems.
   d) __________ is one of the methods used to capture the data for analysis of any organization's functioning.
   e) A ________ is the primary tool used in Structured System Development to graphically depict Systems.
   f) Structured English is often called __________ because it mimics programming code.
   g) In __________ testing, the tester has no knowledge on internals of program being tested.
   h) __________ model of the SDLC incorporates the element of risk analysis also. 1x8

PART-A

Q.2 Explain the following:
   a) Technical feasibility.
   b) Social feasibility.
   c) Economic feasibility. 8

Q.3 Explain OOAD in detail using examples. Compare OOAD and SSAD. 8

Q.4 Write short notes on (any two):
   a) Use-Case Diagram.
   b) E-R Diagram.
   c) Activity Diagram 8

PART-B

Q.5 Explain different types of feasibility study and its importance in System Planning. 8

Q.6 Explain SSAD. Explain the different tools used in Structured Analysis. 8

Q.7 Prepare a Data Flow Diagram for a college Information System. Explain in detail about it. 8
End Semester Examination, May 2019
B. Sc. (Data Science) — First Semester
THEORY OF PROBABILITY (DS-104)

Time: 3 hrs.  Max Marks: 75
No. of pages: 3

Note: Attempt FIVE questions in all; taking at least ONE question from each unit. Q.1 is compulsory. Marks are indicated against each question.

Q.1  Answer the following questions:
   a) Each of three machined parts is classified as either above or below the target specification for the part. Write the sample space.
   b) A random experiment can result in one of the outcomes \{a, b, c, d\} with prob. 0.1, 0.3, 0.5 and 0.1 respectively. Let \( A = \{a, b\}, B = \{b, c, d\}\) and \( C = \{d\}\) then calculate the following:
      \( P(A), P(B), P(C), P(A'), P(A \cup B), P(A \cup B) \).
   c) If \( P(A / B) = 0.3, P(B) = 0.8 \) and \( P(A) = 0.3 \), are the events \( A \) and the complement of \( B \) independent.
   d) If \( X \) is a continuous uniform random variable over \( a \leq x \leq b \), then find mean and variance of random variable.
   e) If the range of \( X \) is the set \( \{0, 1, 2, 3, 4\} \) and \( P(X = x) = 0.2 \), determine the mean and variance of the random variable. 3×5

UNIT-I

Q.2  a) A bin of 50 manufactured parts contains 3 defective parts and 47 non-defective parts. A sample of 6 parts is selected from 50 parts without replacement. How many different samples are there of size 6 that contain exactly 2 defective parts. 7
   b) A part selected for testing is equally likely to have been produced on any one of six cutting tools:
      i) What is the sample space?
      ii) What is the probability that the part is from tool 1?
      iii) What is the probability that the part is from tool 3 or 5?
      iv) What is the probability that the part is not from tool 4? 2×4

Q.3  Cooking oil is produced in two main varieties mono and polyunsaturated. Two common sources of oil are corn and canola. The following table shows the number of bottles of these oils at a supermarket:

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td></td>
<td>Canola</td>
<td>Corn</td>
</tr>
<tr>
<td>Mono</td>
<td>7</td>
<td>13</td>
</tr>
<tr>
<td>Poly</td>
<td>93</td>
<td>77</td>
</tr>
</tbody>
</table>

   a) If a bottle of oil is selected at random then what is the probability that it belongs to the poly saturated category.
   b) What is the probability that the choosen bottle is mono saturated canola oil?
   c) What is the probability that the choosen bottle is not a poly saturated corn oil? 15

UNIT-II

Q.4  A batch of 350 samples of rejuvenated mitochondria contains 8 that are mutated (or defective). Two are selected from the batch, at random, without replacement:
   a) What is the probability that the second one selected is defected given that the first one was defective?
   b) What is the probability that both are defective?
   c) What is the probability that both are acceptable? 5×3
The following table summarizes visits to emergency departments at 4 hospitals in Arizona. People may leave without being seen by a physician and those visits are denoted as LWBS. The remaining visits are serviced at the emergency department and the visitor may or may not be admitted for a stay in hospital:

<table>
<thead>
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Let A denote the event that the visit is to hospital 4, B denote the event that visit result in LWBS at any hospital. Then determine the following probabilities:

a) \( P(A/B) \)
b) \( P(A'/B) \)
c) \( P(A/B') \)
d) \( P(B/A) \)
e) \( P(B'/A') \)

UNIT-III

Q.6
a) The time until a chemical reaction is complete (in milliseconds) is approximated by the cumulative distribution function

\[
F(x) = \begin{cases} 
0 & x < 0 \\
1 - e^{-0.01x} & 0 \leq x
\end{cases}
\]

i) Determine the probability density function of \( x \).
ii) What portion of reactions is complete within 200 milliseconds?

b) Let the continuous random variable \( x \) denote the diameter of a hole drilled in a sheet metal component. The target diameter is 12.5 millimeters. Most random disturbances to the process result in large diameters. Historical data show that the distribution of \( x \) can be modeled by \( p.d.f f(x) = 20e^{-20(x - 12.5)} \), \( x \geq 12.5 \). Find the mean and variance of \( x \).

UNIT-III

Q.7
a) From the following data, verify that the functions given are probabilities mass functions, and also determine the requested probabilities:

\[
f(x) = \begin{cases} 
0.2 & x = -2 \\
0.4 & x = -1 \\
0.1 & x = 0 \\
0.2 & x = 1 \\
0.1 & x = 2
\end{cases}
\]

i) \( P(x \leq 2) \)
ii) \( P(x > -2) \)
iii) \( P(-1 \leq x \leq 1) \)
iv) \( P(x \leq -1 \text{ or } x = 2) \)

b) \( f(x) = \frac{2x + 1}{25} \), \( x = 0, 1, 2, 3, 4 \)

i) \( P(x = 4) \)
ii) \( P(x \leq 1) \)
iii) \( P(2 \leq x < 4) \)
iv) \( P(x > -10) \)

UNIT-III

Q.8
a) Assume that in the detection of a digital signal, the background noise follows a normal distribution with a mean of 0 volt and standard deviation of 0.45 volt. The system assumes a digital 1 has been transmitted when the voltage exceeds 0.9. What is the probability of detection a digital 1 when none was sent?

b) Assume that the number of asbestos particles in a squared meter of dust on a surface follows a passion distribution with a mean of 1000. If a square meter of dust is analyzed, what is the probability that 950 or fewer particles are found?

UNIT-III

Q.9
a) Each sample of water has a 10% chance of containing a particular organic pollutant. Assume that the samples are independent with regard to the presence of pollutant. Find the probability that in the next 18 samples, exactly 2 contain the pollutant.

b) Suppose that \( X \) has an exponential distribution with mean equal to 10. Determine the following:
i) $P(x > 10)$.
ii) $P(x > 20)$.
iii) $P(x < 30)$.
iv) Find the value of $x$ such that $P(X < x) = 0.95$. 

7
End Semester Examination, May 2019
B.Sc. (Data Science) — First Semester
THEORY OF PROBABILITY (DS-104)

Time: 3 hrs.  Max Marks: 75
No. of pages: 3

Note: Attempt FIVE questions in all; taking at least ONE question from each UNIT. Q.1 is compulsory. Marks are indicated against each question.

Q.1 Answer the following questions:
   a) Each of three machined parts is classified as either above or below the target specification for the part. Write the sample space.
   b) A random experiment can result in one of the outcomes \{a, b, c, d\} with prob. 0.1, 0.3, 0.5 and 0.1 respectively. Let \( A = \{a, b\} \), \( B = \{b, c, d\} \) and \( C = \{d\} \) then calculate the following:
      \[ P(A), P(B), P(C), P(A'), P(A \cap B), P(A \cap B) \].
   c) If \( P(A \mid B) = 0.3, P(B) = 0.8 \) and \( P(A) = 0.3 \). Are the events \( A \) and the complement of \( B \) independent.
   d) If \( X \) is a continuous uniform random variable over \( a \leq x \leq b \), then find mean and variance of random variable.
   e) If the range of \( X \) is the set \{0,1,2,3,4\} and \( P(X = x) = 0.2 \), determine the mean and variance of the random variable.

   \[ 3\times5 \]

UNIT-I

Q.2 a) A bin of 50 manufactured parts contains 3 defective parts and 47 non-defective parts. A sample of 6 parts is selected from 50 parts without replacement. How many different samples are there of size 6 that contain exactly 2 defective parts.
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   \[ 7 \]

   \[ 2\times4 \]

Q.3 Cooking oil is produced in two main varieties mono and polyunsaturated. Two common sources of oil are corn and canola. The following table shows the number of bottles of these oils at a supermarket:

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   \[ 15 \]

UNIT-II

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UNIT-III

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<th>1</th>
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<tr>
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<td>0.2</td>
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<td>0.2</td>
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i) \( P(x \leq 2) \)

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iv) \( P(x = 2) \)

b) \( f(x) = \frac{2x+1}{25} \), \( x = 0, 1, 2, 3, 4 \)

i) \( P(x = 4) \)

ii) \( P(x < 1) \)

iii) \( P(2 \leq x < 4) \)

iv) \( P(x > -10) \)

UNIT-III

Q.8 a) Assume that in the detection of a digital signal, the background noise follows a normal distribution with a mean of 0 volt and standard deviation of 0.45 volt. The system assumes a digital 1 has been transmitted when the voltage exceeds 0.9. What is the probability of detecting a digital 1 when none was sent?

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i) $P(x > 10)$.

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iii) $P(x < 30)$.

iv) Find the value of $x$ such that $P(X < x) = 0.95$. 


Q. 1 Answer the following:
   a) Define Robotics.
   b) What is heuristic search?
   c) Which logo is used in “All cats have tools”?
   d) Which search method takes less memory?
   e) Which predicate logic is applied on “All dogs have fails?"

   **PART-A**

Q. 2 What kind of techniques will be used for solving AI problems?  

Q. 3 What is learning by an automation? What is genetic algorithm and how does it help in learning? 

Q. 4 Explain the following:
   a) Propositional calculations
   b) Game theory.
   c) Knowledge triangle.
   d) Probability theory.

   **PART-B**

Q. 5 a) Compare and contrast the working of neuron to perception.  
   b) Explain working of ANN with help of a diagram. 

Q. 6 Explain Bayesian probability network. Discuss Bayes theorem with an example. 

Q. 7 a) “Learning is done by viewing, listening, interactions studying and by experience. It provides us the power to reason, ability to handle new situations and enables us to act in an intelligent way”. Explain the concept of machine learning with different types of learning.
   b) Describe ANN. Explain the role of perception in ANN in detail.
End Semester Examination, May 2019  
BCA — First Semester  
ELEMENTS OF MATHEMATICS (BCA-102)

Time: 3 hrs.  
Max Marks: 75  
No. of pages: 2

Note: Attempt FIVE questions in all; taking at least ONE question from each Unit. Q.1 is compulsory. Marks are indicated against each question.

Q.1 Answer the following questions:

a) If \( A = \{2,3\}, B = \{x:x\text{ is a root of } x^2+5x+6 = 0\} \) find \( A \cup B \).

b) If \( G = \{7,8\} \) and \( H = \{5,4,2\} \) find \( GH \).

c) If \( \tan x = \sqrt{3} \) find \( \sin x \).

d) Find the derivative of the function \( f(x) = 2x^2 + 3x - 5 \).

e) Evaluate \( \lim_{x \to 1} \frac{x^2 - 1}{x - 1} \).

f) In a single through of two dice, the probability of getting a total other than 9 or 11 is _______.

g) Find \( \frac{dr}{dt} \) when \( r = (1 - \cos t)i + (t - \sin t)j \).

h) Which term of A.P. 11, 17, 23, … is 551.

i) If \( f \) and \( g \) are the functions such that \( f : R \to R \) and \( g : R \to R \) \( f(x) = 4x - 1 \) and \( g(x) = x^2 + 2 \) find 'fog'.

j) Write down all the such-set of \{1, 3, 5\}.  

\[ \text{UNIT-I} \]

Q.2 a) In a class of 60 boys there are 45 boys who play cards and 30 boys who play carrom. Use set operations to show:

i) How many play cards only.

ii) How many boys play carrom only.

b) Let \( A = \{2, 3, 4\} \) and \( B = \{3, 6, 8\} \) find \( R \) where \( R \) is relation \( x \text{ divides } y \) from set A to set B. Also, find \( R^{-1} \), Domain (R) and Range (R).

\[ \text{UNIT-II} \]

Q.3 a) Write the domain of the following function:

i) \( y = \frac{x^2 - 9}{x - 3} \)

ii) \( y = \frac{x^2 + 3x + 5}{x^2 - 5x + 4} \)

b) If \( f, g : R \to R \) are defined respectively by \( f(x) = x^2 + 3x + 1 \), \( g(x) = 2x - 3 \). Find:

i) \( fog \)

ii) \( gof \)

iii) \( fof \)

\[ \text{UNIT-III} \]

Q.4 a) If \( A + B = 45 \); prove that \((\cot A - 1)(\cot B - 1) = 2\)

b) Prove that \( \cos 20^\circ \cos 40^\circ \cos 60^\circ \cos 80^\circ = \frac{1}{10} \).

Q.5 a) Two dice are tossed once. Find probability of getting an even number on first die or a total of 8.

b) A card is drawn from a deck of cards. Find probability of getting a king or a heart or a red card.
Q.6  a) Find the value of $a$ if the function $f$ is given by:

$$f(x) = \begin{cases} 
2x - 1 & ; 
x < 2 \\
a & ; 
x = 2 
\text{continuous at } x = 2 \\
x + a & ; 
x > 2
\end{cases}$$

b) Differentiate $\left(\frac{3x + 4}{2 - x}\right)^2$ w.r.t. $x$.

Q.7  a) If $y = x + \sqrt{x^2 - 1}$, prove that $(y - x) \frac{dy}{dx} - y = 0$.

b) Evaluate $\text{div } f$ where $f = 2x^2zi - xy^2zj + 3y^2xk$ at $(1, 1, 1)$.

UNIT-IV

Q.8  a) Evaluate $\int \frac{x + 1}{x^2 + 1} \, dx$.

b) $\int \frac{x}{\sqrt{1 + x}} \, dx$.

Q.9  a) Solve the differential equation:

$$(x + 2) \frac{dy}{dx} = x^2 + 4x - 9$$

b) Show that the set $I$ of all integers $\ldots -4, -3, -2, -1, 0, 1, 2 \ldots \ldots$ is abelian group with respect to the operation of addition of integers.
Q.1 a) Define the terms: Operator, Operand, Expression, Conditional Operator
b) Why return type of function is necessary in computer programming?
c) What is a token and keyword in any programming language?
d) What is the structure of a C# program? Give an example.
e) What is the difference between simple variable and a pointer variable?
f) Differentiate between compilation and execution of a program?
g) Write the name of five built in functions of C#?
h) Write the syntax for try and catch block statements in C#?
i) What is data validation in C#?
j) Define the array and types of array?

Q.2 a) Identify the reusable components in software and discuss how OOPs help in managing them.
b) How programming language paradigms affect the overall software development process? Differentiate between the procedure oriented and object oriented paradigm for programming?

Q.3 a) Write a pseudo-code to find out whether a given triangle ABC is isosceles. Assume that the angles of the triangle are supplied as input. Print the answer as Yes or No.
b) Draw a flowchart to find the Fibonacci series till term≤1000.

Q.4 a) Differentiate implicit type conversion to explicit type conversion in C#? Give examples of each?
b) “Invoking event handlers in C# has always been a bit of pain.” Justify the statement with the help of an example.

Q.5 a) Write a program to find the sum of first 100 even numbers using while loop and do while loop? Also compare the output.
b) Compare the “if else” block and “switch-case” block of statements.

Q.6 What is an array? Explain the creation and accessing elements of array. Write a program to calculate average of temperature of last 7 days obtained by a weather forecasting website? Also sort them in ascending order?

Q.7 Write short notes on:
a) Keyboard events and data validation in C#
b) Error handling in C#
End Semester Examination, May 2019  
B.Sc. (Information Technology) — Fifth Semester  
INTERACTIVE COMPUTER GRAPHICS (BSCA-502)

Time: 3 hrs.  
Max Marks: 100  
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer the following questions:  
a) What is the use of computer graphics in the field of simulation and virtual reality?  
b) Aliasing and anti-aliasing as the problems of scan conversion.  
c) Define homogenous matrix representation of rotation having three input coordinated.  
d) Write three algorithms names for line drawing.  
e) Define “Scaling”.  
f) Differentiate between 2D and 3D transformations.  
g) Define recursive approach for boundary fill algorithm.  
h) Define “View-plane”, “View-volume” and “Clipping”.  
i) Define the step by step process of 3D viewing and clipping.  
j) What is oblique projection? Provide some example of oblique projection.  

2×10

Q.2 Describe various computer graphics software and standards with an example of each. 20

Q.3 a) Discuss and write algorithms for the various line drawing. Compare them with any comment on the best algorithm. 10  
b) Take the line coordinates (2, 4) and (9, 5). Draw a line using DDA algorithm. Also plot the line for the derived coordinates. 10

Q.4 Take the line coordinates (0, 0) and (20, 10). Draw a line by obtaining the plotted pixels using Bresenham line drawing algorithm. 20

Q.5 Obtain the new coordinates of the triangle formed by the vertices A(2, 2), B(5, 2), C(5, 5) by translating them 5 units in x direction and 3 units in y direction. Also obtain the new coordinates by rotating them at an angle of 90°. 20

Q.6 Differentiated between parallel and perspective projections. Describe the subclasses of parallel projection with its definition and an example of each. 20

Q.7 Define “Polygon”. Explain various polygon clipping algorithms with suitable example. 20
End Semester Examination, May 2019
MCA — Fifth Semester
DATA MINING (MCA-502(CB))

Time: 3 hrs. Max Marks: 100

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 a) Fill in the blanks:
   i) ________ is one of the characteristic of data warehouse.
   ii) Data cleansing is the process of removing ________ from input data.
   iii) ________ is one of the class transformation techniques.
   iv) The two tier architecture of data warehouse consists of _______ and _______.
   v) Snowflake schema ________ its dimension tables to eliminate redundancy.
   vi) OLAP stands for ________.
   vii) Cube is defines as ________.

b) Answer the following questions:
   i) “Operational staff needs strategic information”. State whether this statement true or false with suitable reason.
   ii) “The higher the level of granularity the lesser is the level of detail”. State whether this statement true or false with suitable reason.
   iii) Can data warehouse and data mart coexist? Comment with reason.

Q.2 a) Differentiate the following:
   i) DBMS and Data warehouse.
   ii) Data warehouse and Data mart.

b) Explain all the operations that can be performed on the multidimensional logical data model (Cube) with suitable examples.

Q.3 a) Differentiate the following:
   a) Two tier architecture and three tier architecture of data warehouse.
   b) Multidimensional OLAP model and relational OLAP model.

Q.4 Explain the following terms:
   a) Data preprocessing.
   b) Concept hierarchy.
   c) Knowledge discovery from data.
   d) Noise in data.

Q.5 a) Explain the Naïve Bayes classification method with the help of an example.
   b) “Clustering is an unsupervised learning method”. Comment on it.

Q.6 a) What do you understand by frequent item set? What is association rule? Explain how you will measure the interestingness of an association rule.
   b) Explain the types of association rules that can be mined from a given dataset.

Q.7 Explain the following terms:
   a) Web mining.
   b) Text mining.
   c) Spatial data.
   d) Time series data.
End Semester Examination, May 2019
BCA – Fifth Semester
RDBMS USING ORACLE (BCA-503A (CB))

Time: 3 hrs. Max Marks: 75
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer the following multiple choice questions:

a) In a relational database, a referential integrity constraint can be specified with help of:
   i) Primary key.
   ii) Foreign key.
   iii) Secondary key.
   iv) None of these.

b) Who proposed the relational model?
   i) Bill gates.
   ii) E.F. Codd.
   iii) Charles Babbage.
   iv) None of these.

c) Which is not an aggregate function?
   i) Min.
   ii) Max.
   iii) Select.
   iv) Avg.

d) In hierarchical model, data is organized into:
   i) Logical structure.
   ii) Physical structure.
   iii) Tree like structure.
   iv) None of these.

e) A transaction completes its execution is said to be:
   i) Saved.
   ii) Loaded.
   iii) Rolled.
   iv) Committed.

f) The execution sequences in concurrency control are termed as:
   i) Serials.
   ii) Schedules.
   iii) None of these.
   iv) All of these.

g) Give the full form of PL/SQL.

h) The VARCHAR2 data type is used to store:
   i) Variable length character.
   ii) Fixed length character.
   iii) None of these.
   iv) All of these.

i) Exception can be declared only in:
   i) Begin.
   ii) Declarative.
   iii) None of these.
   iv) All of these.

j) Define “E-R Model”.

2x10

PART-A

Q.2 a) Construct an E-R diagram for a hospital with a set of patients and a set of medical doctors. Associate with each patient, a log of various tests and examinations conducted. Also, determine the entities, attributes and primary key in the table.

b) Differentiate between “Hierarchical”, “Network” and “Relational” database models with their relative merits and demerits.

Q.3 a) Differentiate between “Logical” and “Physical” structure of a database.

b) Explain “Oracle” memory structure in context to ORDBMS.

Q.4 Discuss (any five) of the following with syntax, purpose and example:
   i) Union operator.
   ii) Union all.
   iii) Group by.
   iv) Distinct.
   v) Length.
   vi) Delete.

4x5

PART-A
Q.5  a) Differentiate SQL and PL/SQL.  
     b) Discuss various control structures available in PL/SQL. Give example of each.  5

Q.6  a) What are packages? Write the advantages of packages. What are components of an
     Oracle packages? Explain the importance of each.  12
     b) What are different modes of arguments in subprograms? Compare each mode.  8

Q.7  a) Discuss various function and architecture of a DDBMS with suitable diagram.  15
     b) Write the advantages of DDBMS.  5
End Semester Examination, May 2019
BCA — First Semester
HARDWARE INTERFACES (BCA-103A (CB))

Time: 3 hrs. Max Marks: 100
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Define the following in brief:
   a) Integrated Chip.
   b) Serial Port.
   c) Blue Ray Disk.
   d) Anti-virus.
   e) Over-clocking.

   Fill in the blanks:
   f) 1 Nibble = __________ bytes.
   g) POST stands for __________.
   h) L3 is __________ memory.
   i) ISA stands for __________.
   j) SMPS stands for __________.

   PART-A

Q.2 a) Which is the best mobile processor? Explain the features of mobile processor. 10
   b) Compare the features of I3 processor and Pentium IV. 10

Q.3 a) What are the components of LASER printer and their functions? 10
   b) Explain the steps to connect your mobile phone with wireless printer. 10

Q.4 a) Differentiate between SIMM and DIMM module. 5
   b) How DVD is written? 5
   c) Explain the internal configuration of hard disk drive. 10

   PART-B

Q.5 a) List the sequence of events which take place during POST. 10
   b) List the various buses found in your computer: Data-bus and Control-bus. 5
   c) Differentiate between the working of data-bus and control-bus. 5

Q.6 a) What is plug and play port? Explain the working of plug and play port. 10
   b) Explain the working principle of industry Standard Architecture (ISA) BUS. 10

Q.7 a) Give five examples where security of VVIPs have been compromised using information technology glitches. 10
   b) How to avoid the attack of ransomware/virus on your computer? Write five points to avoid such attacks on your computer. 10
Q.1 a) **State whether the following statements are TRUE or FALSE:**

i) UART stands for Universal Asynchronous Receiver Transmitter.  
ii) 8080 was an 8-bit processor.  
iii) PCI stands for Personal Components Interconnect.  
iv) Drive A and B are reserved for floppy drives.  
v) The output quality of a printer is measured by dots per inch.  

b) **Fill in the blanks:**

i) BIOS beep codes "NO BEEP" is a symbol of _________ failure.  
ii) The data storage capacity of DVD is _________ GB.  
iii) North Bridge and South bridge are found on _________.
iv) DRAM is used for _________ memory in PC.

Q.2 a) **What is the role of mother-board in computer? Why it is called mother-board?**  
b) **Explain the different internal components of today's laser printer.**

Q.3 a) **Write a short note on 'Laser printer' and 'Desk-Jet printer'.**  
b) **List five errors of printers.**  
c) **What is the role of keyboard controller?**

Q.4 a) **Explain the features of core-i7 processor in detail.**  
b) **Write short note on 'processor over-cloaking'.**  
c) **Write a short note on 'super controller'.**

Q.5 a) **Explain the north bridge and south bridge used in a motherboard.**  
b) **Write all the steps of POST sequence in detail.**

Q.6 a) **Draw the diagram for industry standard architecture (ISA) and define its components.**  
b) **Explain the working of plug-and-play devices.**

Q.7 a) **What are threats faced by information systems in today’s world?**  
b) **What is a virus and how it may affect your personal computer?**  
c) **Write 10 steps to secure your personal computer from external threats.**
End Semester Examination, May 2019
BCA–Third Semester
INTRODUCTION TO OPERATING SYSTEM (BCA-303(CB))

Time: 3 hrs. Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 a) When does thrashing occur?
    b) What is root partition?
    c) What is multitasking?
    d) What is caching?
    e) What is spoofing?
    f) How internal fragmentation is different from external fragmentation?
    g) Differentiate between Assembler and compiler?
    h) What is preemption?
    i) What is plumbing/piping.
    j) What is VFS?

2×10

PART-A

Q.2 a) What is the relationship between operating systems and computer hardware? How buffering can improve the performance of a computer system? 10
    b) What are the advantages of multiprogramming? How they are different from multiprocessing systems? 10

Q.3 a) What are necessary conditions that the process should satisfy to prevent it from entering in to critical sections? How semaphore is used in solving CS problem? 10
    b) Consider the following scenario:

<table>
<thead>
<tr>
<th>State</th>
<th>Current Loan</th>
<th>Maximum need</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process A</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Process B</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Process C</td>
<td>4</td>
<td>7</td>
</tr>
</tbody>
</table>

Total resources are: 8
Apply the Banker’s algorithm:
    i) What is the content of matrix need?
    ii) Is the system in safe state? 10

Q.4 Consider the following set of processes with the length of CPU burst time given in millisecond.

<table>
<thead>
<tr>
<th>Process</th>
<th>Burst time</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>P_1</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>P_2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>P_3</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>P_4</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>P_5</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>P_6</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

The processes are assumed to have arrived in order P_1, P_2, P_3, P_4, P_5, P_6 all at time 0.

a) Draw Gantt charts illustrating the executions of these processes using FCFS, SJF, a non-preemptive priority and RR (quantum = 2) scheduling.
b) What is turnaround time of each process for each of the scheduling algorithms?
c) Average waiting time of each scheduling algorithm?
d) Which algorithm is best scheduling algorithm? 20

PART-B
Q.5  
a) Given memory partitions of 100 k, 500 k, 200 k, 300 k and 600 k (in order), how would each of the First fit, Best-fit and worst –fit algorithm place process of 212 k, 417 k, 112 k and 426 k (in order)? Which algorithm makes the most efficient use of memory?  
b) Differentiate between physical address space and logical address space? How paging is used in virtual memory?

Q.6 Define ‘virtual memory’. Consider the following string 16,20,13,21,24,25,14,12,19,18,14,15 using 5 frame. All frames are initially empty How many page fault would occur for the following page replacement algorithm. 
i) LRU  
ii) FIFO  
iii) Optimal

Q.7 Write short notes on: 
a) Disk management.  
b) Windows V/s Linux operating system.
End Semester Examination, May 2019
MCA – Third Semester
DATA STRUCTURES (MCA-303A (CB))

Time: 3 hrs.  Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1  a) What is the postfix form of the following prefix *+ab-cd
   i)  ab + cd-*   ii)  abc + *-  
   iii) ab + *cd-  iv)  ab + *cd-

   b) A queue is a,
      i)  FIFO (First In First Out) list   ii)  LIFO (Last In First Out) list.
      iii) Ordered array   iv)  Linear tree

   c) Which data structure is needed to convert infix notation to postfix notation?
      i)  Branch   ii)  Queue
      iii) Tree   iv)  Stack

   d) In Breadth First Search of Graph, which of the following data structure is used?
      i)  Stack   ii)  Queue
      iii) Linked List.   iv)  None of the above

   e) The largest element of an array index is called its
      i)  lower bound   ii)  range
      iii) upper bound   iv)  All of these

   f) How many nodes in a tree have no ancestors?
      i)  0   ii)  1
      iii) 2   iv)  n

   g) Which data structure is used for implementing recursion?
      i)  Queue   ii)  Stack
      iii) Arrays   iv)  List

   h) A technique for direct search is
      i)  Binary Search   ii)  Linear Search
      iii) Tree Search   iv)  Hashing

   i) The complexity of multiplying two matrices of order m*n and n*p is
      i)  mnp   ii)  mp
      iii) mn   iv)  np

   j) A (n) __________ is a graph in which each connection has two directions.
      i)  Undirected graph   ii)  Weighted graph
      iii) Bidirectional graph   iv)  None of the above 2x10

PART-A

Q.2  a) What do you mean by Asymptotic notations? How is it useful in checking the performance of algorithm?  7
   b) How sparse matrix is beneficial over ordinary matrix?  7
   c) Explain the concept of Priority queue.  6

Q.3  a) What are various operations of stack? Write algorithm for the same.  8
   b) Convert the following infix expression into postfix expression:
      A + (B*C– (D/E(F)*G)*H
      P + (Q*R– (S/T^U)*V)  12

Q.4  a) How linked list can be used for polynomial representation. Illustrate it.  8
   b) Write algorithm for insertion in linked list at Beg, Mid., End. And also explain it diagrammatically.  12

PART-B
Q.5  
a) What are various ways to represent a tree in memory?  
b) Differentiate between similar and copied tree.  
c) What are various tree traversal methods?  
d) How can we construct a B Tree?  

5x4

Q.6  
a) Construct a tree by using following data:  

<table>
<thead>
<tr>
<th>Preorder</th>
<th>G</th>
<th>B</th>
<th>Q</th>
<th>A</th>
<th>C</th>
<th>K</th>
<th>F</th>
<th>P</th>
<th>D</th>
<th>E</th>
<th>R</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inorder</td>
<td>Q</td>
<td>B</td>
<td>K</td>
<td>C</td>
<td>F</td>
<td>A</td>
<td>G</td>
<td>P</td>
<td>E</td>
<td>D</td>
<td>H</td>
<td>R</td>
</tr>
</tbody>
</table>

b) What is Binary Search Tree? Can Binary Search tree be used as an index?  

Q.7  
a) Differentiate between the following:  
   i) Sequential file and Index sequential file.  
   ii) Binary tree and Full Binary tree.  
   iii) Breadth first search and Depth first search.  

5x3

b) What are the various operations we can perform on file?  

5
End Semester Examination, May 2019
BCA – Third Semester
INTRODUCTION TO OPERATING SYSTEM (BCA-303A (CB))

Time: 3 hrs.  Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer the following:
   a) CPU scheduling is the basis of
      i) Multiprocessor system    ii) Multiprogramming OS
      iii) Large memory sized system iv) None of the above
   b) The switching of CPU from one process thread to another is called.
      i) Process switch    ii) context switch
      iii) Task switch    iv) All of the mentioned
   c) Every address generated by the CPU is divided into two parts
      i) Frame bit and page no    ii) page number and page offset
      iii) Page offset and frame bit    iv) Frame offset and page offset
   d) A disk that has a boot partition is called
      i) Start disk    ii) End disk
      iii) Boot disk    iv) All of the mentioned
   e) Non-preemptive scheduling is __________.
   f) An edge from process $P_i$ to process $P_j$ in a wait for graph indicates that __________.
   g) In which of the storage placement strategies a program is placed in the largest available hole in the main memory?
   h) In Unix, which system cell creates the new process? __________.
   i) Starvation is __________.
   j) __________ is the concept on which a process is copied into main memory from the secondary memory into the requirements.

PART-A

Q.2 a) What are system programs? Explain how they provide a convenient environment for program development and execution. 10
   b) Write short notes on:
      i) Batch system.
      ii) Real time system. 5×2

Q.3 Consider the following set of processes, with the length of CPU burst given in ms.

<table>
<thead>
<tr>
<th>Process</th>
<th>Burst time</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>$P_1$</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>$P_2$</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>$P_3$</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>$P_4$</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>$P_5$</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

The processes are assumed to have arrived in order $P_1$, $P_2$, $P_3$, $P_4$, $P_5$, all at time 0.
   a) Draw Gantt chart mustrating the execution of these process using FCFS, SJF, a non-preemptive priority (a smaller priority number implies a higher priority) and RR (quantum = 3). Scheduling. 8
   b) Calculate the Avg turnaround time and Avg waiting time for each of the scheduling algorithm. 8
   c) Now assume arrival time of process $P_1$, $P_2$, $P_3$, $P_4$, $P_5$ is 0, 1, 2, 3, 4. Calculate the Avg waiting time for shortest remaining time first scheduling algorithm. 4

Q.4 a) Consider the following snapshot of a system

<table>
<thead>
<tr>
<th>Allocation</th>
<th>Max</th>
<th>Available</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Answer the following using Banker’s algorithm
i) What is the content of matrix need?  2
ii) Is the system is a safe state?  4
iii) If a request from process P₁ arrives for (0, 4, 2, 0) can the request be granted immediately.  4

b) What is process synchronisation? Explain the bounded buffer problem and give a solution using semaphore.  10

**PART-B**

Q.5  a) Consider the reference string: 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6. How many page faults would occur for FCFS and LRU if the page frame size is 31 and 5.  10

b) Differentiate between internal and external fragmentation. Consider the memory partition of 100 kB, 500 kB, 200 kB, 300 kB, 600 kB are available. How the process of 212 kB, 417 kB, 112 kB and 426 kB will be proceed in order using best fit, worst fit and first fit algorithm.  10

Q.6  a) Explain the disk scheduling algorithms with a suitable example.  10

b) Explain the methods that are widely used for allocating disk space to the files.  10

Q.7  a) Explain the design principles of Linux OS.  10

b) Explain the layered architecture of windows 7.  10
End Semester Examination, May 2019
B.Sc. (Information Technology) — Third Semester
COMPUTER ALGORITHMS AND DISCRETE MATHEMATICS
(7.203A)

Time: 3 hrs. Max Marks: 60
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1  a) Find the range of the following function on J.
     \[ f = \{(x, 4x + 1) : x \in J\} \]

b) Given \[ A = \{a, b, c, d, e\} \text{ and } B = \{a, c, e, g\} \text{ and } C = \{b, e, f, g\} \]
prove that \( (A \cup B) \cap C = (A \cap C) \cup (B \cap C) \)

c) Determine truth value of the following statement: \( (a \lor b) \rightarrow (a \lor c) \)

d) Find the output sequence for the function \( X \lor Y \lor Z \) where \( X = 10000010, Y = 100100011, Z = 11001100 \)
e) Give an example of a Hamiltonian circuit.
f) Which algorithm is used to find a spanning tree? 2x6

PART-A

Q.2  Differentiate sorting and searching. Discuss any sorting algorithm with the help of suitable example. 12

Q.3  In a survey of 600 television viewers given the following information:
     - 385 watch cricket matches
     - 295 watch hockey matches
     - 215 watch football matches
     - 145 watch cricket and football matches
     - 170 watch cricket and hockey matches
     - 150 watch hockey and football matches
     And 150 don not watch any of these three kind of matches.
     Now answer the following question:
     a) How many people in the survey watch all three kinds of matches? 12
     b) How many people watch exactly one of the sports?

Q.4  a) Prove that:
     \[ P \oplus P \approx (P \land \neg Q) \lor (\neg P \land Q) \]

b) Represent each of the following sentences into symbolic form:
   i) Jupiter is the biggest planet of the universe.
   ii) If air-conditioner is working properly then the room temperature is low.
   iii) Every natural number is either even or odd. 6

PART-B

Q.5  Suppose there are 15 red balls and 5 white balls. Assume that the balls are distinguishable and that sample of 5 balls is to be selected.
     a) How many samples of 5 balls are there? 12
     b) How many samples contains all red balls?
     c) How many samples contains at least 3 red balls?
Q.6 Define the following terms:
   a) Bipartite graph.
   b) Chromatic number.
   c) Spanning tree.
   d) Euler Path

Q.7 Draw expression tree for:
   a) $a \cdot (b - c) / (d + e)$
   b) $a^2 - b^2$
Q.1 Answer the following in brief:
   a) Define RDBMS.
   b) What is Error handling?
   c) What is transaction and concurrent transaction?
   d) Explain any two character functions in ORACLE.
   e) What are locks? Explain its advantage in concurrent management of transaction.
   f) What is deadlock? Give a real life example of deadlocks.
   g) What is the importance of recovery procedure?
   h) What is a serializability schedule?
   i) Define drop table command.
   j) What are the causes of failures?

**PART-A**

Q.2 Define different Codd rules for effective RDBMS implementation.  

Q.3 Define various decision making statements with the help of suitable examples used in PL/SQL.  

Q.4 What are the conflicts operation? Explain three problems that arise due to concurrent execution of transactions.

**PART-A**

Q.5 What are the different approaches used by concurrency control algorithms? Explain two-phase locking protocol with suitable example.

Q.6 a) What is data tempering?
    b) Explain various causes of system failure with example.

Q.7 What is the importance of recovery procedure? How it is achieved? Explain different recovery techniques with its advantages and disadvantages.
Q.1  a) Differentiate between ‘tree’ and ‘graph’.
b) What do you mean by ‘recursion’?
c) What is Stack?
d) What is self-loop in graph?
e) What is data structure?
f) What is Time complexity?  2×6

PART-A

Q.2  a) Explain the classification of data structure.
b) Write a short note on quick sort with algorithm.  6×2

Q.3  Write an algorithm for bubble sort. Also explain it with the help of an example.  12

Q.4  a) What a short note on ‘binary search with algorithm’?
b) Differentiate between linear and non-linear data structure.  6

PART-B

Q.5  a) What do you mean by cryptography?
b) Convert the following:
   i)  (1247)\textsubscript{8} = (?)\textsubscript{10}
   ii) (1101101)\textsubscript{2} = (?)\textsubscript{8}
   iii) (56)\textsubscript{10} = (?)\textsubscript{16}
   iv) (AB)\textsubscript{16} = (?)\textsubscript{2}  2×4

Q.6  Find the shortest path between a to z in the graph:

Q.7  a) Solve the difference equation:
   \[ a_{t} - 4a_{t-1} + 4a_{t-2} = 0 \]
   and find the particular solution given that \( a_{0} = 1 \) and \( a_{1} = 6 \).
b) Define cryptography with an example.  6×2
Q.1  a) **Answer the following questions:**
   a) What is cumulative frequency curve?  
   b) What are the corrections for the first four moments?  
   c) Explain relation between moment about mean and moment about a number.  
   d) Determine the value of median from the following series:
   
<table>
<thead>
<tr>
<th>Marks</th>
<th>0-10</th>
<th>10-15</th>
<th>15-20</th>
<th>20-25</th>
<th>25-30</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Students</td>
<td>8</td>
<td>6</td>
<td>9</td>
<td>39</td>
<td>43</td>
</tr>
</tbody>
</table>
   
   e) Why arithmetic mean of regression coefficient is greater than correlation coefficients?  
   f) If the regression coefficients are 0.7 and 0.3, find correlation coefficients?  
   g) Distinguish between multiple and partial correlation.  

   b) **Fill in the blanks:**
   i) For drawing Histograms, the class interval should be ___________.  
   ii) For a qualitative phenomenon ____________ is suitable average.  

**UNIT-I**

Q.2  a) Below is the frequency distribution of marks of 100 students:

<table>
<thead>
<tr>
<th>Marks</th>
<th>No. of Students</th>
<th>Marks</th>
<th>No. of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-29</td>
<td>(50-69)</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>30-39</td>
<td>11</td>
<td>70-79</td>
<td>14</td>
</tr>
<tr>
<td>40-49</td>
<td>24</td>
<td>80-89</td>
<td>2</td>
</tr>
<tr>
<td>50-59</td>
<td>32</td>
<td>90-99</td>
<td>1</td>
</tr>
</tbody>
</table>

b) Draw a stem and leaf diagram using the set of data below:

   148 147 145 103 113 135 93 87 111 110 119 107 113 110 104

Draw less than ogive and use it to median determines.

Q.3  a) Draw a histogram and frequency polygon from the following table:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of workers</td>
<td>40</td>
<td>120</td>
<td>90</td>
<td>140</td>
<td>120</td>
<td>80</td>
</tr>
</tbody>
</table>

b) Explain the advantages of graphical representation of statistical data.

**UNIT-II**

Q.4  a) Calculate the mean and standard deviation for the following table giving the age distribution of 542 members:

<table>
<thead>
<tr>
<th>Age</th>
<th>20-30</th>
<th>30-40</th>
<th>40-50</th>
<th>50-60</th>
<th>60-70</th>
<th>70-80</th>
<th>80-90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Members</td>
<td>3</td>
<td>61</td>
<td>132</td>
<td>153</td>
<td>140</td>
<td>51</td>
<td>2</td>
</tr>
</tbody>
</table>

b) Which measure of dispersion is the best and why?
Q.5 Find the Kurtosis based on moments for the following distribution:

<table>
<thead>
<tr>
<th>Marks</th>
<th>0-10</th>
<th>10-20</th>
<th>20-30</th>
<th>30-40</th>
<th>40-50</th>
<th>50-60</th>
<th>60-70</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of students</td>
<td>4</td>
<td>8</td>
<td>11</td>
<td>15</td>
<td>12</td>
<td>7</td>
<td>3</td>
</tr>
</tbody>
</table>

**UNIT-III**

Q.6 Ten students got the following percentage of marks in economics and statistics. Calculate the coe-efficient of correlation.

<table>
<thead>
<tr>
<th>Marks in Economics</th>
<th>78</th>
<th>36</th>
<th>98</th>
<th>25</th>
<th>75</th>
<th>82</th>
<th>90</th>
<th>62</th>
<th>65</th>
<th>39</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marks in Statistics</td>
<td>84</td>
<td>51</td>
<td>91</td>
<td>60</td>
<td>68</td>
<td>86</td>
<td>58</td>
<td>53</td>
<td>47</td>
<td>37</td>
</tr>
</tbody>
</table>

**UNIT-IV**

Q.8 Calculate the line of regression of $y$ on $x$ coefficients from the following table:

<table>
<thead>
<tr>
<th>$x$</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>$y$</td>
<td>7</td>
<td>10</td>
<td>12</td>
<td>14</td>
<td>17</td>
<td>20</td>
<td>24</td>
<td>28</td>
</tr>
</tbody>
</table>

Q.9 a) Establish the formula for angle between two lines of regression \( \tan q = \frac{1 - r^2}{s_x s_y} \), where $r$ is the coefficient of correlation and $s_x$ and $s_y$ are concerned standard deviations.

b) If $r_{xy} = 0.6$ and $b_{xy} = 0.8$, what is the value of $b_{xy}$?
End Semester Examination, May 2019  
MCA – Third Semester  
OBJECT ORIENTED PROGRAMMING IN JAVA (MCA-402A (CB))

Time: 3 hrs.  
Max Marks: 100  
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1  
a) Which function is called to display output of an applet?  
   i) Display( )  
   ii) paint( )  
   iii) None  
b) What is numerical range of a char?  
   i) – 128 to 127  
   ii) 0 to 32767  
   iii) None  
c) Which keyword must be used to monitor for exceptions?  
   i) Try  
   ii) Finally  
   iii) Throw  
   iv) Catch  
d) Which of these is a mechanism for naming and visibility control of a class and its content?  
   i) Object  
   ii) Packages  
   iii) Interfaces  
   iv) None  
e) Which of the following will directly stop the execution of a thread?  
   i) Wait( )  
   ii) Notify( )  
   iii) None  
f) Increment operator increases value of variable by what number?  
   i) 1  
   ii) 2  
   iii) 3  
   iv) 4  
g) Abstract class cannot have a constructor. (True/False)  
h) Main method can be defined only once in a program. (True/false)  
i) JVM is responsible for converting byte code into machine specific code. (True/False)  
j) CUI means __________.  

PART-A

Q.2  
a) Discuss the structure of a typical Java program.  

Q.3  
a) Explain how one-dimensional arrays are declared and initialized in Java language? Give example.  

Q.4  
What is a package? How do we design a package? Discuss various levels of access protection available for packages and their implications.

PART-B

Q.5  
What is a thread? What is the difference between multiprocessing and multithreading? Describe the complete life cycle of a thread.

Q.6  
Write short notes on the following:  
a) Delegation event model.  
b) Applet programming.  

Q.7  
Write a note on ‘JDBC’ in detail.
End Semester Examination, May 2019
BCA – Third Semester
WEB APPLICATION DEVELOPMENT (BCA-304A (CB))

Time: 3 hrs.  Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1  a) The preferred topology for LAN is:
   i) Star  ii) Bus
   iii) Ring  iv) Mesh
b) The extension of JavaScript file is
   i) .html  ii) .css
   iii) .js  iv) None of these
c) HTML uses
   i) pre-specified tags  ii) user defined tags
   iii) tags only for linking  iv) fixed tags defined by the language
d) A table is two dimensional matrix consisting of ________ and ________.
e) Hyperlinks can be of two types: Link to an ________ document or an ________ document.
f) JavaScript is a scripting language created by ________.
g) The form tag has two properties namely ________ and ________.
h) Which JavaScript function is used to convert the string into integer?
i) JavaScript does not allow the data types of the variable to be declared when a variable is created. (True/False)
j) The select object allows multiple choices from a list of choices that are offered. (True/False)  
   2×10

PART-A

Q.2  a) Differentiate the following:
   i) Internet and Intranet
   ii) Web Client and Web Server  
   5×2
b) What is a hyperlink? How it is used in HTML to enhance the working and connectivity? Explain the different types of hyperlinks in detail.  
   10

Q.3  a) What do you mean by HTML? Explain the structure of an HTML program  
   8
b) Design lists of Student details with unordered list, Ordered List and definition List.  
   8
c) How search engine helpful to us? Explain in detail along with all the features.  
   4

Q.4  a) How do I create tables? Create the following layout using table TAgS.

<table>
<thead>
<tr>
<th>Empno</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sec A</td>
</tr>
<tr>
<td>1001</td>
<td>45</td>
</tr>
<tr>
<td>1002</td>
<td>15</td>
</tr>
<tr>
<td>1003</td>
<td>40</td>
</tr>
</tbody>
</table>

b) Explain Image tag with all its attributes. Also given an example for the same.  
   10

PART-B

Q.5  a) How do I create frames? What is a frameset? Create the following layout using Frame TAGS.

b) How can we create functions in JavaScript? Explain three inbuilt functions of JavaScript.

Q.6 a) Develop a HTML page, which accepts:
   i) Any mathematical expression.
   ii) Evaluate the expression.
   iii) Display the result of evaluation.

   b) What are the various operators available in JavaScript?

Q.7 Explain all the attributes comes under following CSS attributes. Explain them with their syntax and semantics:
   a) Font attributes.
   b) Margin attributes.
   c) Border attributes.
   d) Text and color attributes.
End Semester Examination, May 2019
B.Sc. (Information Technology) — Third Semester
OBJECT ORIENTED PROGRAMMING (7.205A)

Time: 3 hrs.                        Max Marks: 75
Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1
a) Differentiate between Java and C++.
b) What is a byte code?
c) ________ is the class which is at the top of exception class hierarchy.
d) Paint ( ) and Repaint ( ) are same. (True/False)
e) How an object is created in Java?
f) What are the naming conventions of a package?
g) Define visibility control.
h) ________ and ________ are two types of polymorphism in java.
i) Give one example of wrapper class.
j) Define Array in java.
k) Multiple inheritance and interface are same. (True/False)
l) ________ class is required to handle events on Menu and Checkbox.
m) What is the use of adapter class?
n) Give on example of Pre-defined exception in java.
o) ________ method is used to specify container layout.

PART-A

Q.2 Write short notes on the following (any three):
a) Features of Java.
b) Jump statements in java.
c) Type casting operators.
d) Java program structure.

Q.3 What do you understand by an Array? How they can be created and initialized in java? Explain through an example. 15

Q.4 Explain the concept of multiple inheritance in java with the help of a program. 15

PART-B

Q.5 Differentiate between the following (any three):
a) Checked and Unchecked exceptions.
b) Input stream and Output stream.
c) Adapter class and Inner class.
d) Application Programming and Applet Programming.

Q.6 Explain Applet life cycle along with the methods involved in it. 15

Q.7 Describe the Delegation Event Model. What are the Event Sources and Event Listeners? Explain with an example Java code, how various mouse events are handled? 15
End Semester Examination, May 2019
BCA – Third Semester
SHELL PROGRAMMING (BCA-306 (CB))

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Write the purpose and use of following commands with their syntax and example.
   a) mkdir.
   b) cp
   c) mv
   d) rm
   e) cat
   f) tail
   g) nohup
   h) lp
   i) who
   j) date

   **PART-A**

Q.2 a) With a meant diagram, explain the architecture of Unix operating system.  
   b) Explain the salient features of Unix operating system.

Q.3 a) Files current permissions are:
      `rw__w__r___` write expression to change them for the following.
      i) `r__r__x`
      ii) `rwxr__x`
      iii) `r__x r__x r__x`
      iv) `rwxr__x`
   b) Explain the various file permission methods in UNIX with examples.

Q.4 What is the relationship of a filename to its Inode? Explain Inode table with all its fields. Draw a neat diagram as well for Inode table.

   **PART-B**

Q.5 What are the different state in which a process can be? What are the advantages and disadvantages of running a process in the background? If the nice value of a process is increased, what would be the effect on the execution speed of the process?

Q.6 a) Write a shell program to generate all combinations of 1, 2 and 3 using for loops.
   b) Any year is entered through the keyboard. Write a program to determine whether the year is leap or not use the logical operations –a and –o.

q.7 a) Explain how numeric and string comparison is done by using text?
   b) Explain the following environmental variables with examples.
      i) PATH
      ii) LOGNAME
      iii) SHELL
      iv) HOME
Q.1 a) Interactive computer graphics enables a user to customize the graphics in:
   i) Computer way. ii) His own way
   iii) Both iv) None of these.

b) The area of computer that is captured by an application is called:
   i) Window ii) Viewport
   iii) Display iv) None of these.

c) The operation that is used for reposition the object are called:
   i) Rubber band method ii) Gravity field
   iii) Dragging iv) None of these.

d) The LCD projector is the output device that is connected to the:
   i) Monitor ii) LCD
   iii) CPU iv) None of these.

e) The roof mounted projector are Bluetooth:
   i) Enabled ii) Disabled
   iii) Both i) and ii) iv) None of these.

f) Basic geometric transformation include:
   i) Translation ii) Rotation
   iii) Scaling iv) All of these.

g) An object can be viewed as a collection of:
   i) One segment ii) Two segment
   iii) Several segment iv) None of these.

h) Bezier curve lies in the ________.
   i) Convex hull ii) Concave hull
   iii) Both i) and ii) iv) None of these.

i) Some common form of clipping include:
   i) Point clipping ii) Line clipping
   iii) Curve clipping iv) All of these.

j) How many types of projections are there:
   i) 1 ii) 2
   iii) 3 iv) 4 1½×10

   Write short notes on the following:

k) B-spline curve. 2½×2

l) Curve drawing algorithm.

PART-A

Q.2 a) What do you mean by computer graphics? What are the applications of computer graphics? 10

b) How colors are generated in CRT? Explain in detail. 10

Q.3 a) What are the steps required to draw a line between points P (2,3) and Q (12,9) using Bresenhem’s line drawing. 10

b) Explain any five interactive graphical techniques in detail. 10

Q.4 a) Explain properties of Bezier Curve. 10
b) What do you mean by seed fill algorithm? Explain its different types in detail.  

**PART-B**

Q.5 What do you mean by transformation? Explain different types of transformations in detail. Also give an example of each.  

Q.6  

a) What is window to viewport mapping? Explain through examples.  

b) Explain Cohen Sutherland algorithm with the help of an example.  

Q.7  

a) What do you understand by hidden surface? Explain its terminology in detail.  

b) Explain Wireframe model in detail.
Q.1 Write short notes on the following:
   a) Parameterized constructors.
   b) Abstraction.
   c) Friend function.

**PART-A**

Q.2 a) Explain all elements of object oriented programming.
   b) How to initialize objects with constructors?

Q.3 a) Differentiate between ‘call-by-value’ and ‘call-by-reference’.
   b) What are constructors and destructors? Explain how they are different from normal functions?

Q.4 What is visibility mode? What are different inheritance visibility modes supported by C++? Explain.

**PART-B**

Q.5 What is Inheritance? Write a program to show the concept of single level inheritance.

Q.6 a) What is polymorphism? Write a program to show binary operator overloading.
   b) What is abstract class? Is it necessary in inheritance?

Q.7 a) Write a program that illustrate the applications of multiple catch statements.
   b) What are the advantages of using exception handling mechanism in a program?
Q.1 Answer the following multiple choice questions:
   a) How can we generate random numbers in python using method?
      i) Random.uniform( )
      ii) Random.randint( )
      iii) Random.random( )
      iv) All of the Above
   b) Which way among them is used to create an event loop?
      i) Window.eventloopf( )
      ii) Window.mainloop( )
      iii) Window.loop( )
      iv) Eventloop.window( )
   c) Which keyword is used to start a function?
      i) Def
      ii) Function
      iii) Try
      iv) Import
   d) Which function is used to open the file for reading in python?
      i) Fopen(filename,mode)
      ii) Open(filename,mode)
      iii) Openfile(filename,mode)
      iv) Open_file(filename,mode)
   e) What is the value of the expression float (4+int(2.39)%2):
      i) 5.0
      ii) 5
      iii) 4.0
      iv) 4
   f) A class in which one or more methods are only implemented to raise an exception is called abstract class. Is it True or False?
   g) Which function overloads the + operator?
      i) _______ add _______ ( )
      ii) _______ Plus _______ ( )
      iii) _______ sum _______ ( )
      iv) None of the above.
   h) _______ represents an entity in the real world with its identity and behavior:
      i) A method
      ii) An Object
      iii) A Class
      iv) An Operator
   i) All keywords in python are in:
      i) Lower case
      ii) Uppercase
      iii) Capitalized
      iv) None of the above
   j) What is the output of the expression print ("abc. DEF".capitalize( ))?
      i) abc.def
      ii) ABC.DEF
      iii) Abc.def
      iv) Abc.Def

   PART-A

Q.2 a) Explain the different types of data types available in python with the help of suitable example of each. 10
   b) Describe the appropriate flow control of a python program. How much indentation is important in the proper flow of the program in python? 10

Q.3 a) Write a python program to enter any number and check whether it is prime or not. 5
   b) Differentiate between “List and Tuple” in context to element storage in the program. 5
   c) Define “String in python”. Explain at least 5 string functions with the help of suitable example. 5
   d) Explain different types of operators available in python with the help of suitable example.
Q.4  a) Differentiate between “Global variables” and “Local variables” in python. Explain your answer with the help of suitable example.  
     b) Write a python program to count the number of each vowel in the given input.

**PART-B**

Q.5  a) Describe the concept of function in context to any programming language. How functions are created and implemented in python? Explain your answer with the help of suitable example.  

Q.6  a) Differentiate between “Readline( )” and “Writeline( )” in context to file handling terminology.
     b) Describe the term “Exception handling”. What is difference between built-in exceptions and user defined exceptions? How exceptions are dissimilar with errors.

Q.7  Explain the following terms:

   a) Finally.
   b) Packages
   c) Dictionary.
   d) Except

5×4
End Semester Examination, May 2019
MCA — Fifth Semester
NETWORK SECURITY AND CRYPTOGRAPHY (MCA-504 (CB))

Time: 3 hrs. Max Marks: 100
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer the following questions:
   a) State five goals of network security.
   b) What is network spoofing?
   c) Name three defense models? Which model is better?
   d) Differentiate between active and passive attacks.
   e) Explain the term “Eaves dropping”.
   f) Write the condition when linear congruence has no solution.
   g) What is block cipher?
   h) What is public key cryptography?
   i) What are Trojans? Give at least one commonly known Trojan.
   j) Differentiate between confidentiality, integrity and availability with respect to information security.

PART-A

Q.2 a) What do you mean by DOS attacks? What are the various types of DOS attacks? State DDOS in relation to spoofed IP address. 10
   b) Write short notes on the following:
      i) Authentication.   ii) Authorization. 5×2

Q.3 a) List and describe three preventive measures that can be taken to minimize the risk of computer virus infection, other than the use of antivirus software. 10
   b) What is biometrics and biometrics authentication? Why is there a need to take multiple samples during the user registration process? 10

Q.4 Write short notes on the following:
   a) Need of security.   b) Encryption.
   c) Email hacking.   d) Social engineering.
   e) Stack and buffer overflow. 4×5

PART-B

Q.5 Find all solutions to each of the following linear equations:
   a) 4x = 4 (mod 6).
   b) 9x + 4 = 20 (mod 7). 10×2

Q.6 a) Find the value of X for following set of congruence using Chinese remainder theorem:
   i)  x = 2 mod 7.
   ii) x = 3 mod 9. 5×2
   b) Explain the function aspect of DES and AES. How are these two different from each other? 10

Q.7 a) What is the purpose and function of PKI? Explain with suitable diagram. 10
   b) Differentiate between the following:
      i) Substitution cipher and Transposition.
      ii) Message integrity and Digital signatures. 5×2
Q.1 Choose the correct option (any ten):

a) Feedback involves:
   i) Telling the speaker what you think of him/her.
   ii) Finishing what you have to say, before listening to what the other person has in mind.
   iii) Checking with the speaker if you understood correctly what was said.

b) Errors in language, grammar, or visual representation of facts take away:
   i) Clarity.
   ii) Correctness.
   iii) Crispness.
   iv) Conciseness.

c) “My mind is preoccupied. I will not be able to listen accurately”. Wails Mrinalini
   Her boss gives her the following advice:
   i) “Jot down points while the meeting is underway”.
   ii) “Send a friend for the meeting”.
   iii) Compose yourself and then go for the meeting”.

d) Devendra Mahajan, CEO, needs to get the rest of his group motivated in times of recession. His closing of a presentation should be as follows:
   i) “Let us work together to achieve targets”.
   ii) “We will provide a bonus if you are able to achieve targets”.
   iii) “Let us discuss what needs to be done”.
   iv) None of the above.

e) While it is OK to respect yourself, it is not equally or as important to respect the other individual. (True/False)

f) At the time of communicating, if you wish to figure out the thoughts in the mind of the sender, intently watch out for:
   i) eye signal.
   ii) body movement.
   iii) hand gestures
   iv) none of the above.

g) Shruti has got into the habit of blinking rapidly throughout the interaction. People who observe her for the first time think that she is:
   i) Hypocritical.
   ii) Acting like a child.
   iii) Lacking in confidence
   iv) None of the above.

h) In a Group Discussion, KISS stands for ____________________.

i) Vikram Sethi, MD of PSU, has found that all employees listen to his presentation even when he rolls up his sleeve and sits on the table, his ability to garner attention is because of his:
   i) Audio Management.
   ii) Knowledge.
   iii) Excellent PPTs.
   iv) None of the above.

j) As soon as the class on finance begins, Rohini tunes off because of:
   i) Preoccupation.
ii) Stress.
iii) Lack of interest.

k) Mohan is a senior lecturer in a small town. He is immensely fond of giving advice to his peers and students because:
i) He knows it all.
ii) He has done his Ph.D.
iii) It makes him feel superior.
iv) He can share his knowledge.

**PART-A**

Q.2  a) How does communication help you at work and outside work? What are the benefits associated with effective communication?  
     b) “Without feedback, communication is incomplete.” Discuss in detail.

Q.3  a) What are the 7C’s and 4S’s of communication?  
     b) How does one make one’s communication more receiver-centric?

Q.4  a) “Lack of interest is a major deterrent to the listening process”. Elaborate with the help of an example.  
     b) What is the importance of listening in the communication process? Explain.

**PART-B**

Q.5  a) Write a letter to the Bank Manager of ICICI Bank to close your saving bank account with valid reasons.  
     b) Write a report on “Campus Placements in Manav Rachna” to be printed in daily newspaper.

Q.6  a) Discuss the significance of correct postures and hand movement.  
     b) “The eyes say it all” Elaborate, discussing the different types of gazes and eye movements.

Q.7  a) State the reasons why a particular website is a hit and the other website with the same theme is a failure.  
     b) How internet has helped to communicate to the masses in an effective way.
Q.1 Choose the correct option:

a) __________ audio/video refers to the use of the Internet for interactive audio/video applications:
   i) Interactive.  ii) Streaming live.
   iii) Streaming stored.  iv) None of the above.

b) According to the Nyquist theorem, we need to sample an analog signal __________ times the highest frequency:
   i) three.  ii) two.
   iii) four.  iv) none of the above.

c) __________ is an application protocol that establishes, manages, and terminates a multimedia session:
   i) RIP  ii) SIP
   iii) DIP  iv) none of the above.

d) A __________ shows the time a packet was produced relative to the first or previous packet.
   i) timestamp  ii) playback buffer
   iii) sequence number  iv) none of the above

e) The first phase of JPEG is:
   i) DCT transformation  ii) quantization.
   iii) data compression  iv) none of the above.

f) __________ encoding is based on the science of psychoacoustics, which is the study of how people perceive sound:
   i) Predictive.  ii) Perceptual.
   iii) both i) and ii)  iv) none of the above

g) __________ is used to compress images:
   i) MPEG  ii) JPEG
   iii) either i) or ii)  iv) none of the above

h) MIDI stands for:

i) Space between lines is called:
   i) Leading.  ii) Kerning.
   iii) Extrude.  iv) Expanded
   v) Font Mapping.

j) Which of these is not likely to be the responsibility of a multimedia project?
   i) Create interfaces.
   ii) Ensure the visual consistency of the project.
   iii) Structure content.
   iv) Create budgets and timelines for the project.
   v) Select media types for content.

PART-A

Q.2 a) What are the different components of multimedia?  

b) Multimedia is multifaceted and is used in various segments of real life. Elaborate.
Q.3  
a) How a font is designed and edited? Give an overview of some fonts editing and designing tools.  
10  
b) Why do we need various text effects in real life? What do they signify?  
10  

Q.4  
Write short notes on (any two) of the following:  
a) Bitmap graphics V/s Vector graphics.  
b) GIF vs. JPEG.  
c) Graphics image sources.  
d) Graphics on internet.  
10x2

**PART-B**

Q.5  
a) Compression of data has made storage comfortable and economic. Elaborate.  
10  
b) Differentiate between lossy and lossless compression with their application in real life situation.  
10  

Q.6  
a) How is Hoffman coding different from Arithmetic coding? Explain with proper diagrams.  
10  
b) When and why do we use Differential Encoding in compression?  
10  

Q.7  
a) Mention the various principles of animation in multimedia.  
10  
b) Name the different softwares used for 2 D animation and 3D animation.  
10
End Semester Examination, May 2019  
BCA – First Semester  
LOGICAL ORGANIZATION OF COMPUTER (BCA-105 (CB))

Time: 3 hrs.  
Max Marks: 100

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Each question carries equal marks.

Q.1  
(a) A digital circuit that can store one bit is called _________.  
(b) In the toggle mode the JK flip flop has _________.  
(c) Xclusive or is also known as _________.  
(d) The Boolean algebra is mostly based on _________.  
(e) In Boolean algebra, A. A is equal to _________.  
(f) Truth table is used to express _________.  
(g) 1’S complement of 10110110 is ___________.  
(h) Positive integers must be represented by _________.  
(i) \((11001)_{2} - (01101)_{2} = \) ___________.  
(j) EBCDIC is abbreviated as ___________.

**PART-A**

Q.2  
(a) Convert the following:  
   i) \((163.875)_{10} = (\quad)_{2}\)  
   ii) \((2056)_{8} = (\quad)_{10}\)  
   iii) \((3956)_{10} = (\quad)_{8}\)  
   iv) \((1011011011)_{2} = (\quad)_{16}\)  
   v) \((2EB7)_{16} = (\quad)_{10}\)  
(b) The message 0011011 is coded in the 7-bit Hamming code is transmitted through a noisy channel. Decode the message, assuming that at most, a single error occurred in code word.

Q.3  
(a) Draw the circuit diagram for the following expression using basic gates:  
   \[ F = A \overline{B} C + A \overline{B} \overline{C} + ABC \]  
   b) Why gates are required in a computer? Explain universal gates.

Q.4  
Perform the following using K-map and draw the circuit diagram:  
(a) \[ \sum m(0,1,3,4,5,7,10,13,14,15) \].  
(b) \[ \sum m(5,6,7,9,10,11,13,14,15) \].

**PART-B**

Q.5  
With the help of a logic diagram and a truth table, explain 4-bit magnitude comparator.

Q.6  
(a) Draw a decimal-to-BCD encoder with the help of a logic diagram and a truth table.  
(b) Distinguish b/w a multiplexer and demultiplexer.

Q.7  
Write short notes on the following:  
(a) Parallel processing.  
(b) Combinational and sequential circuit.
Q.1 Multiple choice questions:
   a) How should you arrange catch blocks?
      i) Only one catch block for each try block.
      ii) Several catch blocks for a try block, arranged in order starting with exception and ending with the most specific exception.
      iii) Several catch blocks within one try block, arranged starting with the most specific exception and ending with exception.
      iv) The catch blocks should be used only when a finally block is not used.
   b) Two methods with the same name but with different parameters.
      i) Overloading
      ii) Loading
      iii) Multiplexing
      iv) Duplexing
   c) Common language runtime (CLR).
      i) Is an execution engine for all .net application.
      ii) Is similar to JVM as in Java.
      iv) Is a compiler?
   d) It is mandatory to override virtual method.
      i) True
      ii) False
   e) What is Minimum and Maximum Size of Int32?
      i) – 3,200,102,400/3,200,102,448
      ii) – 2,147,483,648/2,147,483,648
      iii) – 3,200,000,000/3,200,000,000
      iv) – 32,768/32,768
   f) What does the keyword virtual mean in the method definition?
      i) The method is public
      ii) The method can be derived
      iii) The method must be over-ridden
      iv) The method can be over-ridden
   g) We Can declare a property in an interface.
      i) True
      ii) False
   h) Are private class-level variables inherited?
      i) Yes
      ii) No
   i) Which of the following is NOT Value type variable?
      i) String
      ii) System.Drawing.Point
      iii) Integer
      iv) Decimal
   j) What is the default modifier for the class member?
      i) Private
      ii) Public
      iii) Internal
      iv) Protected

Q.2 Write short notes on the following:
   a) Intelligence
   b) Toolbox
   c) CTS

Q.3 a) What are properties? How do we define properties? Give examples.
    b) How many types of loops are there in C#? Give suitable examples.
Q.4  What is an event? How are events handled in C#? List at least three different types of events that can be handled in C# with suitable examples?  

**PART-B**

Q.5  Write short notes on the following:
   a) ListBox
   b) ComboBox
   c) DateTimePicker
   d) Menu  

Q.6  What are the main classes involved in ADO.NET? Explain the role of each class in making a Database transaction. What is a Dataset? How is it important in making data driven application with C#?  

Q.7  Write short notes on the following:
   a) Destructor
   b) Super
   c) Polymorphism
   d) Interface
End Semester Examination, May 2019
B.Sc. (Information Technology) – First Semester
FUNDAMENTAL OF COMPUTER NETWORKING (7.105)

Time: 3 hrs.  Max Marks: 100
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from Part-A and TWO questions from Part-B. Marks are indicated against each question.

Q.1 a) __________ are the rules that govern a communication exchange.
    b) What is encryption and decryption?
    c) TCP/IP model has __________ layers.
    d) Data flow between two devices can occur in
        i) Simplex
        ii) Half-Duplex
        iii) Full Duplex
        iv) All of the above.
    e) Transmission media lies below the __________ layers
        i) Application
        ii) Transport
        iii) Network
        iv) Physical
    f) IEEE has defined the specifications for a wireless LAN, called __________ which covers the Physical and data link layer.
    g) Routers functions at __________ Layers.
    h) A __________ is a server whose zone consists of the whole tree.
    i) Among which DNS can use the services using the well known port 53.
        i) UBP
        ii) TCP
        iii) Either i) or ii)
        iv) None of the above
    j) Topology refers __________ structure of a network.

    2×10

    PART-A

Q.2 Explain the following
    i) Transmission media
    ii) IPv4 and IPv6 Addressing
    iii) Host name and DNS server.
    iv) Network and its type
    v) 802:11 WLANs

    20

Q.3 a) How does switched network works? Explain various switching networks with the help of example.
    b) Explain the different layers of OSI with the help of suitable diagram.

    10x2

Q.4 a) What is the difference between TCP and UDP?
    b) Define the possible range of IP address for the different classes.
    c) Explain the working of DNS servers.

    4
    8
    8

    PART-B

Q.5 a) Explain the role of firewall in terms of system security.
    b) What is a VPN and why is it needed.

    10
    10

Q.6 How does a VLAN reduces network traffic also list various advantages of VLANs

    20

Q.7 What do you understand by cryptography? Explain different types of cryptography with the help of suitable example.

    20
End Semester Examination, May 2019
B. Sc. (Information Technology)—Second Semester
FUNDAMENTALS OF COMPUTER NETWORKING (7.105A)

Time: 3 hrs Max Marks: 40
No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** All questions carry equal marks.

Q.1 a) Which of the following WAN topologies comes with the highest availability and the greater cost?
   i) Bus
   ii) Partial mesh
   iii) Full mesh
   iv) Full mesh

b) In networking, what does a packet refer to?
   i) An electrical signal
   ii) A unit of data
   iii) An alarm
   iv) A way to connect a node with network

c) Ethernet relies on which of the following transmission types?
   i) Simplex
   ii) Half simplex
   iii) Half duplex
   iv) Full duplex

d) Which technology does the IEEE 802.11 specification describe?
   i) Network security
   ii) Ethernet LANs
   iii) Logical link controls
   iv) Wireless networks

e) A wave with which of the following frequencies would have the longest wavelength.
   i) 10 MHz
   ii) 100 MHz
   iii) 1 GHz
   iv) 100 GHz

   **PART-A**

Q.2 What does DNS stand for and briefly explain its functionality. 7

Q.3 How do layers of the TCP/IP protocol suite correlate to the layers of OSI model? Discuss. 7

Q.4 Your ISP has given you the IPv6 address 2000: ACAD : 1234 : 6600 : :/56
   a) How many /64 subnets are available with this address? 3
   b) What are the first four /64 subnets? 2
   c) What are the last two /64 subnets in the range? 2

   **PART-B**

Q.5 Explain classful and classless addressing with suitable example. 7

Q.6 What is virtualization? Explain the advantages and disadvantages of virtualization. 7

Q.7 Compare the main difference between the client operating system and server operating systems in terms of their functional and hardware specification. 7
End Semester Examination, May 2019
BCA – First Semester
LOGICAL ORGANIZATION OF COMPUTERS (BCA-105A (CB))

Time: 3 Hours
Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all. Q.1 is compulsory. Attempt Any TWO questions from PART-A and two questions from PART-B. Marks are indicated against each question.

Q.1  Multiple choice questions:

a) \((2FAOC)_{16}\) is equivalent to:
   i) \((195084)_{10}\)
   ii) \((00101111101000001100)_{2}\)
   iii) Both (i) and (ii).
   iv) None of these.

b) What characteristic of RAM memory makes it not suitable for permanent storage?
   i) Too show
   ii) Unreliable
   iii) It is volatile
   iv) Too bulky

c) In computers, subtraction is generally carried out by ____________.
   i) 9'S complement
   ii) 10'S complement
   iii) 1’S complement
   iv) 2’S complement

d) A pipeline is like:
   i) An automobile assembly line.
   ii) House pipeline.
   iii) Both (i) and (ii)
   iv) A gas line.

e) The circuit used to store one bit of data is known as:
   i) Register
   ii) Encoder
   iii) Decoder
   iv) Flip Flop

f) Which among following is volatile?
   i) ROM
   ii) EPROM
   iii) DROM
   iv) RAM

g) The performance of the cache memory is measured in term of:
   i) Hit Ratio
   ii) Chat Ratio
   iii) Copy Ratio
   iv) Data Ratio

h) The only difference between a combinational circuit and a flip flop is that:
   i) The flip flop requires previous state.
   ii) The flip flop requires next state.
   iii) The flip flop requires a clock pulse.
   iv) None of the these.

i) Full adder combinational circuits has three inputs:
   i) 2 outputs
   ii) 1 output
   iii) 3 outputs
   iv) None of these.

j) Circuits that employs memory elements in addition to gates is called:
   i) Combinational Circuit
   ii) Sequential Circuit
   iii) Combinational Sequence
   iv) Series.  

Write short notes on:

k) Associative Memory

l) Comparators.

---

PART-A

Q.2  a) Perform the following:
   i) \((169.7)_{10} = (\quad)_{2} = (\quad)_{8} = (\quad)_{16}\)
ii) \((ABC.D)_{16} - (710.23)_{16}\)

iii) Using 2’S complement perform the subtraction \((79)-(23)\)

b) The data was sent as 1100110 and received as 1100111. Using Hamming code detect the error and give the method for obtaining correct sequence.

Q.3 Why NAND and NOR gate are known as universal gates? Simulate NAND and NOR to all the basic gates.

Q.4 a) Find the other cannonical form of:
\[ F(x, y, z) = \pi(3, 4, 6, 7) \]

b) Solve the following expression using K Maps:
   i) \[ F(x, y, z) = \pi(1, 3, 4, 6, 7) \]
   ii) \[ F(A, B, C, D) = \sum(0, 2, 4, 5, 6, 11, 14, 15) \]

PART-B

Q.5 a) Construct a 16 to 1 line multiplexer with two 8 to 1 line multiplexer and one 2 to 1 line multiplexer. Use block diagram for the three multiplexers.

b) Draw and explain the working of 4 bit binary adder subtractor circuits.

Q.6 a) What is the race around condition? How can we overcome this situation? Explain Master slave flip flop.

b) Differentiate between synchronous and asynchronous counters. Also, explain 4 bit binary asynchronous counter.

Q.7 a) What do you understand by the term “Locality of Reference”? Explain different types of mappings in cache memory.

b) Explain the basic components of a microprocessor.
End Semester Examination, May 2019
BCA – Third Semester
LEADERSHIP AND ORGANIZATIONAL BEHAVIOUR (BCA-002A (CB))

Time: 3 hrs. 
Max Marks: 100
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 a) Define communication.
b) Leadership attributes.
c) Differentiate between leader and manager.
d) Trait theory.
e) Define stress.
f) Purpose of leadership.
g) Scope of OB.
h) Authentic self.
i) Importance of organizational behavior.
j) Charismatic leader.

PART-A

Q.2 a) Explain your strength and weakness as a leader.  
10

b) What are the four different leadership styles and brief them?  
10

Q.3 a) Explain situational theory is different from contingency theory.  
10

b) Explain following with the help of example:
   i) Transformational leader.  
5×2
   ii) Great man theory.

Q.4 a) What do you understand by crucibles of leader? How they can affect the general behaviour of a leader. Explain in detail.  
10

b) Write short notes on following:
   i) Leadership purpose.  
5×2
   ii) Empowering leader.

PART-B

Q.5 a) Not all conflict is bad. In fact, managers may prefer some conflict. Why?  
10

b) What is the difference between distributive and integrative bargaining?  
10

Q.6 a) Discuss two ways people learn about organizational behaviour.  
10

b) “The stronger the culture, the more influential it is on employee behaviour”. Justify the statements with suitable example.  
10

Q.7 a) Discuss about prevention and management of stress.  
10

b) Explain the factors that affect an organizational climate. What are the determinants of job satisfaction of employees inside the organization?  
10
End Semester Examination, May 2019
BCA – Third Semester
PRINCIPLES OF MANAGEMENT (BCA-001 (CB))

Time: 3 hrs. Max Marks: 100
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 a) There are ________ levels of management.
   b) The ranks and positions of managers are indicated by management ________.
   c) Every manager is not responsible for coordination of activities. (True/False)
   d) The concept of scientific management was given by
      i) Elton Mayo
      ii) Henry Fayol
      iii) Fedrick Taylor
      iv) Peter Drucker
   e) ________ refers to the chain of superiors ranging from top management to the lowest rank.
   f) MBO is not merely a technique, but a ________ to management.
   g) Planning is first and foremost function of management. (True/False)
   h) Content of organization chart include.
      i) Authority and responsibilities of various executives.
      ii) Ways of promotion
      iii) Salary particulars.
      iv) All of these
   i) ________ is stable and predictable.
   j) ________ identifies gaps in existing manpower.

   2×10

PART-A

Q.2 “Levels of management refers to a line of separation between different positions held by seniors and juniors drawn with a view to distinguish each other in respect of their duties, responsibilities, rights and authority”. Explain this statement in support of your answer. 20

Q.3 a) Explain the importance of decision making. What kind of steps have been taken in the process of decision making in your organization? How can they be improved? Briefly describe. 15
   b) ‘Planning is also a controlling process’. Discuss. 5

Q.4 “The organization structure should divide and group the activities of an enterprise that they contribute most effectively and efficiently to the attainment of enterprise purpose”. Discuss the statement and short the place of ‘departmentalization’ in an organization. 20

PART-B

Q.5 a) Discuss the sources of recruitment. How recruitment is different from selection? Explain. 10
   b) Explain job analysis. What are its importance and utility in HR? 10

Q.6 a) Direction function of management involves dealing with human factor, expound this statement. 10
   b) What do you mean by team building in an organization? How does a team differ from a group? Explain in detail. 10

Q.7 a) “Good leadership is an integrated part of effective management”. Explain and illustrate this statement. 10
   b) Discuss the importance of collective bargaining. 10
Q.1 Answer the following questions:
   a) State the fundamental goal of knowledge representation.
   b) State the meaning of the given predicate logic “∀X human(X) <- mortal(X)”.  
   c) Define the term “Procedural Knowledge”. State any one application where procedural knowledge is used.
   d) Give an example of relational knowledge.
   e) “AI is interdisciplinary in nature and its foundations are in various fields”. Justify the statement with valid reasons.
   f) State at least two characteristics of neural networks.
   g) List any two commonly used AI techniques.
   h) What is the structure of intelligent agent?
   i) In what ways depth first search algorithms are better than breadth first search?
   j) How fuzzy sets are defined in fuzzy logic?  2×10

PART-A

Q.2  
   a) Differentiate between “Uninformed search (Blind search) and Informed search (Heuristic Search) strategies.  10  
   b) What are quantifiers? Discuss universal and Existential quantifier with the help of suitable example.  10

Q.3  
   a) Explain the situations under which hill climbing may fail to find a solution. What can be done to overcome these situations?  10  
   b) What are the task domains of AI? Discuss them with the help of suitable examples.  10

Q.4 Consider the following sentences:
   John likes all kinds of food.
   Apples are food.
   Chicken is food.
   Anything anyone eats and isn't killed by is food.
   Bill eats peanuts and is still alive.
   Sue eats everything Bill eats.
   Translate these sentences into formulas in predicate logic.  20

PART-B

Q.5  
   a) Which of the following are classification tasks appropriate for classification learning algorithms?  
      i) Predicting if a credit card transaction is fraudulent or legitimate.  
      ii) Predicting how much it will rain tomorrow.  
      iii) Predicting the letter of the alphabet represented by an image of a handwritten character.  
      iv) Breaking a database of customers into clusters based on their buying patterns (where the nature of the clusters is determined automatically by the computer, not in any way provided by a human).  2½×4  
   b) Discuss the applications of artificial neural networks in detail.  10
Q.6 Define “Expert System”. What are the applications of an expert system? Name any two expert systems which are used in the area of disease diagnosis. Discuss the architecture of an expert system.

Q.7 Discuss the following terms:
   a) Procedural and Declarative knowledge.
   b) Fuzzy logic.
   c) Forward and Backward Reasoning.
   d) Neural network.
End Semester Examination, May 2019
MCA — Fifth Semester
BIG DATA ANALYTICS (MCA-506(CB))

Time: 3 hrs. Max Marks: 100
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer the following questions:
   a) Differentiate between OLAP and OLTP.
   b) Where does big data come from? List the few important sources.
   c) Define the term “Database Sharding”.
   d) Differentiate between “Structured Data and Unstructured Data”.
   e) Explain what characteristics of social networks make it a big data?
   f) Name some of the important tools useful for big data analytics?
   g) Give example of one document oriented and one column oriented database
   h) List the distinguished features of Hadoop.
   i) Discuss the CAP theorem.
   j) List the benefits of using Cassandra.

   PART-A

Q.2 Requirement specification of blog application in social networking is as follows:
   * Every post has a unique title, description and url.
   * Every post can have one or more tags.
   * Every post has the name of its publisher and total number of likes.
   * Every post has comments given by users along with their name, message, data-time and likes.
   * On each post, there can be zero or more comments.
   For this set of requirements design a Mongo DB schema.

Q.3 What are the different kinds of data on which data mining can be applied? Explain steps involved in data mining knowledge process? Also discuss the issues in data mining?

Q.4 a) List the various applications of big data. How it can be used to improve business for a superstore?
   b) Discuss the role of cloud computing in big data.

   PART-B

Q.5 Write short notes on the following:
   a) Driver code.
   b) Mapper code.
   c) Reducer code.
   d) Combine.

Q.6 Discuss in detail the basic building blocks of Hadoop with the help of neat diagram.

Q.7 What is a HIVE? Specify its role in Hadoop. What kind of data warehouse application is suitable for Hive? What are the types of tables in Hive?
End Semester Examination, May 2019  
BCA – First Semester  
FUNDAMENTALS OF ‘C’ PROGRAMMING (BCA-104(CB))

Time: 3 hrs.  
Max Marks: 100  
No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Write the answers very briefly:  
   a) What does static variable mean?  
   b) What are enumerations?  
   c) What is dynamic memory allocation?  
   d) What are ‘C’ identifiers?  
   e) How is fopen() used?  
   f) What is the difference between structure and union?  
   g) Write the syntax of while loop.  
   h) Define constants.  
   i) Which language is predecessor to ‘C’ programming language?  
   j) Explain any two header files used in ‘C’ language. 

   **2x10**

**PART-A**

Q.2 What is an operator? Explain arithmetic relational, logical and assignment operators in C language?  

   **20**

Q.3 a) Explain the two way selection (if, if-else, nested-if-else) in C language with example.  
   b) Explain the switch statement with syntax and example.  

   **12**  
   **8**

Q.4 a) Explain void and parameter less functions in C with examples.  
   b) Write a ‘C’ program to read a year as an input and find whether it is leap year or not. Also consider end of the centuries.  

   **8**  
   **12**

**PART-B**

Q.5 a) What is a pointer? How can it be initialized? Discuss with suitable examples.  
   b) Explain any five string manipulation library functions with examples.  

   **10**  
   **10**

Q.6 a) What is a structure? Explain the syntax of structure declaration with example.  
   b) Explain how structure variable passed as a parameter to a function with example.  

   **10**  
   **10**

Q.7 a) Explain array of pointer with a suitable program. Use comments to explain the program.  
   b) Write a ‘C’ program to read and display a text from a file. Use comments to explain the program.  

   **10**  
   **10**
End Semester Examination, May 2019
BCA — First Semester
INTRODUCTION TO IT AND PROGRAMMING IN C (BCA-106 (CB))

Time: 3 hrs. Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Multiple choice questions:

a) Which of the following is not a valid variable name declaration?
   i) int____a3;  ii) int____3a;  iii) int____A3;  iv) None of these

b) The keyword used to transfer control from a function back to the calling function is:
   i) Switch  ii) go to  iii) go back  iv) Return

c) A short integer is at least 16 bits wide and a long integer is at least 32 bits wide.
   i) True  ii) False

d) Which of the following is not logical operator?
   i) &  ii) &&  iii) ||  iv) !

e) What does the following declaration mean? Int(*ptr)[10];
   i) ptr is array of pointers to 10 integers  ii) ptr is a pointer to an array of 10 integers  iii) ptr is an array of 10 integers  iv) ptr is an pointer to array.

f) A pointer to a block of memory is effectively same as an array:
   i) True  ii) False

g) Pictorial representation of a logic is known as:
   i) Flow chart  ii) Algorithm  iii) Pseudo code  iv) None of these

h) Which of the following is the correct order of evaluation for the below expression?
   z = x + y * z / 4%2 - 1
   i) */%+-  ii) =*/%+-  iii) */%+-=  iv) */%/-+=

i) Assemble use only:
   i) Mnemonics  ii) Binary code  iii) Both  iv) None of the above

j) While loop is a __________
   i) Entry control loop  ii) Exit control loop  iii) Can act as both  iv) None of the above

k) The function strcat() has __________ parameters.
l) A _______ type variable cannot be used as a subscript in an array.
m) A constant can be declared using ______ keyword.
n) A C program can be executed without the presence of ______ function.
o) Derived datatypes are designed with the help of _______ datatypes.

PART-A

Q.2  a) Explain any two social media tools with usage and limitations of each.  
     b) What is the purpose of translator? Explain the type of translator used by c language.

Q.3  a) Explain different types of data types available in C language.  
     b) Explain the following terms in your own words:
        i) Tokens.
        ii) Variables.
        iii) Identifiers.
        iv) Constants.
Q.4 Write down the syntax of different "if statement " available in C language. Also write a small program of each.

**PART-B**

Q.5 a) What are different ways to initialize an array? Give an example of each.
   b) Write a program in C language to find the sum of all numbers present in an array of 10 numbers.

Q.6 a) Differentiate between following:
   i) Call-by-value and Call-by-reference.
   ii) Inbuilt and user defined function.
   b) Design a function to find the greatest number among three numbers.

Q.7 a) Write short notes on following:
   i) Array of structures.
   ii) Pointer variable.
   b) How structure is different from union? Explain through an example.
Q.1 Multiple choice questions (Only one option is correct):

a) Which of the conditional statements is/are supported by PHP?
   i) If statements
   ii) If –else statements
   iii) If-else if statements
   iv) Switch statements.
   a) Only (i)   b) (ii), (iii) and (iv)   c) (i), (ii) and (iv)   d) All of these.

b) When you use the $_GET variable to collect data, the data is visible to:
   i) None
   ii) Only you
   iii) Everyone
   iv) Selected few

c) PHP’s numerically indexed array begin with position __________.
   i) 1   ii) 2   iii) 0   iv) -1

d) Which one of the following function is used to start a session?
   i) start_session()
   ii) session_start()
   iii) session_begin()
   iv) begin_session()

e) What will be the output of the following PHP code?
   i) <?php
   ii) $names = array("Sam", "Bob", "Jack");
   iii) echo $names[0]. "is the brother of". $names[1]. "and". $names[1]. ";";
   iv) ?>
   a) Sam is brother of Bob and Jack
   b) Sam is the brother of Bob and Bob
   c) Sam is the brother of Jack and Bob
   d) Error

f) Which of the following method sends input to a script via a URL?
   i) Get
   ii) Post
   iii) Both
   iv) None

g) Which of them is not an event in HTML?
   i) Onclick
   ii) Onchange
   iii) Onload
   iv) Onperform

h) Java Script is an __________ language.
   i) Compiled
   ii) Interpreted

i) We cannot Place JS code in the body tag. Say True/false.
   i) True
   ii) False

j) Which of the following variables is not a predefined variable?
   i) $get
   ii) $ask
   iii) $request
   iv) $post.

PART-A

Q.2 Differentiate between the following:

a) For-each and for.

b) Echo and print.

c) If else and switch.

Q.3 Define Array. What are the different types of arrays available in PHP? How can we declare one-dimensional and two-dimensional array in PHP?

Q.4 Explain difference between $_GET and $_POST. Write a sample code to handle input from a form using POST method.
Q.5 Define Session. What is the need of creating session? How can we start and modify Session in PHP?  

Q.6 What are different types of Visibility? Explain the relation between Class and Object using a suitable example.  

Q.7 Explain the methodology of connecting a PHP program to Mysql Server and executing a select query using a suitable example.
End Semester Examination, May 2019
MCA – Third Semester
PROGRAMMING IN UNIX (MCA-307 (CB))

Time: 3 hrs.  
Max Marks: 100
No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.

Q.1 Answer the following questions in brief:
   a) What is the role of Kernel in UNIX operating system?
   b) How will you send mail through a single command to all the users who are currently logged in?
   c) What is the significance of commands *.*?
   d) How will you display all processes running on your system?
   e) Describe the meaning of portability.
   f) If the nice value of a process is increased what would be the effect on the speed of execution of the process?
   g) Draw a process control block.
   h) How will you count number of lines in a file without opening it?
   i) Name three modes of working in Vi Editor.
   j) List four communication commands in UNIX?

2×10

**PART-A**

Q.2 What do you understand by background processes? Explain the working of background processes with a suitable example. Explain any two system processes that always run in background and also explain their purpose in detail.

20

Q.3 Discuss the following commands by taking suitable examples:
   a) sort
   b) cut
   c) touch
   d) wc
   e) cat

4×5

Q.4 a) How does Unix access files? Discuss in detail.
   b) Construct pipelines for the following:
      i) List all files beginning with the character ‘A’ on the screen and also store them in a file called file1.
      ii) Display the list of last 20 files present in the current directory. Also, store this list in a file called file-profile.

12

4×2

**PART-B**

Q.5 Write a menu driven program which has following options:
   a) Contents of /etc/password.
   b) List of users who have currently logged in.
   c) Present working directory.
   d) Exit.

5×4

Q.6 Discuss the following:
   a) Socket.
   b) Formatting a disk.
   c) Making a file system.
   d) Mounting a file system.

5×4

Q.7 a) Write a shell program to generate all combinations of 1, 2 and 3 using for loops.
   b) Any year is entered through the keyboard. Write a program to determine whether the year is leap or not. Use the logical operators –a and -
End Semester Examination, May 2019
B. Sc. (Information Technology) – First Semester
BUSINESS ENVIRONMENT (7.106)

Time: 3 hrs.  
Max Marks: 50  
No. of pages: 1

Note: Attempt **FIVE questions in all; Q.1 is compulsory.** Attempt **ANY TWO questions from PART-A and TWO questions from PART-B.** Marks are indicated against each question.

Q.1 Answer in brief:
   a) Demand  
   b) Goods  
   c) CSR  
   d) Services  
   e) Organizational culture  

   **PART-A**

Q.2 Give an introduction to the term “business environment”. What is the role of business in society?  

   **PART-B**

Q.5 Explain the concept of demand and supply. Give examples of Indian economy to support your statement.  

Q.6 Explain the role of socio-cultural, legal and technological elements in business.  

Q.7 The external environment is governed by many factors like customer relationship, Competition, suppliers, labour supply and government agencies. Justify the statement.
Q.1 Fill up the right choice:
   a) Leadership is ______________.
      i) The process of influencing a group toward the achievement of goals
      ii) A group that achieves goals
      iii) The function of influencing a group towards the achievement of goals.
      iv) Directing a group towards the achievement of goals
   b) Research on leadership made it increasingly clear that predicting leadership success involved ____________.
      i) Proper analysis of leader consideration for people and concern for production
      ii) Hiring managers that could demonstrate and develop trust with workers
      iii) Something more complex than isolating a few leader traits or preferable behaviors
      iv) Was more complex than a few leader styles
   c) A democratic leadership style has which of the following characteristics?
      i) Split power
      ii) A dictatorial leader
      iii) Genuine
      iv) Answers i) and ii)
      v) Answers ii) and iii)
   d) Charismatic leadership has which of the following characteristics?
      i) Seeks to involve staff in the decision making process.
      ii) Takes the view that rewards and punishment motivate staff.
      iii) Seeks to ensure staff understand issues facing the organisation.
      iv) Builds a strong and distinctive image for the organisation.
      v) Builds a strong and distinctive image for the organisation.
   e) Which of the following is reward power?
      i) Leader can exercise power as a result of their position in the organisation.
      ii) Leader has power because of their expert knowledge.
      iii) Leader is able to exercise power because of their charisma and reputation.
      iv) Leader can reward staff who comply with instructions.
      v) Leader can punish staff who do not comply with instructions.
   f) Which leadership style tends to centralize authority and make unilateral decisions?
      i) Cultural style
      ii) Autocratic style
      iii) Democratic style
      iv) Laissez-faire
   g) Jared’s boss encourages employees to participate in the decision-making process but does not give them complete freedom to do as they like. She has this of leadership style.
      i) Monarchial
      ii) Autocratic
      iii) Laissez-faire
      iv) Democratic
   h) The __________ theory states a manager’s choice of organizational structures and control systems depends on characteristics of the external environment.
      i) Mechanistic
      ii) Management science
      iii) Organic
      iv) Contingency
   i) Scientific management, administrative management, and bureaucratic management belong to the management viewpoint known as the
      i) Classical perspective
      ii) Behavioral perspective
      iii) Quantitative perspective
      iv) Systems perspective
   j) Which of the following is the ‘odd one out’?
PART-A

Q.2  a) Define ‘leadership’. How can leadership be developed?  
     b) What are the five basis of power?  

Q.3  a) How is management different from leadership?  
     b) What is your leadership style? What are the basic traits a leader should have?  

Q.4  Write short notes on (any two):  
     a) Situational and contingency theories of leadership.  
     b) Functional leadership theory.  
     c) Information processing leadership theory.  
     d) Self leadership theory.  
     e) Transactional and Transformational theory of leadership.  

PART-B

Q.5  a) Differentiate between ‘a group’ and ‘a team’.  
     b) What are the factors which bring resistance to the performance of a team in an 
        organization?  
     c) What are the different stages of team building? Elaborate.  

Q.6  a) State Maslow’s Hierarchy of Needs in an organization and its limitations.  
     b) Elaborate on Herzberg Two-Factor Theory of motivation.  

Q.7  a) What are the various types and effects of conflicts? How can they be resolved?  
     b) Discuss the challenges and opportunities for organizational behaviour.  


i) Management science.  
ii) Management accounting.  
iii) Operations management.  
iv) Systems management.  

2×10
End Semester Examination, May 2019  
BCA – Third Semester  
PRINCIPLES OF MANAGEMENT (BCA-001A (CB))

Time: 3 hrs.  
Max Marks: 100  
No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Write short notes on:  
a) Role of managers.  
b) Trends and challenges of management in Global Scenario.  
c) Supportive leadership.  
d) MBO  
e) Types of plans.  

**PART-A**

Q.2 “Management is the dynamic life giving element in every organization”. Discuss the statement in detail.  

Q.3 “Planning is looking ahead and controlling is looking backwards”. Discuss.  

Q.4 What are different forms of organization from ownership point of view? Explain with merits and demerits in detail.  

**PART-B**

Q.5 “Leadership is situational”. In the light of this statement, discuss the various theories of leadership in brief.  

Q.6 What do you mean by training? What are pre-requisites of a control system?  

Q.7 Explain ‘training’. Discuss various methods of preparing trainings.
Q.1 Short answer questions:
 a) Define a neuron. Draw a diagram.
b) Write application areas of artificial intelligence.
c) Define rule based system. Give example.
d) Define machine learning.
e) Which search method takes less memory? Justify your answer.

Q.2 Discuss the following terms:
 a) Knowledge
 b) Intelligence
 c) Artificial Intelligence
 How are these terms connected together in terms of artificial intelligence?

Q.3 For the search tree given below, show:
 a) Breadth first search.
b) Depth first search.
Write the algorithm for both also.

Q.4 Write short notes on:
 a) Knowledge representation.
b) Logic and its types.
c) Forward chaining and backward chaining.
d) KR schemes.

Q.5 Explain the expert systems and discuss the architecture of expert system diagrammatically.

Q.6 Write short notes on:
 a) Procedural vs declarative knowledge.
b) Rule based deduction system.
c) Backward and forward reasoning.
d) Conflict resolution.

Q.7 Describe artificial neural networks and its working with the help of a diagram.
End Semester Examination, May 2019  
BCA – First Semester  
PROGRAMMING IN C (BCA-1002)

Time: 3 hrs.  
Max Marks: **75**  
No. of pages: 2

**Note:** Attempt **FIVE** questions in all; **taking at least ONE question** from each **UNIT**. **Q.1 is compulsory**. Marks are indicated against each question.

**Q.1**

a) Who developed C language?
   i) Dennis Ritchie  
   ii) James Gosling  
   iii) Ray Boyce  
   iv) None of the above

b) Which operators are used to compare the values of operands to produce logical values in C language?
   i) Logical  
   ii) Relational  
   iii) Assignment  
   iv) None of the above

c) The operator '&' is used for:
   i) Bitwise AND  
   ii) Bitwise OR  
   iii) Logical AND  
   iv) None of the above

d) Maximum value of unsigned integer is ________.
   i) 65535  
   ii) 32767  
   iii) – 65535  
   iv) None of the above

e) Which is an incorrect variable name?
   i) id_no  
   ii) Id No  
   iii) None of the above

f) Which of the following language is predecessor to C programming language?
   i) A  
   ii) ADA  
   iii) C++  
   iv) B

g) What is return type of ftell function?
   i) Double  
   ii) int  
   iii) Long  
   iv) Float

h) Which of the following cannot be used as identifiers?
   i) Letters  
   ii) Digits  
   iii) Underscore  
   iv) Space

i) C language was developed in a year ________.
   i) 1970  
   ii) 1975  
   iii) 1980  
   iv) 1985

j) Name the loop that executes at least once.
   i) For  
   ii) If  
   iii) While  
   iv) Do-while

**UNIT-I**

**Q.2** Define ‘operator’. Discuss various types of operators available in C language. Give example of each.  

**Q.3**

a) Discuss the structure of C language with a suitable example.  

b) What are constants? Discuss various types of constants available in C language.  

**UNIT-II**

**Q.4** What do you understand by array? Discuss how arrays are declared and initialized in C language. Give suitable example of each type.  

**Q.5**

a) Write a program in C language to check whether given number is palindrome or not.  

b) Discuss the format and purpose of Nested if statement with suitable example.
Q.6 Differentiate between the following:
   a) Structure and Union.
   b) Call-by-value and Call-by-reference.
   c) Local and Global Variables.  

Q.7 What is recursion? Explain how it is implemented in C language. Give a suitable example.  

Q.8 Explain various storage classes available in C language.  

Q.9 Describe various I/O functions used for file handling. Give the example of each.
Q.1 Choose the correct option:

a) The 3-D process of extending a plane surface some distance, either perpendicular to the shape’s outline or along a defined path, is called:
   i) Lathing
   ii) Rendering
   iii) Modeling
   iv) Extruding
   v) Skinning

b) The responsibility for ensuring that content included in a product does not infringe on a copyright belongs to:
   i) The developer
   ii) The original creator
   iii) The product’s purchaser
   iv) The U.S. copyright office
   v) The library of congress.

c) From a visual perspective, interface design most closely parallels:
   i) Mapmaking
   ii) Cinematography and film editing
   iii) Technical writing
   iv) Fine art
   v) Technical drawing and illustration.

d) MPEG stands for:
   i) Multiformat Processed event Graphics
   ii) Multi-Phase element grid
   iii) Meta-program environment graph
   iv) Moving picture expert group
   v) Micro-Phase electronic guidance.

e) The VGA standard of a 640X480 pixel monitor showing 256 colors is:
   i) The highest resolution and color depth currently available
   ii) The standard used by most browsers
   iii) Still used by a small number of users
   iv) Not used by a significant number of users
   v) No longer considered a viable standard

f) To create a smooth transition between two images when morphing, it’s important to set numerous:
   i) Layers
   ii) Keyframes
   iii) Key points
   iv) Anchor tags
   v) Splines

g) When delivering a project, you should:
   i) Not bother testing; it will probably work
   ii) Test once on your development computer
   iii) Test on a couple of other computers
   iv) Test on several other computers at least once
v) Test on as many different computers as many times as you can
h) A barcode reader can:
   i) Scan graphics into a computer
   ii) Read Universal Product code patterns
   iii) Provide pressure-sensitive input
   iv) Recognize spoken words when trained
   v) All of the above.
i) An IP address can be exchanged with a(n):
   i) MIME-type
   ii) Point-to-point Protocol
   iii) Domain name
   iv) Email-address
   v) Usenet group
j) The world wide web was originally designed to deliver:
   i) High-quality multimedia
   ii) Text documents with embedded graphics
   iii) Data in many formats, including file transfers, chat and email
   iv) Streaming media formats
   v) Top-secret military information

**PART-A**

Q.2  
 a) What is Multimedia? Explain components of Multimedia with an example of each. **10**
 b) Write short notes on following topics:
   i) Storyboard
   ii) JPEG
   iii) CBT
   iv) Hypermedia
   v) Optimizing video files for CD-ROM **2x5**

Q.3  
 a) Discuss Hot Spots, Hyperlinks and Buttons. How they are used? **10**
 b) List and discuss the stages of multimedia structures and how they might be organized? **10**

Q.4  
 a) How to create a transparent background in Photoshop? **5**
 b) Explain what is Photoshop light room? **5**
 c) Define what is the meaning of a Path? **5**
 d) How do you select and exact color to match? **5**

**PART-B**

Q.5  
 a) How to Embed Flash in Html? **5**
 b) Explain the flash vs. animated images and java applets? **5**
 c) What is flash tweening? **5**
 d) Can flash .swf Movies be very time consuming to edit? **5**

Q.6  
 a) Write answers in relevance to blender software:
   i) What is a Torus?
   ii) What render engines can you use with blender?
   iii) How do you scale selected 3d objects?
   iv) How do you Add plug-ins in blender?
   v) What do you use modifiers for? **2x5**
 b) Explain various principles of animation. **10**

Q.7  
 a) Illustrate design and architecture of multimedia database. **10**
 b) What are digital rights management systems? How are they helpful? **10**
End Semester Examination, May 2019
BCA – First Semester
DATABASE MANAGEMENT SYSTEM (BCA-204A (CB))

Time: 3 hrs.  Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1  

a) __________ is a full form of SQL.
   i) Standard query language     ii) Sequential query language
   iii) Structured query language  iv) Server side query language

b) Grant and revoke are __________ statements.
   i) DDL ii) TCL
   iii) DCL iv) DML

c) Which one of the following is a procedural language?
   i) Domain relational calculus ii) Tuple relational calculus
   iii) Relational algebra iv) Query language

d) In an ER model, __________ is described in the database by storing its data.
   i) Entity ii) Attribute
   iii) Relationship iv) Notation

e) The __________ operation performs a set union of two "similarly structured" tables
   i) Union ii) Join
   iii) Product iv) Intersect

f) The fifth Normal form is concerned with
   i) Functional dependency ii) Multivalued dependency
   iii) Join dependency iv) Domain key

g) Dependency preservation is not guaranteed in
   i) BCNF ii) 3NF
   iii) 4NF iv) DKNF

h) The deadlock state can be changed back to stable state by using __________ statement.
   i) Commit ii) Rollback
   iii) Savepoint iv) Deadlock

i) __________ specifies a search condition for a group or an aggregate.
   i) GROUP BY Clause ii) HAVING Clause
   iii) FROM Clause iv) WHERE Clause

j) Define BCNF.

2×10

PART-A

Q.2  

a) Discuss ‘Three level architecture’ of DBMS with suitable example.  10
b) What are the advantages and disadvantages of DBMS?  10

Q.3  What is data model? Discuss various types of data models with advantages and disadvantages.  20

Q.4  

a) What is the difference between relational algebra and relational calculus?  5
b) Define: primary key, secondary key, foreign key, candidate key, and alternate key.  15

PART-B
Q.5 Discuss the following with suitable example:
   a) Functional dependency.
   b) Full Functional dependency.
   c) Partial dependency.
   d) Multivalued dependency.
   e) Transitive dependency.  4×5

Q.6 a) What is concurrency control? Discuss various problems associated with this.  10
     b) Discuss different types of locks with suitable examples.  10

Q.7 Define ‘data security’. Explain various techniques to implement database security.  20
Q.1  a) Which of the following indicates the maximum number of entities that can be involved in a relationship?
   i) Minimum cardinality
   ii) Maximum cardinality
   iii) ERD
   iv) Greater Entity Count (GEC)

   b) A recursive relationship is a relationship between an entity and ________.
   i) Itself
   ii) a subtype entity
   iii) An archetype entity
   iv) an instance entity

   c) Which of the following is an Open Source DBMS?
   i) MySQL
   ii) Microsoft SQL Server
   iii) Microsoft Access
   iv) Oracle

   d) In which normal form the partial dependency is removed?
   i) First
   ii) Second
   iii) Third
   iv) BCNF

   e) A transaction state changes from active to ________, after the transaction has been rolled back and the database restored to its state prior to the start of the transaction.
   i) Partially committed
   ii) Committed
   iii) Aborted
   iv) Failed

   f) When a primary key is define in the table, DBMS automatically creates a ________ on a primary key column.
   i) Unique index
   ii) Sequence
   iii) Trigger
   iv) Synonym

   **PART-A**

Q.2  Explain the general architecture of typical DBMS. What are the effects of data independence in DBMS?  

Q.3  a) What is the need of Big Data Analytics? Explain the application area where big data analytics can be used.

   b) Design an ER diagram for the following Dental Clinic database. Your diagram should have all the needed detail. Make the necessary Assumption to solve them.
   The clinic has several dentists. Each dentist has a unique Number, name, nationality, multiple room-number, salary, birth-date and home-address (Box, City, Zip). Each client (patient) has a unique Code, name, home-phone, work-phone, address, and birth-date. Each client is assigned to one dentist. All future visits will be to the same dentist. A client can be insured or self-paying. An insured client should have an insurance company-name, and company-phone, while a self-paying client must have a bank-name and a bank account. Each visit of a client is described by a date, type, action, fee, and date-of-next appointment.

Q.4  a) Consider the following relational database schema:
   Student (Student-id, Sname, major, GPA)
   Faculty (Faculty-id, fname, dept, designation, salary)
   Course (Course-id, Cname, Faculty-id)
   Enrol (Course-id, Student-id, grade)

   Write the following query in SQL:
   i) List the names of all students enrolled for the course “IS6T1”.

   **PART-B**

Q.2  Explain the general architecture of typical DBMS. What are the effects of data independence in DBMS?  

Q.3  a) What is the need of Big Data Analytics? Explain the application area where big data analytics can be used.

   b) Design an ER diagram for the following Dental Clinic database. Your diagram should have all the needed detail. Make the necessary Assumption to solve them.
   The clinic has several dentists. Each dentist has a unique Number, name, nationality, multiple room-number, salary, birth-date and home-address (Box, City, Zip). Each client (patient) has a unique Code, name, home-phone, work-phone, address, and birth-date. Each client is assigned to one dentist. All future visits will be to the same dentist. A client can be insured or self-paying. An insured client should have an insurance company-name, and company-phone, while a self-paying client must have a bank-name and a bank account. Each visit of a client is described by a date, type, action, fee, and date-of-next appointment.

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   Course (Course-id, Cname, Faculty-id)
   Enrol (Course-id, Student-id, grade)

   Write the following query in SQL:
   i) List the names of all students enrolled for the course “IS6T1”.

   **PART-B**

Q.2  Explain the general architecture of typical DBMS. What are the effects of data independence in DBMS?  

Q.3  a) What is the need of Big Data Analytics? Explain the application area where big data analytics can be used.

   b) Design an ER diagram for the following Dental Clinic database. Your diagram should have all the needed detail. Make the necessary Assumption to solve them.
   The clinic has several dentists. Each dentist has a unique Number, name, nationality, multiple room-number, salary, birth-date and home-address (Box, City, Zip). Each client (patient) has a unique Code, name, home-phone, work-phone, address, and birth-date. Each client is assigned to one dentist. All future visits will be to the same dentist. A client can be insured or self-paying. An insured client should have an insurance company-name, and company-phone, while a self-paying client must have a bank-name and a bank account. Each visit of a client is described by a date, type, action, fee, and date-of-next appointment.

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   Student (Student-id, Sname, major, GPA)
   Faculty (Faculty-id, fname, dept, designation, salary)
   Course (Course-id, Cname, Faculty-id)
   Enrol (Course-id, Student-id, grade)

   Write the following query in SQL:
   i) List the names of all students enrolled for the course “IS6T1”.
ii) List the names of all students enrolled for the course “IS6T1 and have received “A” grade.
iii) List all the departments having an average salary of above Rs. 10,000.
iv) Give a 20% raise to salary of all faculties.
v) List the names of all faculty members beginning with “P” and ending with letter “A”.

b) Explain the DDL and DML commands in SQL.

**PART-B**

Q.5  
a) What is the need of normalization? Explain first, second and third normal forms with example.  
b) What is the use of cloud computing? Explain the services provided by the cloud computing.

Q.6  
a) What is the role and responsibilities of Database Administrator? Explain.  
b) Explain the techniques that are used to implement database security.

Q.7  
What is concurrency control? Explain two phase locking techniques for concurrency control?
End Semester Examination, May 2019

B. Sc. (Information Technology) - Third Semester

DATABASE ENGINEERING – II (7.214)

Time: 3 hrs. Max Marks: 60

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from Part A and TWO questions from Part B. All questions carry equal marks.

Q.1 Answer the following:
   a) Differentiate between ‘DBMS’ and ‘RDBMS’.
   b) Define views with suitable example.
   c) What do you mean by SQL? Discuss its features.
   d) What do you mean by ‘deadlock detection’? Explain.

   PART-A

Q.2 Design an ER-diagram for an airline reservation system.

Q.3 What is union, intersection, minus, group by and having clause in SQL? Explain each with an example. How they are different from joins?

Q.4 What are different types of attributes in RDBMS? What is cardinality? Explain both with suitable examples.

   PART-B

Q.5 Discuss the various control structures in PL/SQL with suitable example.

Q.6 What is two phase locking protocol? How inconsistency can be removed during this protocol, discuss and also explain the concept of deadlock during two phase locking protocol.

Q.7 Differentiate between:
   a) Implicit and Explicit cursors.
   b) Local and stored procedures.
End Semester Examination, May 2019
BCA – Third Semester
MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE
(BCA-401A (CB))

Time: 3 hrs.  
Max Marks: 100
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt ANY TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1  
(a) Given that \( P \cap Q = P \cap R \), is it necessary that \( Q = R \)? Justify your answer.
(b) Let \( A = \{a, b, c, d\} \). Let \( R = \{(a, b), (a, c), (b, a), (b, c), (c, d), (d, a)\} \). Find the transitive choice of \( R \).
(c) Prove the following by mathematical induction \( 1 + 3 + 5 + \cdots + 2n - 1 = n^2 \)
(d) State and explain pigeonhole principle with an example.  

**PART-A**  

Q.2  
Define the following terms and give one example of each
(a) Set cardinality
(b) Posets
(c) Equivalence relations
(d) Operation functions

Q.3  
State pigeon hole principle and its application. There are 50 baskets of apples. Each basket contains no more than 24 apples. Show that there are at least three baskets containing the same number of apples.  

Q.4  
(a) Prove that if \( L \) be a lattice then \( a \land b = a \) if and only if \( a \lor b = b \).
(b) Explain Disjunctive Normal Form (DNF) and Conjunctive Normal Form (CNF). Determine the disjunctive normal form of the following Boolean expression.
\[ x \land (y \lor z) \]

**PART-B**  

Q.5  
(a) What is recurrence relation? Explain the order of recurrence relation with example.
(b) Solve the recurrence relations.
\[ a_n - 4a_{n-1} = 6, \quad 4^n, \quad a_0 = 1 \]

Q.6  
Write short notes on:
(a) Quadrant planes
(b) Section formula
(c) Intercept form
(d) Condition of concurrency of three lines.

Q.7  
(a) What is a spanning tree? Discuss the computer representation of general trees. Also prove that a tree with \( n \) vertices has \( (n - 1) \) edges.
(b) Consider the graph show in fig. Find the minimum spanning tree of the following graph:
Fig.
Q.1 Answer the following questions:
   a) Define “Database schema”.
   b) Who is DBA?
   c) List any two database languages.
   d) What is referential integrity?
   e) How can you define alternate key?
   f) Discuss “Candidate key”.
   g) What is timestamp?
   h) Give the functions of transaction log.
   i) When the schedule is serializable?
   j) Define “Derived attribute”.  

Q.2 2×10

   PART-A

   Q.2 a) Distinguish between specialization and generalization. How will you represent them in an ER diagram?  
   b) Give examples of different types of JOIN statement in SQL.

   Q.3 a) State the desirable ACID properties of a transaction.  
   b) Explain the recovery algorithm in detail.

   Q.4 a) List any 5 significant differences between a file processing system and a DBMS.  
   b) Define 3 NF and Boyce-Codd NF. Explain with suitable examples.

   PART-B

   Q.5 a) Explain two phase locking protocol and its disadvantages.  
   b) How can you say that security in database is required? Discuss in detail with the security risks associated with it.

   Q.6 a) Define functional dependency and explain inference rules of FD.  
   b) Relation R has five attributes ABCDE. Fields of R contain only atomic values. F: [A → {B, C}, {B, C} → A, D and D → E] are the set of functional dependencies (FDs) so that F + is exactly the set of FDs that hold for R.
      i) How many candidate keys does the relation R have? Explain.
      ii) The highest normal form of R is? Explain.

   Q.7 a) R(ABC) F = {A → B, A → C} decomposed into D = R1(AB), R2(BC). Find whether D is lossless or lossy? Give explanation.  
   b) Consider the following tables:
      WORKS(PNAME,CNAME,SALARY)
      LIVE(PNAME,STREET,CITY)
      LOCATED-IN(CNAME,CITY)
      MNGER(PNAME,MGRNAME)
      Express in the form of relational algebra for the following queries:
      i) Find the names of all persons who live in city “Mumbai”.
      ii) Retrieve the names of all persons of Infosis’ whose salary is between ₹30,000 and ₹50,000.
      iii) Find the names of all persons who live and work in the same city.
      iv) List the names of the people who work for “wipro’ along with the cities they live in.
v) Find the average salary of all " Infosians".
End Semester Examination, May 2019  
BCA – First Semester  
INTRODUCTION TO INFORMATION TECHNOLOGY AND PROGRAMMING TECHNIQUE (BCA-101(CB))

Time: 3 hrs.  
Max Marks: 100
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Attempt the following:
   a) What is RAM? Explain.
   b) What is Pseudo code?
   c) What is Flowchart? Explain.
   d) Write a note on ‘linkers’.
   e) What is Non-Impact Printers?
   f) Solve \((101110)_2 = ?_{10}\)
   g) What do you mean by Debugging?
   h) Explain two characteristics of computer.
   i) Explain the uses of Magnetic Disk.
   j) What is Flash Memory?

PART-A

Q.2 a) What is Computer? Discuss various applications of computers.
   b) Explain the different components of computer with the help of a block diagram.

Q.3 What is input/output device? List three input and three output devices in detail.

Q.4 Explain the following:
   a) ROM and its type.
   b) Flash memory.
   c) Magnetic tape and magnetic disk.
   d) Primary and secondary memory.

PART-B

Q.5 a) Define ‘software’. Explain its importance. Also explain the difference between system and application software.
   b) Explain the following:
      i) Compiler, Interpreter and Assembler.
      ii) Error and its various types.

Q.6 What do you mean by problem solving? List the various problem-solving techniques and explain any two problem solving techniques in detail.

Q.7 What do you understand by structured programming? Explain the top-down and bottom-up programming strategies with diagram.
End Semester Examination, May 2019
BCA – Third Semester
MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE
(BCA-401A (CB))

Time: 3 hrs.  
Max Marks: 100
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1  
a) Given that \( P \cap Q = P \cap R \), is it necessary that \( Q = R \) ? Justify your answer.

b) Let \( A = \{a, b, c, d\} \). Let \( R = \{(a, b), (a, c), (b, a), (b, c), (c, d), (d, a)\} \). Find the transitive closure of \( R \).

c) Prove the following by mathematical induction:
\[ 1 + 3 + 5 + \cdots + 2n - 1 = n^2 \]

d) Define odd vertex in detail.

PART-A

Q.2  
Define the following terms and give one example of each:

a) Set cardinality.

b) Posets.

c) Equivalence relations.

d) Operation functions.

Q.3  
State Pigeon hole principle and its application. There are 50 baskets of apples. Each basket contains not more than 24 apples. Show that there are at least three baskets containing the same number of apples.

Q.4  
a) Prove that if \( L \) be a lattice then \( a \land b = a \) if and only if \( a \lor b = b \).

b) Explain Disjunctive Normal Form (DNF) and Conjunctive Normal Form (CNF). Determine the disjunctive normal form of the following Boolean expression.
\[ x \land (y \lor z) \]

PART-B

Q.5  
a) What is recurrence relation? Explain the order of recurrence relation with an example.

b) Solve the following recurrence relations:
\[ a_n - 4a_{n-1} = 6, 4^n, a_0 = 1 \]

Q.6  
Write short notes on the following:

a) Quadrant planes.

b) Section formula.

c) Intercept form.

d) Condition of concurrency of three lines.

Q.7  
a) What is a spanning tree? Discuss the computer representation of general trees. Also prove that a tree with \( n \) vertices has \( (n - 1) \) edges.

b) Consider the graph shown in the figure and find the minimum spanning tree of the following graph:
Q.1 Write short notes on (any four) of the following:
   a) Define “Small scale industry”. What are its chief characteristics?
   b) What is the interrelationship between enterprise and society?
   c) What are the salient features of new small enterprise policy?
   d) What are the important factors to be considered during the selection of project?
   e) What you meant by project appraisal?

Q.2 What is feasibility study? Explain the important areas of feasibility study with relevant corporate examples.

Q.3 How do you safeguard your business by undertaking following analysis?
   a) Market research.
   b) Industry and competitor analysis.

Q.4 What are the qualities that an entrepreneur must possess in order to be successful?

Q.5 Describe the various sources of finance available for any business enterprise. Which will be most appropriate source of funding for new venture and why?

Q.6 Explain the different types of entrepreneurship development programmers for development of entrepreneurs in India.

Q.7 Describe the process of project launching. Prepare an outline of the preliminary project report for setting up an “Ecommerce Venture”.
End Semester Examination, May 2019
BCA — Fifth Semester
E-COMMERCE (BCA-004(CB))

Time: 3 hrs.  Max Marks: 100
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer the following questions:
   a) Write the name of essential four C’s in e-commerce.
   b) What is plastic money?
   c) What is the role of SCM in e-commerce?
   d) List four major benefits of e-commerce.
   e) Define the term “Digital signature”.
   f) What is an ERP?
   g) Define the term “EDI in e-commerce”.
   h) What is digital economy?
   i) What is the effect of E-marketing on businesses?
   j) Give four technology related issues in e-commerce? 2×10

PART-A

Q.2 a) What do you understand by e-commerce framework? What are its applications in current business scenario? 10
   b) “E-commerce is not successful in some countries” do you agree. What could be the reasons of failures of e-commerce? Discuss its limitation and scope in detail. 10

Q.3 a) What are the securities challenges and the protection measures available to any electronic business? 10
   b) Describe the functional requirements for online selling and what specialized services and servers perform these functions? 10

Q.4 Compare the following term with suitable example:
   a) Credit card system v/s Debit card system.
   b) Stored valued cards v/s E-cash.
   c) Treats v/s Protection in e-commerce.
   d) Electronic fund transfer v/s Electronic check systems. 5×4

PART-B

Q.5 a) What are the nut and bolts of EDI? Explain auctions and services from traditional to internet-based EDI? 10
   b) What is meant by e-marketing? Explain how it is playing a vital role in the success of e-Business. 10

Q.6 a) Explain the importance of ERP in the e-business era? Explain the advantages and disadvantages of ERP? 10
   b) What role does SCM play in e-commerce? Also explain the role of ERP in SCM? 10

Q.7 Write short notes on the following:
   a) Issues in digital economy and success factors. 10
   b) Global electronic commerce and impact on industry structure. 10×2
End Semester Examination, May 2019
BCA — Fifth Semester
PROJECT MANAGEMENT (BCA-005(CB))

Time: 3 hrs.                             Max Marks: 100
Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 a) Which is the first stage in the project management model?
   i) Project control.
   ii) Project planning.
   iii) Project definition.
   iv) Understanding the project environment.
b) “A Gantt chart is used to show a project timeline diagrammatically”. Is it True or False?
c) “The critical path is an activity (or series of activities) that if delayed will delay the whole project. Is it True or False?
d) “Projects are usually in high-volume, low-variety operations”. Is it True or False?
e) A critical path network diagram does not:
   i) Identify the particularly important activities.
   ii) Calculate earned value.
   iii) Help determine the amount of float.
   iv) Calculate the duration of the whole project.
f) Successful project management does not include which of the following factors?
   i) Interchangeable staff.
   ii) Control mechanisms.
   iii) Responsiveness to clients.
   iv) Competent team members.
g) Despite of how carefully a project is planned, it is almost certain to be changed before:
   i) Execution.
   ii) Planning.
   iii) Completion.
   iv) Assigning resources.
h) Cause of change that cannot be managed by project manager is:
   i) Technological uncertainty.
   ii) Innovation.
   iii) Change in environment.
   iv) Increased client knowledge.
i) “Project managers have to assess the risks that may affect a project”. Is it True or False?
j) The process each manager follows during the life of a project is known as:
   i) Project management.
   ii) Manager life cycle.
   iii) Project management life cycle.
   iv) All of the mentioned.

PART-A

Q.2 a) Explain the difference between software and a program. Also explain the prerequisite of software development. 10
   B “Project management is necessary for successful development of software”. Comment on it. 10

Q.3 a) Discuss “Project development lifecycle” in detail. 10
   b) Discuss the role of project initiation in project development lifecycle. 10
Q.4  
  a) “Failed to plan is planning to fail”. Comment on it.  
  b) Differentiate between “Project oriented planning and Project management planning”  

**PART-B**

Q.5  
  Write short notes on the following:  
  a) Gantt chart.  
  b) Simulation.  

Q.6  
  Explain the following terms:  
  a) Project control.  
  b) Data collection.  
  c) Project evaluation.  
  d) Auditing.  

Q.7  
  a) Explain “Organization structure” briefly.  
  b) Explain some situations that may lead to conflicts in an organization.  
  c) Give two methods of resolving conflicts in an organization.
End Semester Examination, May 2019
MCA – Fifth Semester
HUMAN RESOURCE MANAGEMENT (MCA-006 (CB))

Time: 3 hrs. Max Marks: 50
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer the following in 50 to 100 words:
   a) What do you understand by term “human resource”?
   b) What is the importance of human resource planning in human resource management?
   c) Define term ‘collective bargaining’.
   d) Describe the significance of human resource policies in providing welfare facilities to workers.
   e) Discuss term ‘job analysis’.

   2×5

   PART-A

Q.2 Identify five major challenges of Human Resource Management (HRM). Discuss the various functions of human resource management to meet these challenges. 10

Q.3 What is the role of competencies analysis in recruitment? 10

Q.4 Discuss the role of socialization in procurement of human resources. 10

   PART-B

Q.5 Explain some of the welfare activities that can be planned to ensure employee’s health and safety. 10

Q.6 Define ‘job analysis’. Discuss the significance of it in management of human resources. 10

Q.7 Explain some of the contemporary issues in human resource management. 10
End Semester Examination, May 2019
BCA – First Semester
INTRODUCTION TO INFORMATION TECHNOLOGY AND PROGRAMMING
TECHNIQUE (BCA-101(CB))

Time: 3 hrs. Max Marks: 100

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer the following questions:
   a) Which protocol provides e-mail facility among different hosts?
      i) FTP    ii) SMTP    iii) TELNET    iv) SNMP
   b) In MS-Excel to enter a formula in a cell, we must begin with an operator such as:
      i) $    ii) @    iii) +    iv) =
   c) In how many generations computer can be classified?
      i) 3    ii) 4    iii) 5    iv) 6
   d) First generation of computer was based on which technology?
      i) Transistor    ii) LSI    iii) VLSI    iv) Vacuum Tube
   e) Which of the following memory is non-volatile?
      i) SRAM    ii) DRAM    iii) ROM    iv) All of these.
   f) Time during which a job is processed by the computer is:
      i) Execution Time    ii) Delay Time    iii) Real Time    iv) Waiting Time
   g) An error is also known as:
      i) Bug    ii) Debug    iii) Cursor    iv) Icon
   h) Who invented the super computer?
      i) Charles Babbage    ii) JH Van Tassell    iii) Charles Ginsberg    iv) Seymour Cray
   i) Graphical pictures that represent an object like file, folder etc are:
      i) Task bar    ii) Windows    iii) Icons    iv) Desktop
   j) The size of commonly used floppy disk is:
      i) 4.5”    ii) 3.5”    iii) 3.25”    iv) 5.5”.

   2x10

PART-A

Q.2 What do you mean by digital computer? How do you classify digital computer. Explain its working through block diagram.

Q.3 Solve the following:
   a) \((1010101100)_2 = ?_{10}\)
   b) \((177.34)_8 = ?_{10}\)
   c) \((289)_{16} = ?_8\)
   d) \((BA)_{16} = ?_8\)
   e) \((264)_8 = ?_{16}\)

   4x5

Q.4 Explain the following:
   a) Laser Printer.
   b) Control Unit.
   c) Primary Memory and Secondary Memory.
   d) Thermal Printer.

   5x4

PART-B
Q.5 What are logical, syntactic and execution errors? Give examples of each, what is most difficult to find and why? Explain.  

Q.6 a) What are the various measures that needs to be taken care when designing an algorithm, illustrate with the help of an example.  

b) Write an algorithm to check if your year of birth is leap year or not?  

Q.7 a) What is meant by system software and application software? Differentiate between assembler, compiler and interpreter.  

b) Explain the following:  
   i) Decision Table.  
   ii) Debugging.
End Semester Examination, May 2019  
B. Sc. (Information Technology) – First Semester  
BUSINESS ENVIRONMENT (7.106)

Time: 3 hrs.  
Max Marks: 50  
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer in brief:  
a) Demand  
b) Goods  
c) CSR  
d) Services  
e) Organizational culture  
2×5

PART-A

Q.2 Give an introduction to the term “business environment”. What is the role of business in society?  
10

Q.3 a) Why are internal factors of a business enterprise regarded as controllable factors?  
b) What kind of external factors influence the process of business enterprises?  
5

Q.4 How does the organisational culture, structure and strategies affect the internal environment of a business?  
10

PART-B

Q.5 Explain the concept of demand and supply. Give examples of Indian economy to support your statement.  
10

Q.6 Explain the role of socio-cultural, legal and technological elements in business.  
10

Q.7 The external environment is governed by many factors like customer relationship competition, suppliers, labour supply and government agencies etc. Justify the statement.  
10
End Semester Examination, May 2019
BCA – Third Semester
MATHEMATICS-II (BCA-301)

Time: 3 hrs.  
Max Marks: 75
No. of pages: 2

Note: Attempt **FIVE** questions in all; **taking at least ONE question** from each **UNIT**. **Q.1 is compulsory.** Marks are indicated against each question.

Q.1 Answer the following:
   a) Define a singular matrix along with an example.
   b) Expand \((2a + 3b)^3\).
   c) Find \(25^\frac{1}{2}\).
   d) If \(A = \begin{bmatrix} -1 & 3 & 1 \\ 0 & 4 & 5 \\ 3 & 1 & 2 \end{bmatrix}\) find \(|A|\).
   e) Find the value of \(\lim_{{x \to \infty}} \frac{5x + 2}{3x + 1}\).  

**UNIT-I**

Q.2  
   a) If \(A = \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}\), show that \(A^2 - 2I = 3A\).  
   b) Evaluate: \(\begin{bmatrix} 1 & 2 & 3 \\ 0 & 1 & 2 \end{bmatrix} \begin{bmatrix} 2 \\ 2 \\ 4 \end{bmatrix}\)

Q.3  
   a) Solve the following equation using Cramer’s rule:
       \[
       \begin{align*}
       3x + 2y &= 4 \\
       2x - 3y &= 2
       \end{align*}
       \]
   b) In how many ways can 5 men and 4 women be seated in a row so that the women occupy the even places?

**UNIT-II**

Q.4  
   a) Prove that union of two countable set is countable.  
   b) Prove that the set \(R\) of all real numbers is uncountable.

Q.5  
   a) Prove that the greatest lower bound of a set if its exist is unique.  
   b) Show that no real numbers other than zero is a limit point.

**UNIT-III**

Q.6  
   a) Discuss comparison tests.  
   b) Prove that every convergent sequence converges to a unique limit.

Q.7  
   a) State and prove Squeeze principle.  
   b) Show that the series \(\sum_{n=1}^{\infty}(-1)^n\) oscillates.

**UNIT-IV**

Q.8  
   a) Discuss L’Hospital rule along with suitable examples.
b) Discuss Taylor’s series along with suitable examples.

Q.9 Show that

\[ x - \frac{x^2}{2} < \log(1 + x) < x - \frac{x^2}{2(1 + x)}, [\forall x > 0] \]
End Semester Examination, May 2019
BCA – Third Semester
NUMERICAL ANALYSIS AND STATISTICAL TECHNIQUES
(BCA-301 (CB))

Time: 3 hrs. Max Marks: 100
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer the following:
   a) Differentiate between correlation and regression.
   b) Explain error with their types _________.
   c) State Baye’s theorem of probability.
   d) State Lagrange’s interpolation formula.
   e) State Newton’s divide difference formula. 4×5

PART-A

Q.2 a) Find by Newton-Raphson method, the real root of equation: 3x = cos x + 1; correct to four decimal places. 10
   b) Use Bisection Method to solve: x² – 36 = 0; correct to three decimal places. 10

Q.3 Elaborate:
\[ \int_{0}^{1} \frac{1}{1 + x^2} \, dx \]
by:
   a) Simpson’s \( \frac{1}{3} \) Rule
   b) Simpson’s \( \frac{3}{8} \) Rule 10×2

Q.4 Find \( y(0.3) \) correct to two decimal places by using Taylor’s series method
\[ y' = x - y^2, \quad y(0) = 1 \] 20

PART-B

Q.5 Calculate the Arithmetic mean, median and mode of the following data:

<table>
<thead>
<tr>
<th>Height (cm)</th>
<th>120–124</th>
<th>125–129</th>
<th>130–134</th>
<th>135–139</th>
<th>140–144</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Students</td>
<td>6</td>
<td>14</td>
<td>27</td>
<td>23</td>
<td>16</td>
</tr>
</tbody>
</table>

20

Q.6 Write short notes on the following:
   a) Binomial distribution.
   b) Random sampling. 10×2

Q.7 In a locality, 100 persons were randomly selected and asked about their academic qualifications. The results were as given below:

<table>
<thead>
<tr>
<th></th>
<th>Middle</th>
<th>High</th>
<th>Graduation</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>10</td>
<td>15</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>Female</td>
<td>25</td>
<td>10</td>
<td>15</td>
<td>50</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
<td>25</td>
<td>40</td>
<td>100</td>
</tr>
</tbody>
</table>

Can you say that education depends on sex? 20
Q.1  **Multiple choice questions/short answer questions:**

a) Marketing is the management process responsible for __________, anticipating and satisfying customer requirements profitably.
   i) Supplying  
   ii) listening to  
   iii) identifying  
   iv) researching  

b) E-business is:
   i) The use of electronic communications for all business process.
   ii) An organization using electronic media to purchase form its supplies.
   iii) Any electrically mediated communication between an organization and its stakeholders.
   iv) An organization to using electronic media to sell direct to its customers.

**Pair these different types of marketing activities with their definitions:**

| c) | RSS feeds | i) A regularly updated source of content to engage audience |
| d) | Blog | ii) A website that facilitates peer-to-peer communication |
| e) | Social network | iii) Delivery of audio/video content |
| f) | Podcasts | iv) Alerts on news, products or promotions received by their audience through readers that regularly check for new content. |

g) _______ is the digital communication technique which involves improving visibility and monitoring sentiment within social networks and blogs.
   i) SEO  
   ii) E-mail marketing  
   iii) EPR  
   iv) Display advertising  

h) What is special about social media?
   i) Content is out of the will of users and is not controlled by the platform
   ii) Content is not controlled by the platform
   iii) Content is out of the will of users
   iv) None of the above.

i) To make best SEO friendly website, what is important?
   i) Content + Images  
   ii) Only content  
   iii) Full of images  
   iv) Flash content  

j) If you want to look at the search query used to get the visitors on your site, you would look into:
   i) Behaviour report  
   ii) Advertising report  
   iii) Audience reports  
   iv) Acquisition report  

**PART-A**

Q.2  “Search engine is a service that allows internet users to search for content via the World Wide Web”. How does a search engine work? Explain the concept of crawler and directories related to search engine in detail.  

Q.3  a) “Search engine optimization or SEO is a process of keep changing the position of a web page or website in a search engine result”. How do we do so? What are the SEO tools which we use? What is the main purpose of using keyword in SEO?  

b) Write a note on how Google works?
Q.4 How does social media benefit any brand? What are the impacts of social media on digital marketing?

PART-B

Q.5 What do you think is the most important in an online advertisement? Discuss the types of online advertisements.

Q.6 “Online reputation management is everything about you or your business that shows up online”. What all does it include? Why is having a good online reputation necessary at all?

Q.7 Write short notes on:
   a) Pros and Cons of online shopping.
   b) Internet business.
   c) Internet marketing techniques.
   d) Personalization e-commerce.
End Semester Examination, May 2019
B. Sc. (Information Technology)—First Semester
MATHEMATICS FOR COMPUTING (7.107)

Time: 3 hrs. Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer the following questions:
   a) What are equivalent sets? 2
   b) Define proper subset. 2
   c) Find the power set of \{a, b, c\} 2
   d) What is a diagonal matrix 2
   e) Explain disjoint sets. 2
   f) If \( A = \{2, 4, 6, 8\}\) and \( B = \{6, 8, 10, 12\}\), what are \( A \cup B \) and \( A \cap B \) ? 2
   g) Prove that \( (A \cap C)^c = (B \cap C)^c \) 4
   h) Define degree of a linear equation. 2
   i) Define Central Tendency in statistics. 2

PART-A

Q.2 a) Let \( U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}\), \( A = \{1, 2, 3, 4\}\), \( B = \{2, 4, 6, 8\}\) and \( C = \{3, 4, 5, 6\}\). Find
   i) \((A \cap C)^c\)  
   ii) \((B \cap C)^c\)  
   iii) \((A - C)^c\)  
   iv) \((B - C)\) 10

b) Write down all the subsets of the following sets:
   i) \(\{a\}\)  
   ii) \(\{a, b\}\)  
   iii) \(\{1, 2, 3\}\)  
   iv) \(\emptyset\) 10

Q.3 a) If \( f(x) = 2x + 1 \), find the range if domain is \{-1, 2, 3\} and hence find the function. 10
   b) If \( f(x) = x^3 - \frac{1}{x^2} \), find the value of \( f(x) + f\left(\frac{1}{x}\right) \). 10

Q.4 Find the inverse of the matrix:
\[
\begin{bmatrix}
1 & 2 & -2 \\
-1 & 3 & 0 \\
0 & -2 & 1 \\
\end{bmatrix}
\]
and verify that \( AA^{-1} = A^{-1}A = I \). 20

PART-B

Q.5 a) Solve the following equations:
   i) \( 2x^2 - 10x + 5 = 0 \)  
   ii) \( x^2 - 4x - 12\sqrt{x^2 - 4x + 19} + 51 = 0 \). 5x2

b) Simplify \( \frac{p\sqrt[n]{x^m} \cdot q\sqrt[n]{x^{m+1}}}{\sqrt[n]{x^{-m}} \cdot x^{n-1}} \) 10

Q.6 a) A bag contains 3 red balls, 5 yellow balls and 7 pink balls. If one ball is drawn at random from the bag, what is the probability that it is either pink or red? 10
b) i) State Baye’s theorem to find the probability.
   ii) An urn \( B_1 \) contains 2 white and 3 black balls and another urn \( B_2 \) contains 3 white and 4 blacks balls. One urn is selected at random and a ball is drawn from it. If the ball drawn is found black, find the probability that the urn chosen was \( B_1 \).

Q.7 a) The frequency table of the monthly salaries of 20 people is shown below:

<table>
<thead>
<tr>
<th>Salary (In Rs)</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>3500</td>
<td>5</td>
</tr>
<tr>
<td>4000</td>
<td>8</td>
</tr>
<tr>
<td>4200</td>
<td>5</td>
</tr>
<tr>
<td>4300</td>
<td>2</td>
</tr>
</tbody>
</table>

i) Calculate the mean of the salaries of the 20 people.
ii) Calculate the standard deviation of the salaries of the 20 people.

b) Explain and write the formula of mean, mode and median.
End Semester Examination, May 2019
BBA (General and Banking)/ Global (IB) — Fifth Semester
B. Com. (Hons.) Industry Integrated/ B. Sc. (IT) — Fifth Semester
BCA/ B.A. (Hons.) English - Fifth Semester
MCA/ M. Com. - Third Semester
ENTREPRENEURSHIP DEVELOPMENT (COM-O-306)

Time: 3 hrs.  Max Marks: 100
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Write short notes on (any four) of the following:
a) Entrepreneurial characteristics.
b) Benefits of marketing research.
c) Significance of demand forecasting.
d) Types of ownership.
e) Difference between controlling and planning.
f) Seed funding. 2×10

PART-A

Q.2 “Entrepreneurship is a better profession option in present circumstances”. Comment and put forth your views on this statement. 20

Q.3 Design the process for the new product/services you intend to develop? Appraise the common barriers and mistakes faced by any entrepreneur while developing new product/services. 20

Q.4 Demonstrate “Porter’s five forces” with an example of any branded product/services. 20

PART-B

Q.5 What do you understand by intellectual property rights? How many types of I.P. Laws exist in India? Why patent is necessary for an entrepreneurship. 20

Q.6 What are the elements of direction? Describe the traits of leadership and its styles. Elaborate the difference between manager and leader. 20

Q.7 What are the main four financial decisions? Describe various sources of finance; enumerate pros and cons of each fund. 20
End Semester Examination, May 2019
MCA — Sixth Semester
PROGRAMMING IN .NET (MCA-602 CB)

Time: 3 hrs.  Max Marks: 100
No. of pages: 2

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.

Q.1 Multiple choice questions:
   a) When a condition in an If…Then statements tests true:? 
      i) the next Else statement is activated.
      ii) the next If statement is activated.
      iii) the next Then statement is activated.
      iv) the End If statement is activated.
   b) Two methods with the same name but with different parameters. 
      i) Overloading
      ii) Multiplexing
      iii) Loading
      iv) Duplexing
   c) The scope of a variable refers to: 
      i) the length of the variable 
      ii) the name of the variable 
      iii) the accessibility of the variable 
      iv) the data type of the variable.
   d) It is mandatory to override virtual method 
      i) True
      ii) False
   e) Which method will return the number of elements in an array? 
      i) Dimension 
      ii) Length 
      iii) Number 
      iv) Size
   f) What does the keyword virtual mean in the method definition? 
      i) The method is public
      ii) The method can be derived
      iii) The method must be over-ridden
      iv) The method can be over-ridden
   g) We Can declare a property in an interface 
      i) True
      ii) False
   h) The first record in a dataset has a position property of:?
      i) zero.
      ii) one.
      iii) any value defined by the programmer
      iv) Both i) and ii)
   i) Apostback occurs when:?
      i) a browser posts a form to the server
      ii) a user's action activates the handing of a server event
      c) a server posts a form to the client
      d) Both i) and ii).
   j) What is the default modifier for the class member?
      i) Private
      ii) public
      iii) internal
      iv) protected

   **PART-A**

Q.2 Write short notes on the following:
   a) CLS.
   b) Constructor
   c) IL
   d) JIT
   e) Type Safety

Q.3 a) What is a IDE? Discuss 5 different features of visual studio. 
   b) Discuss about indexers in detail. Give examples to support your answer.
Q.4 What is a namespace? How is a namespace declared? How is a namespace used in other namespace? Give suitable examples.

PART-B

Q.5 Write short notes on the following with examples
a) Handling a Button Click Event.
   b) Handling a Dropdown down SelectedIndexChanged event.

Q.6 a) Explain the role of DataAdapter in making Responsive Data Driven Applications.
   b) Write a program to execute a update query. Use Table definition of your choice.

Q.7 Write a short note on the following:
   a) Constructor
   b) Overloading
   c) Super
   d) Overriding
   e) Interface
End Semester Examination, May 2019
B. Sc. (Information Technology) – Sixth Semester
MOBILE COMMUNICATION (BSCA-602)

Time: 3 hrs.  Max Marks: 100
No. of pages: 2

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1  Multiple choice questions.

a) The process of transferring a mobile station from one base station to another is:
   i) MSC
   ii) Roamer
   iii) Hand off
   iv) Forward channel

b) Commonly used mode for 3G networks is
   i) TDMA
   ii) FDMA
   iii) TDD
   iv) FDD

c) The shape of the cellular region for maximum radio coverage is
   i) Circular
   ii) Square
   iii) Oval
   iv) Hexagon

d) The advantage of using frequency reuse is:
   i) Increased capacity
   ii) Limited spectrum is required
   iii) Same spectrum may be allocated to other network
   iv) All of the above

e) Co-channel reuse ratio depends upon:
   i) Radius of the cell
   ii) Distance between the centers of the co-channel cells
   iii) Frequency allocation of nearest cells
   iv) Both a) and b)

f) Which multiple access technique is used by IEEE 802.11 standard for wireless LAN?
   i) CDMA
   ii) CSMA/CA
   iii) ALOHA
   iv) None of the mentioned

g) IEEE 802.11 have three categories of
   i) frames
   ii) fields
   iii) signals
   iv) sequences

h) Wireless LANs implement security measures in the
   i) Session Layer
   ii) Data Link Layer
   iii) Sub Layer
   iv) Application Layer

i) The basic GSM is based on ____________ traffic channels.
   i) connection oriented.
   ii) connection less.
   iii) packet switching.
   iv) circuit switching.

j) GSM is the digital standard for Europe; What do the letters GSM currently mean?
   i) Global Special Mobile
   ii) Greater System’s Mobile
   iii) Global Systems for Mobile Communications
   iv) None of the above!  

2×10

**PART-A**

Q.2  a) Explain the working of wireless communication with the help of block diagram? Also discuss various generations of wireless communication? 6

b) Discuss the requirement of modulation in mobile communication. Explain various modulation techniques in detail. 8

c) What is the need of multiplexing? What are various types of multiplexing techniques? 6
Q.2 Explain GSM architecture in detail. What are main subsystems of GSM architecture? Also list the advantages and disadvantages of GSM communication.

Q.3 Write Short notes on:
   a) HLR, VLR, EIR and AUC registers.
   b) Hand off.
   c) GPRS.
   d) Radio interference.

**PART-B**

Q.5 a) What is wireless LAN? Also discuss various advantages of LAN.
    b) Differentiate between Ad-hoc and Infrastructure networks.
    c) What are IEEE 802.11 wireless networks? Explain the architecture of IEEE 802.11 in detail.

Q.5 a) What is wireless application protocol? Explain its architecture in detail.
    b) Write a short note on:
       i) Palm OS.
       ii) Wireless markup language.

Q.6 a) What is kernel? Explain its features. Explain the process of memory management in detail.
    b) Illustrate the working of memory management? Describe its functionality in detail.

Q.7 a) What is wireless application protocol? Explain its architecture in detail.
    b) How does Bluetooth work? Explain the layered architecture of Bluetooth.
End Semester Examination, May 2019
BCA – Second Semester
DATA STRUCTURES (BCA-2001)

Time: 3 hrs.  
Max Marks: 75  
No. of pages: 2

Note: Attempt FIVE questions in all; taking at least ONE question from each UNIT. Q.1 is compulsory. Marks are indicated against each question.

Q.1 Multiple choice questions:
a) How many nodes in a tree have no ancestors?
i) 0  ii) 1  iii) 2  iv) n
b) Which data structure is used for implementing recursion?
i) Queue.  ii) Stack.  iii) Arrays.  iv) List.
c) A technique for direct search is:
i) Binary Search  ii) Linear Search  iii) Tree Search  iv) Hashing
d) The complexity of multiplying two matrices of order m*n and n*p is:
i) mnp  ii) mp  iii) mn  iv) np
e) A(n) __________ is a graph in which each connection has two directions.
i) undirected graph  ii) Weighted graph  iii) bidirectional graph  iv) None of the above

Short answer type questions
f) What is the meaning of sorting?
g) What is overflow and underflow condition in a linked list?
h) Describe the structure of node in doubly linked list.
i) Differentiate Linear and Binary Search. Which is better and why?
j) What is Dequeue?

1½×10

PART-A

Q.2 a) Write algorithm for insertion in single linked list at Beg, Mid., End. And also explain it diagrammatically.  
10
b) An array A [5][5] is stored in the memory with elements with element occupying 4 bytes of space. Assuming the base address of A to be 1000, compute the address of A[2][4] when the array is stored i) row wise ii) column wise.  
5

Q.3 a) Sort the given list using Merge sort:
23,34,45,12,17,18,45,56,32,42  
10
b) Write algorithm to insert an element from an array.  
5

Q.4 a) Convert the expression into its postfix form and also evaluate it. Write the algorithm for conversion of infix into postfix  
10
5*(6+2)-12/4
b) Write algorithm for insertion and deletion in linear queue.  
5

PART-B

Q.5 a) Construct a tree with given data:
Inorder  D,B,F,E,A,G,C,L,J,H,K  
Postorder  D,F,E,B,G,L,J,K,H,C,A  
10
b) Write algorithm for Preorder Traversal.  
5
Q.6  a) Write notes on
   i) Indexed Sequential organization.
   ii) Direct File Organization.
   b) What do you mean by hashing? What are various hashing functions?

Q.7  a) What are various ways to represent a graph in memory? Also represent the following graph.

b) What do you mean by file organization?
Q.1 Answer the following questions in brief:
   a) How does a main() function in C++ differ from main in C?
   b) In C++, a variable can be declared anywhere is the scope. What is the significance of this feature?
   c) When will you make a function inline? Why?
   d) How is a member function of a class defined?
   e) List the demerits of friend function.
   f) Distinguish between the following two statements:
      time T2 (T1);
      time T2 = T1;
   g) Can a pointer of base class type point to an object of the derived class? Discuss.
   h) Write a function to print sum of n natural numbers.
   i) Differentiate a text file and a binary file.
   j) How many arguments are needed for overloading a unary operator?  2×10

PART-A

Q.2 Describe how data is shared by functions in an Object Oriented Programming and in Procedure Oriented Programming. How does a class accomplish Data hiding?  20

Q.3 What are the merits and de-merits of using friend function? List some of the special properties of friend function.  20

Q.4 When do we use default arguments in a function? Discuss function overloading with an example.  20

PART-B

Q.5 Write an interactive program to perform the banking system which includes deposit, withdraw, interest, balance query. The account number and initial amount is initialized using constructor.  20

Q.6 Define operator overloading. Discuss how to overload unary operator and binary operators. Give examples.  20

Q.7 a) Describe the different forms of Inheritance supported by C++.
   b) Define:
      i) Try and catch.
      ii) Use of re-throw.  5×2
End Semester Examination, May 2019  
BCA – Second Semester  
DATA STRUCTURE USING “C” (BCA-203A (CB))

Time: 3 hrs.  
Max Marks: 100  
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer the following multiple choice questions:

a) What is the postfix form of the following prefix *+ab-cd
   i) ab+cd-*  
   ii) abc+*-
   iii) ab+*cd-  
   iv) ab++*cd-

b) A queue is a,
   i) FIFO (First In First Out) list.  
   ii) LIFO (Last In First Out) list.
   iii) Ordered array.  
   iv) Linear tree.

c) Which data structure is needed to convert infix notation to postfix notation?
   i) Branch  
   ii) Queue
   iii) Tree  
   iv) Stack.

d) In Breadth First Search of Graph, which of the following data structure is used?
   i) Stack.  
   ii) Queue.
   iii) Linked List.  
   iv) None of the above.

e) The largest element of an array index is called its:
   i) lower bound.  
   ii) range.
   iii) upper bound.  
   iv) All of these.

f) How many nodes in a tree have no ancestors?
   a) 0  
   ii) 1
   iii) 2  
   iv) n

g) Which data structure is used for implementing recursion?
   i) Queue.  
   ii) Stack.
   iii) Arrays.  
   iv) List.

h) A technique for direct search is:
   i) Binary Search  
   ii) Linear Search
   iii) Tree Search  
   iv) Hashing

i) The complexity of multiplying two matrices of order m*n and n*p is:
   i) mnp  
   ii) mp
   iii) mn  
   iv) np

j) A(n) __________ is a graph in which each connection has two directions.
   i) undirected graph  
   ii) Weighted graph
   iii) bidirectional graph  
   iv) None of the above

2×10

PART-A

Q.2 a) What do you mean by complexity? How is it useful in checking the performance of algorithm? 7
b) How sparse matrix is beneficial over ordinary matrix 7
c) Explain the concept of Priority queue 6

Q.3 a) What are various operations of stack? Write algorithm for the same. 8
b) Convert the following infix expression into Postfix expression:
   A+(B*C-(D/E|F)*G)*H
   P+(Q*R-(S/T^U)*V) 12

Q.4 a) How linked list can be used for polynomial representation. Illustrate it 8
b) Write algorithm for insertion in linked list at Beg, Mid., End. And also explain it diagrammatically. 12
PART-B

Q.5  a) What are various ways to represent a tree in memory?  
     b) Differentiate between trees and graphs.  
     c) What are various tree traversal methods?  
     d) How can we construct a B Tree?  

Q.6  a) Construct a tree by using following data  
     Preorder GBQACKFPDERH  
     Inorder QBKCFAGPEDHR  
     b) What is Binary Search Tree? Can Binary Search tree be used as an index?  

Q.7  a) Differentiate between the following:  
     i) Sequential file and Index sequential file.  
     ii) Selection and bubble sort.  
     iii) Breadth first search and Depth first search.  
     b) What are the various operations we can perform on file?
Q.1 Answer the following:

a) The memory address of the first element of an array is called;
   i) floor address
   ii) foundation address
   iii) first address
   iv) base address.

b) The memory address of the fifth element of an array can be calculated by the formula;
   i) LOC (Array[5]=Base (array)+w(5-lower bound), where w is the number of words per memory cell for the array.
   ii) LOC (Array[5]=Base (Array[5])+(5-lower bound), where w is the number of words per memory cell for the array.
   iii) LOC (Array[5]=Base (Array[4])+(5-Upper bound), where w is the number of words per memory cell for the array.
   iv) None of above.

c) Two dimensional arrays are also called;
   i) tables arrays
   ii) matrix arrays
   iii) both of above
   iv) none of above.

d) Which of the following data structure store the homogeneous data elements:
   i) Arrays
   ii) Records
   iii) Pointers
   iv) None

e) When new data are to be inserted into a data structure, but there is no available space, this situation is usually called;
   i) underflow
   ii) overflow
   iii) housefull
   iv) saturated

f) Which of the following name does not relate to stacks:
   i) FIFO list
   ii) LIPO list
   iii) Piles
   iv) Push-down lists.

g) The term “push” and “pop” related to the;
   i) array
   ii) lists
   iii) stacks
   iv) all of above.

h) Two main measures for the efficiency of an algorithm are:
   i) Processor and memory
Q.2 a) Define arrays. What is the significance of arrays? How is the address calculated for location in one dimensional and two dimensional arrays?  

b) Write algorithm to insert the element, delete the element in one dimensional array?  

Q.3 What is stack? Enumerate all its applications in detail.  

Q.4 a) Convert the expression into its postfix form and also evaluate it. Write the algorithm for conversion of infix into postfix.  

b) Write algorithm for insertion and deletion in linked list from beg mid and end.  

Q.5 a) Construct a tree with given data:  

   i) Inorder D,B,F,E,A,G,C,L,J,H,K.  

b) Write algorithm for bubble sort. Also explain in detail with the help of an example.  

Q.6 Solve the given list with the help of heap sort.  

   34, 23, 45, 12, 21,28, 31, 38, 26  

Q.7 a) What is collision? What are the various collision resolution method?  

b) What are the various operations that we can perform on a file?
Q.1 Answer the following questions:
   a) In which normal form, a composite attribute is converted to individual attribute.
   b) Which form simplifies and ensures that there are minimal data aggregates and repetitive groups. Explain briefly.
   c) What are the features of multivalued attributes?
   d) Describe the properties of a relation.
   e) Given a query to find all planetary leader who are apprentice and use the dark side of the force: select leader from Jedi-Teams, Jedi, Government where apprentice=name and name=leader and side='dark'. Express it in relational algebra. 3×5

Q.2 a) Compare Hierarchical Model, Network Model and relational model. 8
    b) Mention the functionalities of DBA. 7

Q.3 a) Explain insertion, deletion and modification anomaly anomalies with suitable examples. 8
    b) State BCNF. How does it differ from 3NF? 7

Q.4 a) Explain in detail about the key constraints used in database system. 8
    b) Suppose a relation R(A, B, C, D, E) with functional dependency BD→E, A→C. Show that the decomposition into R1=(A, B, C) and R2=(D, E) is lossy. 7

Q.5 a) Explain different types of binary operation. 7
    b) Explain the following:
       i) Outerjoin.
       ii) Natural join 8

Q.6 a) Consider the following relation schema:
   Employee (Eid., Ename, dept)
   Account (All-id, E-id, salary)
   Answer the following relational algebraic query and sql query.
   Find the names of employees having salary greater than 40,000/-. 7
    b) Define BCNF with example. 4
    c) Define inference rules for functional dependency. 4

Q.7 a) Construct an E-R diagram for a Car insurance company whose customers own one or more cars each. Each Car associated with it zero to any number of recorded accidents. 8
    b) Explain the distinctions among the terms primary key, candidate key and super key. 7
End Semester Examination, May 2019  
B.Sc. (Information Technology) — First Semester  
FUNDAMENTALS OF COMPUTER PROGRAMMING (7.103)

Time: 3 hrs.  
Max Marks: 75  
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Each question carries equal marks.

Q.1  
a) What is logical error?  
b) What is a constant?  
c) Why do we use “main method” in a C# program?  
d) Write the syntax of do-while loop.  
e) What is concatenation of two strings?  
f) What is type conversion?  
g) What is a keyword? Give an example.  
h) What is arithmetic operator? Give an example.  
i) How to initialize a 1-D, 2-D array?  
j) Why to use try catch statements in C#?  

1½ × 10

PART-A  

Q.2  
Explain software development life cycle in detail.  

15

Q.3  
Explain algorithm, pseudocode and flow chart with an example of each.  

15

Q.4  
What do you mean by strings? Explain any five string functions with an example of each.  

15

PART-B  

Q.5  
What are relational and logical operations in C#? Differentiate between if-else and switch case-blocks.  

15

Q.6  
Explain the need for array variables. Write a program to implement an array in C#.  

15

Q.7  
Write short notes on the following:  
a) Error handling techniques with examples.  
b) Built-in and user-defined data types and functions.  

7½ × 2
Q.1 Answer the following multiple choice questions:

a) In the ______ layer, translations from one character code to another occur.
   i) Transport.
   ii) Session.
   iii) Presentation.
   iv) Application

b) A central computer surrounded by one or more computers is called.
   i) bus network.
   ii) ring network.
   iii) star network.
   iv) none of these.

c) Which topology requires a multipoint connection?
   i) Bus.
   ii) Star.
   iii) Mesh.
   iv) Ring.

d) A television broadcast is an example of ______ transmission.
   i) half-duplex.
   ii) simplex.
   iii) full-duplex.
   iv) automatic.

e) ______ is the protocol suite for the current Internet.
   i) UNIX.
   ii) NCP.
   iii) TCP/IP.
   iv) ACM.

f) ARQ stands for ______.
   i) Acknowledge repeat request.
   ii) Automatic retransmission request.
   iii) Automatic repeat quantization.
   iv) Automatic repeat request.

g) He divisor in a cyclic code is normally called the _______.
   i) redundancy.
   ii) degree.
   iii) generator.
   iv) none of the above.

h) The checksum of 0000 and 0000 is _________.
   i) 0000
   ii) 1111
   iii) 0111
   iv) 1110

i) The network layer in the Internet is designed as a ________ network.
   i) circuit-switched.
   ii) datagram.
   iii) virtual-circuit.
   iv) none of the above.

j) To avoid collisions on wireless networks, ______ was invented.
i) CSMA/CD.
ii) CSMA/CA.
iii) either (a) or (b).
iv) both (a) and (b).

\[2 \times 10\]

**PART-A**

**Q.2**

a) What are data communication and its basic component? Explain its characteristics?  

\[10\]

b) Write short notes on the following:
   
i) Connection-oriented and Connection-less services.
   
ii) Modes of data transmission.  

\[5 \times 2\]

**Q.3**

Explain various data encoding techniques and also discuss its requirement in data communication. Draw various digital to digital data encoding techniques for the given data:

a) 111010100.
   
b) 001110101.
   
c) 111100011.
   
d) 110000111.

\[20\]

**Q.4**

a) What do you mean by switching? What are the three fundamental switching methods explain? Which is better packet switching or circuit switching?  

\[6\]

b) What is transmission impairments. Explain each briefly. Which transmission media is superior in communication channel and why?  

\[7\]

c) Describe different layers of TCP/IP in detail. Explain the protocols fall under the application layer of the TCP IP stack?  

\[7\]

**PART-B**

**Q.5**

Define flow control in data link layer. Mention the categories of flow control and elaborate each type with the help of diagram in detail.  

\[20\]

**Q.6**

a) Given the dataword a101001111 and the divisor 1011, show the generation of CRC Codeword at the sender site.  

\[10\]

b) What is the main function of transport layer? Explain how the routing and congestion is control in this layer.  

\[10\]

**Q.7**

a) Explain the IEEE 802.11 standard with its architecture and its working process in detail. Describe the function of logic link control.  

\[10\]

b) Write short notes on the following:
   
i) IPv4 and IPv6.
   
ii) TCP and UDP.  

\[5 \times 2\]
End Semester Examination, May 2019
Bachelor of Computer Application – Fourth Semester
NUMERICAL ANALYSIS AND STATISTICAL TECHNIQUES
(BCA-301A (CB))

Time: 3 hrs.  Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from Part-A and TWO questions from Part-B. Marks are indicated against each question.

Q.1  a) Define the following:
     i) Linear Equations.
     ii) Relative Error.
     iii) Regression.
     iv) Multiplication law of probability.
     v) Backward Interpolation.
     2x5
b) The mean and variance of Poisson distribution are ______ and ________.
     c) State Lagrange’s Interpolation formula.
     d) What is Relative error of the approximation 3.14 to the value π?
     e) Is there any Relationship between Mode, Mean and Median?
     f) The number of significant digits in the number 401.051280 is _________.  2x5

PART-A

Q.2  a) Use Bisection Method to solve $x^2 - 36 = 0$ correct to three decimal places.  10
     b) Find the value of $Y(2.5)$ by using the following data:
        X:  1  2  3  4
        Y:  1  8 27 64  10

Q.3  a) Solve the equation $\frac{dy}{dx} = 1 - Y$ with the initial condition $x = 0, y = 0$ using Euler’s Method and tabulate the solutions at $x = 0.1, 0.2, 0.3$.  10
     b) Evaluate $\int_0^1 e^{-x^2} dx$ by Simpson’s $\frac{1}{3}$ Rule.  10

Q.4  a) From the following table of Premium for policies maturing at different ages, estimate the Premium for Policies maturing at age of 46.
     Age:    45  50  55  60  65
     Premium (in rupees):  114.84 96.16 83.32 74.48 68.48 10
     b) Briefly describe the various operators used in Interpolation and discuss their relationship as well.  10

PART-B

Q.5  a) Calculate the average profit and mode for the data given below:
     Profits (lakhs): 200-400 400-600 600-800 800-1000 1000-1200
     f:           500  300  280  120  100  10
     b) Differentiate between the basic concepts of correlations and Regression.  10

Q.6  a) Discuss various laws used in probability to solve various problems.  10
b) The probability that a contractor will get a plumbing contract is $\frac{2}{3}$ and the probability that he will not get an electric contract is $\frac{5}{9}$. If the probability of getting at least one contract is $\frac{4}{5}$, what is the probability that he will get both?

Q.7 Write short note with Mathematical description on following Distributions:

a) Poisson Distribution.

b) Normal Distribution.
Q.1  
a) For what value of $k$, the given matrix has rank 2, $A = \begin{bmatrix} 1 & 5 & 4 \\ 0 & 3 & 2 \\ k & 13 & 10 \end{bmatrix}$

b) Find the diagonal and trace of the matrix $A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 5 & 3 \\ -3 & 3 & 1 \end{bmatrix}$

c) For what value of $\lambda$, the vectors $(1 - 2, 1)$, $(2, \lambda, 5)$, $(3, -5, 7\lambda)$ are linearly dependent.

d) If $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 3 & 0 \\ 2 & 1 & 2 \end{bmatrix}$, find all the Eigen values of $A^{-1}$.

e) Verify that the matrix $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & -2 \\ -2 & 2 & -1 \end{bmatrix}$ is orthogonal.

f) Find the sum and the product of eigen values of the matrix: $A = \begin{bmatrix} 7 & 4 & -1 \\ 4 & 7 & -1 \\ -4 & -4 & 4 \end{bmatrix}$

---

Q.2  
a) Express $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$ as a sum of symmetric and skew symmetric matrix.

b) Find the inverse of the matrix $A$, where $A = \begin{bmatrix} 1 & 1 & 2 & 1 \\ 6 & -6 & 6 & 12 \\ 7 & 3 & 3 & -3 \\ 2 & 2 & -1 & 1 \end{bmatrix}$

OR

a) Find the rank of matrix $A = \begin{bmatrix} 2 & 1 & -3 & -6 \\ 3 & -3 & 1 & 2 \end{bmatrix}$ by reducing to its normal form.

b) Write the co-factor matrix of $A = \begin{bmatrix} 1 & 1 & 2 & 3 \\ 1 & 3 & 0 & 3 \\ 1 & -2 & -3 & -3 \\ 1 & 1 & 2 & 3 \end{bmatrix}$
Q.3 For what value of $k$ the equations: $x + y + z = 1; 2x + y + 4z = k; 4x + y + 10z = k^2$ have a solution and solve them in each case. 

OR

Find the value of $\lambda$ such the following equations: $\lambda x + 2y - 2z = 1, 4x + 2\lambda y - 3z = 2,$ $6x + 6y + \lambda z = 3$ have:

i) unique solution, 
ii) infinite solution.

Q.4 a) Are the following vectors are linearly dependent? If yes, find the relation between them, where $X = \{(2,3,1,-1),(2,3,1,-2),(4,6,2,1)\}$

b) Let $T: R^2 \to R^2$ is defined by $F(x, y) = (x + y, x)$. Show that $F(x, y)$ is Linear.

OR

Let $T_1: R^3 \to R^2$ and $T_2: R^3 \to R^3$ be two linear transformations defined as $T_1(x, y, z) = (3x, y + z), \ T_2(x, y, z) = (2x - 3z, y)$.

Compute $T_1 + T_2, \ 5T_1, \ 4T_1 - 5T_2, \ T_1T_2, \ T_2T_1$.

Q.5 Find the Eigen values and Eigen vectors of the matrix: 

\[
A = \begin{bmatrix}
8 & -6 & 2 \\
-6 & 7 & -4 \\
2 & -4 & 3
\end{bmatrix}
\]

OR

Find the characteristic equation of the matrix $A = \begin{bmatrix}
2 & 1 & 1 \\
0 & 1 & 0 \\
1 & 1 & 2
\end{bmatrix}$. Also find the matrix represented by $A^8 - 5A^7 + 7A^6 - 3A^5 + A^4 - 5A^3 + 8A^2 - 2A + 1$.
End Semester Examination, May 2019
B. Sc. (Information Technology) – Fourth Semester
DESKTOP APPLICATION DEVELOPMENT (7.206 / 7.206A)

Time: 3 hrs. Max Marks: 75
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1  

a) Which of the following converts the expression to String data type in VB.NET?  
i) C#  
ii) J#  
iii) VB .NET  
iv) Java

b) The default property for a text box control is  
i) Text  
ii) Enable  
iii) Multiline  
iv) Password Char

c) Visual Studio .NET provides which feature  
i) Debugging  
ii) Application Deployment  
iii) Syntax Checking  
iv) All of the above

d) The ___________ enable us to pass data between a program and a class.  
i) Functions  
ii) Properties  
iii) Procedures  
iv) Variables

e) A ___________ performs invisible tasks even if you write no code  
i) Destructor  
ii) Private Method  
iii) Constructor  
iv) Function

f) ___________ object is used to fill a dataset/dataset table with query results in ADO .NET.  
i) Data reader  
ii) Data adapter  
iii) Dataset  
iv) Data tables

g) The modifier used to define an array of parameters or list of arguments:  
i) ref  
ii) out  
iii) param  
iv) var

h) Which of the following statements are correct about functions?  
i) .NET allows a function to have arguments with default values.  
ii) Redefining a method parameter in the method’s body causes an exception.  
iii) .NET allows a function to have arguments without default values.  
iv) Omitting the return type in method definition results into exception.

i) What are the three primary kinds of parameters?  
i) input, integer, string  
ii) integer, string, date time  
iii) int, varchar, nvarchar  
iv) input, output, inputoutput

j) OleDb Connection object works with:  
i) When connection to an Oracle Database.  
ii) When connecting to an office Access Database.  
iii) When connecting to SQL Server 6.x or later.  
iv) When connecting to SQL Server 2000.
**PART-A**

Q.2  
   a) Explain the term Data Type in VB .NET. How different data types are used in programming. Elaborate your answer with the help of suitable example.  
   b) Differentiate between Combo box and List box with the help of suitable programs of both the controls.  

Q.3  
   Database plays an important role when we want to store the data from any application. How ADO .NET helps in storing the data. Explain the detailed architecture of ADO .Net with all the required steps.  

Q.4  
   a) Differentiate between call by value and call by reference to be used in function.  
   b) Explain the difference between procedure and function with the help of example.  

**PART-B**

Q.5  
   a) Differentiate between variable and constant with the help of examples.  
   b) Differentiate between Multiple and Multilevel Inheritance.  

Q.6  
   a) Describe the different controls available in VB .NET. Elaborate at least five most used controls with the help of example.  
   b) Differentiate between if else and switch case with suitable examples.  

Q.7  
   Explain the following:  
   a) Data set()  
   b) Data grid  
   c) Printing navigator  
   d) Binding source  
   e) Table adapter  

---

**3x5**
Q.1

1. The concept of derived class is involved in:
   - Inheritance
   - Encapsulation
   - Data hiding
   - None
   ii) Which of these assignments are not valid?
      - short x = 4.8;
      - float b = 4.3f;
      - double d = 4.3;
      - None
   iii) Which of these access specifier can be used for an interface?
      - Public
      - Private
      - Protected
      - All of the above
   iv) Which function is used to allocate memory to array variable in Java?
      - Alloc
      - New
      - Alloc
      - None
   v) Which of the following is not a decision making statement?
      - if
      - if-else
      - Switch
      - Do-while
   vi) Which provides accessibility in classes and interface?
      - Import
      - Static import
      - All of above
      - None
   vii) Which access specifier must be used for main() method?
      - Private
      - Public
      - Protected
      - None
   viii) Who is called father of Java programming language?
      - Java
      - C
      - None
   ix) Which of the class is superclass of String and StringBuffer class?
      - Java
      -util
      - Java
      -Lang
      - None
   x) Define Variable.

2×10

PART-A

Q.2

(a) Explain the architecture of JVM.
(b) What is the difference between Java and C?
(c) Discuss various data types in Java.

Q.3

What are Repetitive Statements? Discuss the syntax, purpose, flowchart and example of different repetitive statements in Java.

Q.4

Define array. Explain, how arrays are declared and initialized in Java. Give example of each.
What is the difference between this and super?
PART-B

Q.5 Define Exception. List various types of Exception available in Java. Also discuss about finally statement with suitable example.

Q.6
(a) What is Applet? What is difference between local and remote Applet?
(b) Distinguish Applet and Application
(c) Write an applet to draw the following:

Q.7
What are AWT controls? Discuss various types of AWT controls available in Java with suitable example of each.
End Semester Examination, May 2019
BCA – Sixth Semester
MULTIMEDIA AND ANIMATION (BCA-603 (CB))

Time: 3 hrs. Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Choose the correct option:
   a) An e-mail address typically consists of a user ID followed by the ________ sign and the name of the e-mail server that manages the user's electronic post office box.
      i) @ ii) #
      iii) $ iv) *
   b) Which among the following is an example of computer simulated environment?
      i) Audio visual aids ii) Video conference
      iii) Social networking groups iv) Virtual Reality
   c) The ________ file format is a method of encoding pictures on a computer.
      i) html ii) url
      iii) jpeg iv) doc
   d) If frames are displayed on screen fast enough, we get an impression of
      i) Signals ii) Motions
      iii) Packets iv) Bits
   e) Which file format is for photoshop?
      i) jpeg ii) psd
      iii) odt iv) doc
   f) ________ audio/video refers to the use of the internet for interactive audio/video applications
      i) Interactive ii) Streaming live
      iii) Streaming stored iv) None of the above
   g) All of the following are technologies used to gather information about you online except
      i) spy ware ii) cookies
      iii) gmail iv) anonymizers
   h) Many bitmapped images in a sequence is known as
      i) JPEG animation ii) tweening
      iii) TIF animation iv) GIF Animation
   i) A printed page might be presented in which of these orientations?
      i) newscape ii) portrait
      iii) flat-file iv) x-height
   j) A concentric ring on a disk is referred to as a
      i) track ii) sector
      iii) table iv) segment

PART-A

Q.2 What do you understand by the term Multimedia? Explain the impact of Multimedia on the functioning of different markets in the world. 20

Q.4 a) “Formatted text has its advantage over plain text”. Elaborate. 10
   b) Differentiate between RTF and HTML text. 10
Q.5  a) You are assigned to create an interface that will look good across platforms. What is the difference between images as shown on a Macintosh and PC? How would you deal with this problem?  
   b) Compare and contrast the use of MIDI and digitized audio in a multimedia production.  

**PART-B**

Q.5  Discuss the animation techniques of eel and computer animation and choose the correct file types for animations.  

Q.7  a) Discuss video analog and digital technologies and displays.  
   b) List the points to consider when shooting and editing video for use in multimedia.  

Q.8  Identify the typical members of a multimedia project team and describe the skills that they need for their work.
End Semester Examination, May 2019
BCA – Second Semester
INTERNET TECHNOLOGIES (BCA-205A (CB))

Time: 3 hrs. 
Max Marks: 100
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Write short notes on the following:
   a) Email ethics.
   b) Links, URL and Hyperspace.
   c) Patents.
   d) Cyber crime. 

   PART-A

Q.2 a) Explain the architecture of internet with suitable diagram.  
    b) Explain the various modes of connecting to internet with suitable practical examples. 

Q.3 a) Elaborate the importance of email in current scenario and illustrate its structure. 
    b) Name the protocol for assigning IP address to each device in the network. Explain the concept and working with suitable diagram. 

Q.4 a) Why manner and good behaviour is necessary for online communication? Explain the golden rules for netiquette. 
    b) Differentiate between intellectual property and physical property. Specify the ways and methods to safeguard intellectual property. 

   PART-B

Q.5 What you understand by the term scanning? Compare and contrast between active and passive scanning techniques. How can we protect ourselves from cyber crime? 

Q.6 Write short notes on the following:
   a) Identity theft.
   b) Server browser settings.
   c) Data security threat techniques.
   d) Cyber laws. 

Q.7 "A network of internet connected objects able to collect and exchange data”. Justify the statement. Why do we need IOT? How do we envision IOT era is days to come?
End Semester Examination, May 2019
MCA – Second Semester
OPERATING SYSTEM (MCA-204A (CB))

Time: 3 hrs.  Max Marks: 100
No. of pages: 2

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Write short notes on the following:
   a) Real-time operating system.
   b) Program and process.
   c) Turn around time, waiting time, through-put.
   d) Long-term scheduler and short-term scheduler.
   e) Discuss the benefits of batch operating systems.
   f) Describe four necessary conditions for the deadlock.
   g) Dynamic loading and swapping.
   h) Paging and page table.
   i) File system and naming conventions.
   j) Directory structure.

**PART-A**

Q.2 Consider the following set of processes with the length of CPU-burst time given in milliseconds:

<table>
<thead>
<tr>
<th>Process</th>
<th>Burst time</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>P₁</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>P₂</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>P₃</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>P₄</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

Draw Gantt charts and calculate average turn-around time and waiting time for FCFS, SJF, priority and round-robin \( rθ = 4 \text{ ms} \) scheduling algorithms.

Q.3 a) Explain the desirable features of a real-time operating system.
   b) Differentiates between multiprocessing and multiprogramming operating system.

Q.4 Let us consider the four processes, with following scenario:

<table>
<thead>
<tr>
<th>Process</th>
<th>CPU time</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>P₁</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>P₂</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>P₃</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>P₄</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Draw Gantt chart and calculate average turn-around time and waiting time for FCFS, SJF, Priority and RR \( rθ = 5 \) scheduling algorithms.

**PART-B**

Q.5 Consider the following snap shot of a system:

<table>
<thead>
<tr>
<th>Process</th>
<th>Allocation</th>
<th>Max</th>
<th>Available</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A B C</td>
<td>A B C</td>
<td>A B C</td>
</tr>
<tr>
<td>P₀</td>
<td>0 1 0</td>
<td>7 5 3</td>
<td>3 3 2</td>
</tr>
<tr>
<td>P₁</td>
<td>2 0 0</td>
<td>3 2 2</td>
<td></td>
</tr>
<tr>
<td>P₂</td>
<td>3 0 2</td>
<td>9 0 2</td>
<td></td>
</tr>
<tr>
<td>P₃</td>
<td>2 1 1</td>
<td>2 2 2</td>
<td></td>
</tr>
<tr>
<td>P₄</td>
<td>0 0 2</td>
<td>4 3 3</td>
<td></td>
</tr>
</tbody>
</table>
Answer the following using banker’s algorithm:
a) What is the content of need matrix?
b) What is the safe sequence for processes?  20

Q.6 Explain the steps of page fault that need to be taken in paged virtual memory system with the help of suitable diagram.  20

Q.7 Consider a disk queue with pending request for I/O to block on cylinders:
98, 183, 37, 122, 14, 124, 65, 67
Current head position is at cylinder 53. Find out the total distance the disk arm will cover with following scheduling algorithms:
a) FCFS
b) SSTF
c) SCAN
d) Look  20
End Semester Examination, May 2019  
BCA – Second Semester  
INTERNET TECHNOLOGIES (BCA-205 (CB))

Time: 3 hrs.  
Max Marks: 100  
No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1  
a) Differentiate internet and internet.  
b) Why plug-ins are used? Give an example.  
c) What is search engine optimization?  
d) How electronic-mail is beneficial over traditional mailing system?  
e) What is DNS spoofing?  
f) Differentiate public-FTP from private FTP server.  
g) What do you mean by ethical hacking? Give an example.  
h) What is a SQL injection? Give an example.  
i) What is identity theft? Give an example.  
j) How you can make your web browser safe?  

(2×10)

**PART-A**

Q.2  
a) Explain the internet architecture in detail.  
b) How web browser works? How can you make web browser secure?

10

Q.3  
a) Write the significance of electronic-mail is current scenario. Explain the structure and tips to write an e-mail.  
b) What is search engine optimization? How search engine works?

10

Q.4  
a) What is the role of DHCP is WWW? Explain DHCP header in detail.  
b) Explain the working of DNS server. Also explain DNS header in detail.

10

**PART-B**

Q.5  
a) Explain the need for electronic mail ethics. How human right issues involved on the internet?  
b) What is unlawful communication? Which law is applicable for the same? How can be careful of unlawful communication over internet?

10

Q.6  
a) Differentiate passive scanning techniques from active scanning techniques? Give some examples too.  
b) What is SQL injection? Explain using an example. Also, example exploitation of SQL injection in web applications.

10
Q.7  Write short notes on the following:
   a) Cyber security.
   b) Cross-site scripting.
   c) Cyber laws and coverage.
   d) Identity theft.
End Semester Examination, May 2019
BCA – Sixth Semester
MULTIMEDIA AND ANIMATION (BCA-603A (CB))

Time: 3 hrs. Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1  a) A smaller version of an image in called _________
   i) Clipart ii) Bitmap
   iii) Thumbnail i) None of the above

b) MPEG stands for _________
   i) Multi format processed event graphics
   iii) None of the above

c) MP3 is an extension of a _________ file.
   i) Video file ii) Audio file
   iii) Text file iv) None of these

d) Morphing means _________
   i) Changing position ii) Changing color
   iii) Changing shape iv) None of the above

e) Joint photographic experts group is used to compress _________
   i) Music ii) Pictures
   iii) Images iv) Frames

f) An IP address can be changed with a
   i) MIME type ii) Domain name
   iii) Usenet iv) None of the above

g) To create a smooth transition between two images when morphing, its important to set numerous
   i) Layers ii) Key frames
   iii) Anchor tags iv) None of the above

h) FPS stands for _________
   i) Minimum refresh rate to avoid flicker for all motion devices is 30 Hz. (True/False)

j) A good example of hypermedia is internet. (True/False) 2×10

PART-A

Q.2  What is multimedia? Explain the different evolving technologies for multimedia systems. Also, describe various components of multimedia. 20

Q.3  a) Differentiate typeface and a font. List at least three attributes of a font. 10
b) Write short note on hypermedia and hypertext application. 10

Q.4  a) Discuss various image file formats. 10
b) Differentiate between bitmap, vector and 3D images and describe capabilities and limitations of each. 10

PART-B

Q.5  a) Discuss the animation techniques of cell and computer animation. 10
b) Discuss the physical and psychological principles as to why animation works, as well as how it is usually presented?  

Q.6 List the steps involved in capturing video, compressing the video and preparing it for DVD. Briefly, discuss the decisions you need to make with each step regarding compromises on image quality and other limiting factors.  

Q.7 a) Discuss the four primary stages in a multimedia project.  

b) Determine which multimedia authoring system is most appropriate for any given project?
Q.1 Define the following in brief:
   a) Weak entity.
   b) Physical view of database.
   c) File system.
   d) Alternate key.
   e) Partial dependency.
   f) Meaning of consistency in database.
   g) Concurrency.
   h) DCL
   i) DML stands for ________.
   j) Define ‘triggers’.

Q.2 a) Define the following:
   i) Entity.
   ii) Relationship.
   iii) Attribute.
   iv) Cardinality.
   v) Derived-attribute.

b) Draw an E-R diagram for “Teacher teaches student”. You can take attribute of teacher, student and subject as per your choice.

c) Write five responsibilities of DBA.

Q.3 a) Why relational model is most widely used for database design?

b) What is network data model and hierarchical data model?

Q.4 a) Explain 3-tier architecture of database. How logical view provides data independence?

b) How normalization is implemented in 1NF and 2NF? Explain with examples.

Q.5 a) What is concurrency control in DBMS?

b) Explain ACID property of transaction with suitable example.

Q.6 Consider the following:
   Employee (Employee ID, First Name, Last Name, Address, DoB, Gender, Position)
   Department (Dept No., Dept Name, Manager, Emp ID)
   Project (Project No. Project Name, Dept No.)
   Work on (Emp ID, Project No., Hours worked)

Write SQL statements:
   a) List name and address of employee who work for IT department.
   b) List total hours worked by each employee.
   c) List the total no. of employee in each department.
   d) List project number, project name and no. of employee who work on that project.

Q.7 a) What are triggers in SQL? What are its benefits? Explain with example.

b) What is difference between partial dependency and fully dependency?

c) Define the following:
i) Primary key.  
ii) Foreign key.  
iii) Candidate key.
Q.1 Define the following terms:
   a) Packet sniffing.
   b) Eavesdropping.
   c) Risk assessment.
   d) Risk management.
   e) Encryption.
   f) Decryption.
   g) Cryptograph.
   h) Intrusion.

   PART-A

Q.2 What are the five major stages of risk assessment? Explain them in detail.

Q.3 Explain the security governance roles and responsibility of the following stake holders:
   a) CEO
   b) Chief security officer.
   c) Mid-level managers.
   d) Employees.

Q.4 a) List the 8 commandments of ethics in cyber security.
   b) What is the meaning of ACL in firewall? How it helps in enhancing computer security?

   PART-B

Q.5 What is the role of scanning and analysis tools in enhancing network security? Discuss various tools and highlight their utility.

Q.6 Explain RSA algorithm with example.

Q.7 Explain the working of digital forensics and its importance.
Q.1

Multiple Choice Question

(a) The time horizon in data warehouse is usually
1. 1-2 years  2. 5-6 years  3. 5-6 years  4. 5-10 years

(b) What do data warehouses support?
1. Operational databases  2. OLTP  3. OLAP
4. None

(c) ______ means about data
1. Data cube  2. Data mart  3. Metadata
4. None

(d) ______ algorithm is used to generate frequent patterns
4. None

(e) Removing duplicate records is a process called
4. None

(f) Treating missing data is called as
1. Selection  2. Transformation  3. Interpretation
4. Preprocessing

(g) Data Mining helps in
1. Inventory  2. Sales promotion  3. Marketing
4. All of the above

(h) Define data cube

(i) State true or false: "Transaction processing is a kind of data warehouse application"

(j) State true or false: "The data is stored, retrieved and updated in OLTP"

20

PART-A

Q.2

(a) What is meant by metadata in the context of data warehouse? Explain different types of metadata stored in a data warehouse. Illustrate with suitable examples.

(b) Differentiate between data warehouse and data mart.

20

Q.4
PART-B

Q.5 Write short note on the following
(i) Data extraction
(ii) Data Transformation
(iii) Data loading

Q.6 Explain in detail OLAP tools and products

Q.7 (a) Consider the dataset that details the transaction of a departmental store along with minimum support threshold. Find various frequent items sets

<table>
<thead>
<tr>
<th>TID</th>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>Butter, Bread, Milk</td>
</tr>
<tr>
<td>T2</td>
<td>Butter, Milk</td>
</tr>
<tr>
<td>T3</td>
<td>Bread, Egg, Biscuits</td>
</tr>
<tr>
<td>T4</td>
<td>Bread, Butter, Milk, Biscuits</td>
</tr>
</tbody>
</table>

(b) Discuss various data mining applications
End Semester Examination, May 2019
BCA — Sixth Semester
DATA WAREHOUSING (BCA-605(CB))

Time: 3 hrs. Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt ANY TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1
1. a) Give full form of OLAP.
   b) The type of relationship in Star Schema is — One to One — One to many — many to many
   c) The role of ETL process is to identify erroneous data and to fix them. (True/false)
   d) A data mart is designed to optimize the performance for well-defined and predictable use. (True/false)
   e) Data in data warehouse are loaded and refreshed from operational systems. (True/false)
   f)Both static data and event data can be stored in a database. (True/false)
   g) Metadata is a component of a data warehouse. (True/false)
   h) Define Date Cleaning.
   i) Give one feature of OLTP.
   j) Which method is used to find frequent patterns? 2×10

PART-A

Q.2
2. a) What do you understand by dependent and independent data marts? Explain the issues involved in building data marts.
   b) Discuss various features of data warehousing

Q.3
3. a) Write the advantages of OLAP over OLTP.
   b) Write short note on schemas for multidimensional database.

Q.4
4. a) Discuss some of the distinguishing characteristics and goals of data warehouse architecture.
   b) Discuss: ROLAP, MOLAP and HOLAP

PART-B
Q.5: Explain:
   (a) Data Warehouse backend tools and utilities
   (b) Tuning and testing of data warehouse.

Q.6: (a) Discuss the various steps for the design and construction of data warehouse.
     (b) What are logical architectures? Explain.

Q.7: (a) Explain various tools for data warehousing with their importance and utility.
     (b) Write short note on Business Information Data Warehouse.
Q.1 Answer the following questions:
   a) What is scope resolution operator? Explain with example.
   b) List out the advantages of object oriented languages? List any four.
   c) How do you declare static data members and static member functions? Explain with example.
   d) Define Friend Function and discuss how it can access the data of a class.
   e) Differentiate between a structure and a class with examples.

Q.2 Differentiate between Procedural languages and object Oriented Languages. Also, list the basic concepts of OOPs and discuss each.

OR
List the OOPs concepts and discuss each in detail by taking suitable examples. Also, list the applications of OOP.

Q.3 Write a program to calculate the area of the following:
   a) Area of a circle.
   b) Area of a rectangle.
   Use the overloaded function area ( ) for the same.

OR
Define a class to represent a bank account. Include the following members:
   **Data Members:**
   i) Name of depositor.
   ii) Account No.
   iii) Type of Account
   iv) Balance amount.
   **Member Function:**
   i) To assign initial values
   ii) To deposit and withdraw amount
   iii) To display name and balance.
   Write a main program to test the program.

Q.4 List the operators that cannot be overloaded. Write a program to overload “==” operator to compare two strings.

OR
Create a class FLOAT that contains one float data member. Overload all the four arithmetic operators so that they operate on the objects of FLOAT.

Q.5 What is Inheritance? List its types. Discuss the overriding of base class members in a derived class with example.

OR
Discuss how the constructors and destructors are used in derived classes with the help of a small program.
Q.1 Answer the following:
   a) The complexity of bubble sort algorithm is:
      i) $O(n)$  ii) $O(\log n)$  iii) $O(n^2)$  iv) $O(n \log n)$
   b) The complexity of merge sort algorithm is:
      i) $O(n)$  ii) $O(\log n)$  iii) $O(n^2)$  iv) $O(n \log n)$
   c) The indirect change of the values of a variable in one module by another module is called:
      i) internal change  ii) inter-module change  iii) side effect  iv) side-module update.
   d) ......................... Is conceptually a top down approach for solving problems.
      i) Divide  ii) Backtracking  iii) Dynamic programming  iv) Divide and Conquer
   e) According to Strassen’s method the complexity of matrix multiplication is ______?
   f) The Worst case occur in linear search algorithm when:
      i) Item is somewhere in the middle of the array.
      ii) Item is not in the array at all
      iii) Item is the last element in the array
      iv) Item is the last element in the array or is not there at all.
   g) The Average case occur in linear search algorithm:
      i) When item is somewhere in the middle of the array.
      ii) When Item is not in the array at all
      iii) When Item is the last element in the array
      iv) when Item is the last element in the array or is not there at all.
   h) The complexity of the average case of an algorithm is:
      i) Much more complicated to analyze than that of worst case
      ii) Much more simpler to analyze than that of worst case
      iii) Sometime more complicated and some other times simpler than that of worst case
      iv) None of the above.
   i) The complexity of linear search algorithm is:
      i) $O(n)$  ii) $O(\log n)$  iii) $O(n^2)$  iv) $O(n \log n)$
   j) The complexity of Binary search algorithm is:
      i) $O(n)$  ii) $O(\log n)$  iii) $O(n^2)$  iv) $O(n \log n)$
      $2 \times 10$

Q.2 a) Write general algorithm for greedy method. How greedy method can be applied to solve Knapsack Problem?  
   b) Solve the knapsack problem using greedy method with no of inputs and capacity of bag 15. Profits and weights are given below.
      N=7m=15
      $(p1, p2, p3, p4, p5, p6, p7) = (10, 5, 15, 7, 6, 18, 3)$
      $(1, w2, w3, w4, w5, w6, w7) = (2, 3, 5, 7, 4, 1)$
      $10$

Q.3 a) Write the algorithm for Merge Sort. Analyze its complexity.
   b) Design the state space tree for merge sort with given list
      23, 34, 12, 16, 17, 19, 2
      $10$
Q.4 Explain stresses matrix multiplication is method? Also analyze its complexity.  

**PART-B**

Q.5 a) What do you mean by backtracking? Explain algorithm for the same. Also draw the state space representation of 8 queen’s problem.  
b) Solve the given graph using Dijkstra’s algorithm with a as source vertex.

Q.6 Consider the graph and solve Travelling Salesman Problem using dynamic programming approach.

Q.7 a) Explain the relationship between P, NP, NP Hard, NP Complete.  
b) State and prove Cook’s Theorem.
Q.1 Multiple choice questions (only one option is correct):

a) With A=False and B = True, which statement evaluate as False?
   i) A OR A
   ii) A OR B
   iii) B OR A
   iv) B OR B

b) Which statement about objects is true?
   i) One object is used to create one class.
   ii) One class is used to create one object.
   iii) One object can use many class.
   iv) One class can create many objects
   v) There is no relationship between objects and classes.

b) Which property determines whether a control is displayed to the user?
   i) Hide
   ii) Show
   iii) Visible
   iv) Enabled

d) Which is not an integer data type:
   i) Single
   ii) byte
   iii) Short
   iv) Integer

e) The Boolean data type:
   i) is unsigned
   ii) has two states
   iii) is displayed by the program as yes or no
   iv) Both i) and ii)
   v) All of the above

f) Which is not an ADO.NET Data Adapter Object?
   i) OleDbDataAdapter
   ii) SQL. DataAdapter
   iii) QueryDataAdapter
   iv) Both i) and ii).

g) The first step of configuring a DataAdapter is to select:
   i) an adapter object
   ii) a connection object
   iii) a database object
   iv) a dataset object
   v) None of the above.

h) A postback occurs when:
   i) a browser posts a form to the server
   ii) a user’s action activates the handling of a server event
   iii) a service posts a form to the client
   iv) both i) and ii)
v) all of the above

i) Which is the file extension used for an ASP.NET file?
   i) asn
   ii) asp
   iii) aspn
   iv) aspx

j) Where do cookies store information?
   i) HTML source
   ii) text file
   iii) URL
   iv) Both i) and ii) 2x10

**PART-B**

Q.2 Explain all the layers of Dot.Net Framework in detail. Draw a diagram to illustrate the relation between different layers. 20

Q.3 What is a variable? What are the different types of variables available in C#? Give suitable example to support your answer. 20

Q.4 Explain inheritance in C#? How is runtime polymorphism implemented in C#? Give suitable example to support your answer. 20

Q.5 List any 5 components used in creating a desktop application. Give example to illustrate the use of properties in manipulating the behaviour of desktop components. 20

Q.6 Write short notes on the following:
   a) Web service.
   b) XML.
   c) COM. 20

Q.7 Write a program to execute a select query to display all the students from the BCA-VI class on the below mentioned table and populate the results in a grid view.
   Table student:
   Name
   Roll No
   Class
   Address
   Email ID
   Sample raw ('student1; '123443; BCA;‘22IB Baker Street; ‘student1@gmail.com’). 20
Q.1  
   a) A table can have only one:  
      i) Primary key  
      ii) Alternate key  
      iii) Candidate key  
      iv) All the above.  
   b) What is the smallest unit of data in rotational model?  
      i) Data type  
      ii) Field  
      iii) Data value  
      iv) None of these  
   c) What are the components of E& R model?  
      i) Entity  
      ii) Attribute  
      iii) Relationship  
      iv) All the above.  
   d) The association between two entities is called:  
      i) Binary relationship  
      ii) Ternary relationship  
      iii) Recursive relationship  
      iv) None of these  
   e) EER stands for ____________.  
   f) Key used for uniquely identify the table is ______.  
   g) DDL stands for ____________.  
   h) Software failures may include failures related to software such as:-  
      i) Operating system  
      ii) DBMS software  
      iii) Application programs  
      iv) All of these.  
   i) Command to drop table is _____________.  
   j) SQL stands for _____________.  

PART-A

Q.2  
   a) What are roles and responsibilities of database administrator?  
   b) Explain three scheme architecture of DBMS in perspective of student database  

Q.3  
   a) Write a short note on:  
      i) Data independence.  
      ii) Data dictionary.  
      iii) Primary key  
      iv) Unique key  

Q.4  
   a) What are various check constraints in SQL. Explain with suitable examples.  
   b) Taking suitable example, explain string functions, mathematical functions and data functions in SQL.  

PART-B

Q.5  Why normalization is used in database explain 1NF, 2NF, 3NF and BCNF using suitable examples.  

Q.6  What are locks in concurrency control. What are different types of locks? Explain two phase locking with suitable example.  

Q.7  Write a short note on:  
   a) Distributed databases
b) Shadow paging

c) Log based recovery

d) Data security.
End Semester Examination, May 2019  
MCA – Second Semester  
DATABASE SYSTEMS (MCA-205A (CB))

Time: 3 hrs.  
Max Marks: 100  
No. of pages: 1

Note: Attempt FIVE questions in all. Q1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1  
a) A table can have only one:  
   i) Primary key  
   ii) Alternate key  
   iii) Candidate key  
   iv) All the above.  
b) What is the smallest unit of data in relational model?  
   i) Data type  
   ii) Field  
   iii) Data value  
   iv) None of these  
c) What are the components of E&R model?  
   i) Entity  
   ii) Attribute  
   iii) Relationship  
   iv) All the above.  
d) The association between two entities is called:  
   i) Binary relationship  
   ii) Ternary relationship  
   iii) Recursive relationship  
   iv) None of these  
e) EER stands for ____________.
   f) Key used for uniquely identify the table is ______.
   g) DDL stands for ____________.
   h) Software failures may include failures related to software such as:  
      i) Operating system  
      ii) DBMS software  
      iii) Application programs  
      iv) All of these.  
   i) Command to drop table is ____________.
   j) SQL stands for ____________.

2x10

PART-A

Q.2  
a) What are roles and responsibilities of database administrator?  
5  
b) Explain three scheme architecture of DBMS in perspective of student database.  
15

Q.3  
a) Write short notes on:  
   i) Data independence.  
   ii) Data dictionary.  
   v) Primary key  
   iv) Unique key  
5x4

Q.4  
a) What are various check constraints in SQL? Explain with suitable examples.  
5  
b) Taking suitable example, explain string functions, mathematical functions and data functions in SQL.  
15

PART-B

Q.5  
Why normalization is used in database? Explain 1NF, 2NF, 3NF and BCNF using suitable examples.  
20

Q.6  
What are locks in concurrency control? What are different types of locks? Explain two phase locking with suitable example.  
20

Q.7  
Write short notes on:  
a) Distributed databases.  
b) Shadow paging.  
c) Log based recovery.  
d) Data security.  
5x4
Q.1 Answer the following questions:
   a) Name the different layers which define cloud architecture.
   b) What is the requirement of virtualization in implementing cloud?
   c) Name some open source cloud computing platform databases.
   d) What is use of API’s in cloud services? Define.
   e) Define platform as a service.
   f) List down the basic characteristics of cloud computing.
   g) Define hybrid cloud.
   h) List down the basis clouds in cloud computing.
   i) What is cloud service? Define.
   j) Define information as a service.  

PART-A

Q.2 What is cloud computing, differentiate it with traditional software development and also explain its features?  

Q.3 What are the fundamental components introduced in cloud reference model? Discuss, also describe the features of economic and business model behind cloud computing.  

Q.4 Explain the following:
   a) Workload.
   b) Aggregation.
   c) Silas.
   d) CaaS.  

PART-B

Q.5 Explain the need of security in cloud computing and discuss the different security challenges and issues of cloud computing.  

Q.6 Explain the following terms:
   a) OPE
   b) HOM
   c) RND
   d) OPE-JOIN  

Q.7 How parallel and distributed programming paradigms are related to concurrency and also differentiate between implicit and explicit parallelism?
End Semester Examination, May 2019
B. Sc. (Information Technology) – Fourth Semester
WEB APPLICATION DEVELOPMENT (7.303A)

Time: 3 hrs.  Max Marks: 75
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer the following multiple choice questions:
   a) Which protocol is used to transfer files from local host to remote host?
      i) HTTP  ii) FTP
      iii) TCP  iv) UDP
   b) Which of the following is not an ASP.NET page event?
      i) Init  ii) Load
      iii) Import  iv) Disposed
   c) Which of the following web-server control used as container for other server controls
      in a ASP.NET page?
      i) Placeholder  ii) Panel
      iii) Table  iv) Imagemap
   d) Which of the following webserver control is used as container for other server
      controls in a ASP.NET webpage?
      i) Placeholder  ii) Panel
      iii) Table  iv) Imagemap
   e) Which protocol is used to call a web service ____________?
   f) Which of the following options is correct with regard to HTML?
      i) It is a modeling language.
      ii) It is a scripting language.
      iii) It is a partial programming language.
      iv) It is used to structure documents.
   g) Ajax stand for ____________.
   h) How can you create an e-mail link?
      i) <email.href = “@b”>
      ii) <mail> a @ b </mail>
      iii) <a href = “a @ a”>
      iv) <a href = “url” Target = “”>
   i) Which is the latest version of ASP.NET? ______________
   j) Define a cookie

   PART-A

Q.2 a) Write down the steps to connect one .NET page with another.
   b) Write short notes on the following:
      i) View state
      ii) Session

   PART-B

Q.3 “ASP.NET validation controls define an important role in validating the user input data”.
Describe ASP.NET validation controls. What are different types of validation controls?
Explain with suitable examples.

Q.4 Explain A good navigation strategy taking any web site example of your choice.

Q.5 a) Write HTML code in notepad to create following web page:
   i) Create scrolling text.
ii) Display any image in 400 × 300 pixels below the scrolling text.
iii) Display following text below the image computer generations.

First
Second
Third
Fourth

b) Create the following table using basic table tags of HTML:

<table>
<thead>
<tr>
<th>Quick</th>
<th>Brown fox</th>
<th>jumps</th>
</tr>
</thead>
<tbody>
<tr>
<td>over the</td>
<td>lazy</td>
<td>dog</td>
</tr>
<tr>
<td></td>
<td>then</td>
<td>it</td>
</tr>
<tr>
<td></td>
<td></td>
<td>fall</td>
</tr>
<tr>
<td></td>
<td></td>
<td>prey to lion</td>
</tr>
</tbody>
</table>

Q.6 Write short notes on the following:
a) Tree view control.
b) List view control.
c) Data pager control.

Q.7 Explain 3-tier architecture of ASP.NET in detail.
End Semester Examination, May 2019
BCA – Fourth Semester
DATABASE MANAGEMENT SYSTEM (BCA-204 (CB))

Time: 3 hrs. Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1 Explain the following:
   a) How file processing system different from database management system?
   b) State any two roles of DBA.
   c) Differentiate between DDL and DML.
   d) What is foreign key constraint?
   e) Discuss Super key.
   f) Give any one example where aggregation concept is useful?
   g) What is timestamp?
   h) We can convert any weak entity set to a strong entity set by simply adding appropriate attributes. Why then, do we have weak entity sets?
   i) When the schedule is serializable?
   j) Define ‘derived attribute’.

   2x10

   **Part-A**

   Q.2 a) Suppose you are given the following requirements for a simple database for the National Hockey League. It has many teams, Each team has a name, city, a coach, a captain and a set of players. Each player belongs to only one team. Each player has a name, a position, a skill level and a set of injury records. A team captain is also a player. A game is played between two teams and has a date and a score
   Construct a clean and concise ER diagram.
   b) How is a view created and dropped? What problems are associated with updating of views?

   10

   **Q.3** a) State the states of the transaction with the state diagram.
   b) Explain the recovery algorithm in detail.

   10

   **Q.4** a) What is the purpose of cladding in an optical fibre? Discuss its density relative to core
   Explain the 3 schema architecture in DBMS. Highlight the difference between physical and logical data independence.
   b) Define normalization How 3NF and Boyce Codd NF differs from each other? Explain with suitable examples.

   10

   **Part-B**

   **Q.5** a) Why we need concurrency control? Explain the concurrency control techniques with suitable examples.
   b) How can you say that security in database is required? Discuss in detail with the security risks associated with it.

   10

   **Q.6** a) Define functional dependency and explain inference rules of FD.
   b) Let R(ABCD) be a relation scheme with the following dependencies:

   10
Q.7  
a) \( R(ABC) F = \{A \rightarrow B, A \rightarrow C\} \) decomposed into \( D = R1(AB), R2(BC) \) Find whether \( D \) is Lossless or Lossy? Give explanation.

b) Consider the following tables:

\[\text{Person ( name, age, gender ) where Name is a key}\]
\[\text{Frequents ( name, pizzeria ) where name, pizzeria is a key}\]
\[\text{Eats ( name, pizza ) where name, pizza is a key}\]
\[\text{Serves ( pizzeria, pizza, price ) where pizzeria, pizza is a key}\]

Write the queries in the relational algebra form:

[i] Find all pizzerias frequented by at least one person under the age of 18.

[ii] Find the names of all females who eat either mushroom or pepperoni pizza (or both).

[iii] Find the names of all females who eat both mushroom and pepperoni pizza.

[iv] Find all pizzerias that serve at least one pizza that Amy eats for less than $10.00.

[v] Find all pizzerias that are frequented by only females or only males.
End Semester Examination, May 2019
MCA — Fourth Semester
CLOUD COMPUTING (MCA-406(CB))

Time: 3 hrs. Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from Part-A and TWO questions from Part-B. Each question carries equal marks.

Q.1 Multiple choice questions:
    a) _______ as a utility is a dream that dates from the beginning of the computing industry itself.
       i) Model          ii) Computing
       iii) Software     iv) All of the mentioned.
    b) Which of the following is essential concept related to cloud?
       i) Reliability     ii) Productivity
       iii) Abstraction   iv) All of the above.
    c) Which of the following is cloud platform by Amazon?
       i) Azure       ii) AWS       iii) Cloud era   iv) All of these.
    d) Cloud computing abstracts systems by pooling and sharing of resources.
       i) True          ii) False
    e) Which of the following is best known service model?
       i) SaaS         ii) PaaS      iii) IaaS       iv) All of these
    f) All cloud computing applications suffer from the inherent _______ that is intrinsic in their WAN connectivity.
       i) Propagation   ii) Latency   iii) Noise    iv) All of the above
    g) A group of users within a particular instance is called ________.
       i) Suser        ii) Pod       iii) Superuser  iv) All of the above
    h) A hybrid cloud combines multiple clouds where those clouds retain their unique identities, but are bound together as a unit.
       i) Public       ii) Private    iii) Community  iv) Hybrid
    i) Which of the following is deployment model?
       i) Public       ii) Private    iii) Hybrid     iv) All of the above.
    j) CaaS stands for ________ as service.
       i) Compliance   ii) Computer   iii) Community  iv) Communication

2x10

PART-A

Q.2 a) What is meant by cloud computing? Discuss its advantage and also explain the architecture of cloud computing including various layers with suitable example. 12
    b) Explain various cloud deployment models with suitable examples of each. 8

Q.3 a) What are the different factors important for the selection of type of PaaS cloud? 10
    b) Define virtualization. Why virtualization is important in cloud computing? Also compare virtual machine with physical machine. 10

Q.4 a) Explain the following in relation to IaaS model:
       i) Workloads.
       ii) Pods.
       iii) Silos. 10
    b) What is VIM? How is it related to cloud infrastructure management? 5
    c) Explain any four desired features of a cloud. 5

PART-B
Q.5  a) What are the different security challenges in cloud computing? Discuss each in brief.  
   b) Discuss different levels of trust in cloud computing.  
   c) Explain man-in-the-middle attack and side channel attack with respect to cloud computing.

Q.6  Write short notes on:
   a) Amazon web services.
   b) Google App Engine.
   c) Microsoft Azure.
   d) Hadoop.

Q.7  a) Explain third party cloud services stating relevant examples of each.
   b) Explain security reference architecture with neat diagram.
End Semester Examination, May 2019
MCA – Fourth Semester
ARTIFICIAL INTELLIGENCE (MCA-404A (CB))

Time: 3 hrs.  
Max Marks: 100
No. of pages: 2

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A and TWO questions from PART-B. Marks are indicated against each question.

Q.1  
a) State the fundamental goal of knowledge representation.
b) State the meaning of the given predicate logic: “(∀X) Oranges(X) ← yellow(X)”
c) Given P(A) = 0.3 and P(A|B) = 0.4 and P(B) = 0.5 find P(B|A).
d) Discuss need of heuristic functions.
e) How natural language processing is done by the computers?
f) State at least two characteristics of neural networks.
g) List any two commonly used AI techniques.
h) How many layers are there in a simple neural network? Draw a simple neural network.
i) In what ways depth first search algorithms are better than breadth first search?
j) How fuzzy sets are defined in fuzzy logic? Show the fuzzy union operation by taking an example.

2×10

PART-A

Q.2  
a) Differentiate uninformed search (blind search) and informed search (heuristic search) strategies.  

b) What are quantifiers? Discuss universal and Existential quantifier with the help of suitable example.

10

Q.3  
a) Explain the situations under which hill climbing may fail to find a solution. What can be done to overcome these situations?

b) What are the task domains of Al? Discuss them with the help of suitable examples.

10

Q.4  
Consider the following sentences:
John likes all kinds of food.
Apples are food.
Chicken is food.
Anything anyone eats and isn’t killed by is food.
Bill eats peanuts and is still alive.
Sue eats everything bill eats.

Translate these sentences into formulas in predicate logic.

20

PART-B

Q.5  
a) Which of the following are classification tasks appropriate for classification learning algorithms?
   i) Predicting if a credit card transaction is fraudulent or legitimate
   ii) Predicting how much it will rain tomorrow?
   iii) Predicting the letter of the alphabet represented by an image of a handwritten character
   iv) Breaking a database of customers into clusters based on their buying patterns (where the nature of the clusters is determined automatically by the computer, not in any way provided by a human)

b) Discuss the applications of artificial neural networks.

10

Q.6  
The following is the rule set of a simple weather forecast expert system:
1. IF cyclone THEN clouds
2. IF anticyclone THEN clear sky
3. IF pressure is low THEN cyclone
4. IF pressure is high THEN anticyclone
5. IF arrow is down THEN pressure is low
6. IF arrow is up THEN pressure is high

a) Use forward chaining to reason about the weather if the working memory contains the fact: arrow is down. Show your answer in a table naming the rules matching the current working memory (conflict set), which rule you apply, and how the working memory contents changes on the next cycle after a rule has fired:

<table>
<thead>
<tr>
<th>Cycle</th>
<th>Working Memory</th>
<th>Conflict set</th>
<th>Rule fired</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>arrow is down</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

b) Use backward chaining to reason about the weather if the working memory contains the fact: clouds. Show your answer in a similar table.

Q.7 Discuss following:

a) Procedural and declarative knowledge.
b) Min max strategy.
c) Expert system.
d) Neural network.
Q.1 Fill in the blanks:
   a) __________ computing refers to applications and services that run on a distributed
      network using virtualized resources.
   b) __________ concept in cloud is related to pooling and sharing of resources.
   c) __________ is a cloud platform by Amazon.
   d) __________ refers to the location and management of the cloud’s infrastructure.
   e) There are _________ dimensions of a cloud cube model.
   f) ________ is a cloud computing service model in which hardware is virtualized in the
      cloud.
   g) __________ offering provides the tools and development environment to deploy
      applications on another vendor’s application.
   h) ________ serves as a PaaS vendor within Google App Engine System.
   i) Amazon web services offers a classic SOA approach to __________.
   j) __________ is a man-in-the-middle type of service.  

**2x10**

**PART-A**

Q.2 a) What is cloud computing? Explain the two important features of cloud computing.  
    b) What are the different applications of cloud computing?  
    c) Explain the concept of virtualization in cloud computing.  

Q.3 a) Define the terms IaaS, PaaS and SaaS. Explain briefly with an example each service
      model.  
    b) Explain the following:
       i) IDaaS  
       ii) CaaS  

**5x2**

Q.4 Explain the following in relation to SaaS.
   a) Different services provided by SaaS.
   b) Security issues in SaaS model.
   c) Characteristics of SaaS model.
   d) Architecture of SaaS.  

**5x4**

**PART-B**

Q.5 a) Explain security, privacy and trust in cloud computing.  
    b) Explain the need of security in cloud computing.  
    c) Explain security reference architecture with neat diagram.  

Q.6 a) What is the use of onion encryption layer in cloud computing? How is it useful in
      maintaining trust and reputation in cloud computing?  
    b) How parallel and distributed programming paradigms are related to concurrency
       and also differentiate between implicit and explicit parallelism.  

Q.7 Write short notes on *(any two)*:
   a) Google App Engine.  
   b) Microsoft Azure.  
   c) Amazon web Service.  

**10x2**
End Semester Examination, May 2019
BCA – Fourth Semester
SOFTWARE ENGINEERING (BCA-405 (CB))

Time: 3 hrs.  
Max Marks: 100
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A. and any TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer the following:
   a) What is software crisis?
   b) What is prototyping?
   c) Outline the need for software configuration management.
   d) Differentiate between coupling and cohesion.
   e) What are software reliability metrics?
   f) Differentiate between white box and black box listing?
   g) List the characteristics of a good SRS.
   h) How web engineering is different from software engineering?
   i) Explain the term project planning and control in brief.
   j) Explain the terms software reuse in brief.

PART-A

Q.2 a) What are the fundamental activities of software engineering?  
   b) With neat diagram, explain the spiral model of software development process.
   c) What is SRS? Explain the various ways of writing SRS.

Q.3 a) Consider the problem of credit card approval system and design the following:
   a) Problem statement.
   b) Level –O DFD.
   c) Level-1 DFD.
   d) ER-diagram.

Q.4 a) Explain COCOMO model in detail with the help of diagram and example.
   b) What should be included in a GANTT Chart. How PERT Chart is different from GANTT Chart?

PART-B

Q.5 a) What problems are likely to arise if two modules are less cohesive? Discuss all types of cohesion.
   b) Explain the design principles and concepts than can be used to produce “Good Quality” Software design.

Q.6 a) Consider a program for determining the previous date. Its input is a triple of day, month and year with the values in the range:

   \[
   \begin{align*}
   1 \leq \text{month} \leq 12 \\
   1 \leq \text{day} \leq 31 \\
   1900 \leq \text{year} \leq 2025
   \end{align*}
   \]

   The possible outputs would be previous date or invalid input date. Design the boundary value test cases.

b) Explain structural testing with the help of an example. How it is different from functional test?

Q.7 Write short notes on:
   a) Software quality assurance.
   b) Software re-engineering.
   c) Measurements of reliability.
   d) SEI-Capability maturity model.
End Semester Examination, May 2019
BCA – Fourth Semester
FUNDAMENTALS OF OBJECT ORIENTED ANALYSIS AND DESIGN
(BCA-406 (CB))

Time: 3 hrs. No. of pages: 1
Max Marks: 100

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A, and any TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer the following:
   a) Class is defined as _______ in object oriented programming paradigm.
   b) _______ and _______ features of object oriented programming provide data security.
   c) UML stands for ________.
   d) UML is used to ________.
   e) The building blocks of UML are ________, ________ and ________.
   f) Give the class rotation in UML.
   g) One of the advantages of inheritance is _______.
   h) Give two symbols used in use case rotation in UML
   i) Package is used to ____________.
   j) Generalization and inheritance have the same meaning in object oriented programming paradigm.

PART-A

Q.2 Explain the following concepts in object oriented programming using suitable examples:
   a) Class
   b) Object
   c) Encapsulation
   d) Polymorphism

Q.3 a) “Rumbaugh’s methodology is the closest to approach to system analysis and design.” Justify the statement using suitable examples.
    b) Explain all the four parts of Booch’s object system design method.

Q.4 Explain the following rotation in UML:
   a) Package    b) Activity    c) Initial and final state    d) Association

PART-B

Q.5 a) Explain how the sequence diagrams in UML model, shows the flow of logic within a system in a visual manner.
    b) What is an abstract class? Explain the purpose of using an abstract class with the help of suitable examples.

Q.6 a) Explain the access specification method in object oriented design with the help of example.
    b) Explain how the concepts of sequence diagram and communication diagram represent

Q.7 Explain the purpose of the following with suitable examples:
   a) Package.
   b) Static model.
   c) Aggregation.
   d) Extensibility.
Q.1 Multiple choice questions:

a) Which of these services is not platform as a service?
   i) Force.com
   ii) Microsoft Azure
   iii) Amazon EC2
   iv) Joyent

b) What feature does not belong to a private cloud?
   i) Self-service portal.
   ii) Dial-home support.
   iii) Rapid elasticity.
   iv) None of the above.

c) Which of the following companies offer a cloud computing video game service?
   i) Ubisoft.
   ii) Blizzard
   iii) Online.
   iv) Cloud computing.

d) What is the term for restricting users so that they can access the features they are assigned?
   i) Authorization
   ii) Authentication
   iii) Administration
   iv) All of the above

e) Which of the following is not an advantage of cloud?
   i) No worries about running out of storage
   ii) Easier to maintain a cloud network.
   iii) Immediate access to computing resources.
   iv) Paying only for what you use.

   State whether TRUE or FALSE:
   f) A cloud environment can be accessed from anywhere in the world as long as the user has access to the internet.

   Fill in the blanks:
   g) ________ describes a distribution model in which applications are hosted by a service provider and made available to user.

   h) Onion encryption layers are _______, ________, ________, and ________.
   i) Two examples of public cloud are ________ and ________.
   j) Pods are managed by _____________.

2×10

PART-A

Q.2 a) Give a brief about the relation between cloud and SOA? How the principle of SOA are implemented in cloud computing? 8
   b) What is delivery of service? Explain its process in brief. 6
   c) Classify he different types of clouds. Give an example of public cloud. 6

Q.3 a) What are the fundamental components introduced in the cloud reference model? 9
   b) What is VIM? How is it related to cloud infrastructure management? 6
   c) Explain any four desired features of a cloud. 5

Q.4 Explain the following in relation to IaaS, PaaS and SaaS:
Q.5  
a) What is the current state of data security in cloud?  
b) What are the various key mechanisms to protect data in cloud?  
c) How are various service models ensure security at their home?  

Q.6  
Write short notes on:  
a) Features of cloud platforms.  
b) Distributed programming paradigms.  
c) Programming on Microsoft Azure.  
d) Programming support of Google App engine.  

Q.7  
Explain the following in relation to communicate with clouds:  
a) Instant messaging client.  
b) Micro blogs.  
c) Instant messaging interoperability.
End Semester Examination, May 2019  
B.Sc. (IT) – Second Semester  
BUSINESS ENVIRONMENT (7.106)

Time: 3 hrs.  
Max Marks: 50  
No. of pages: 1

Note: Attempt FIVE questions in all; Q.1 is compulsory. Attempt any TWO questions from PART-A. and any TWO questions from PART-B. Marks are indicated against each question.

Q.1 Answer in brief:  
a) Role of a manager in an organization.  
b) Components of legal environment.  
c) Types of economic system.  
d) Corporate social responsibilities.  
e) Govt. agencies responsible to develop small scale business.  

PART-A

Q.2 “It is said that a certain problems, which prevail in our society, can be solved through business.” Justify he statement as to what role business plays in society.  

Q.3 What do you mean by “Environmental Analysis”? Explain the characteristics, objectives and significance.  

Q.4 How internal environment of a business is affected by organizational culture, structure and strategies? Explain your answer by taking an example.  

PART-B

Q.5 “An external environment is composed of all the outside factors or influences that impact the operation of business” What are the main factors of external environment? How does external environment affect an organization?  

Q.6 Highlight the role of world trade organization (WTO) as a bridge between governments of various countries and how it helps in smooth movement of goods and services across international boundaries.  

Q.7 Explain the importance of legal and political elements of a business in context of an Indian business system.