



## DEPARTMENT OF PHYSICS

*"T3, Examination, May 2018"*

**Semester:** IV

**Subject:** Digital Electronics

**Branch:** Physics

**Course Type:** Core

**Time:** 3 Hours

**Max.Marks:** 80

**Date of Exam:** 23/05/2018

**Subject Code:** PHH 216-T

**Session:** Evening (II)

**Course Nature:** Hard

**Program:** B.Sc

**Signature:** HOD/Associate HOD

---

Note: All questions are compulsory from part A ( $2 \times 10 = 20$  marks). Attempt any two questions from Part B and two questions from Part C.

### Part A

#### Q.1 Compulsory question: ( $10 \times 2 = 20$ )

- A binary ripple counter is required to count up to  $(16383)_{10}$ . How many flipflops are required? If the clock frequency is 10.5 MHz. What is the frequency at the output of MSB?
- A 4-bit modulo – 16 ripple counter uses JK flipflop. If the propagation delay of each flipflop is 50 nanosecond, determine the maximum clock frequency that can be used.
- Write four differences between serial and parallel transfer?
- What are the differences between synchronous and asynchronous counters?
- What are counters? Write any three important applications of a counter.
- Differentiate between combinational and sequential circuits.
- Add +5 and -2 using 1's complement addition.
- What are half subtractors? Write logic diagram for a half subtractor.
- What are parallel adders?
- Define RS flipflop with diagram.

#### Part B (Attempt any two questions) ( $15 \times 2 = 30$ )

**Q.2** Explain positive edge triggered clocked JK flip flop with truth table and logic circuit diagram. What is race around condition in JK flip flop? Explain how it occurs? Suggest a method to overcome the race around difficulty.

**Q.3** What are adders? Explain half adder and full adder with truth table and logic diagram. What two types of input does a clocked flip flop have? Explain. What is meant by edge and level triggering? Define setup time and hold time for a clocked flip flop.

**Q.4** What is full subtractor? Explain it with truth table and circuit diagram.

**Part C (Attempt any two questions) (15×2 = 30)**

**Q.5** What are various categories of semiconductor memories? Explain their comparison based upon speed (access time), power requirements, cost per unit, noise immunity and packing density.

**Q.6** What are shift registers? Write their classifications and explain them with diagram.

**Q.7** What is microprocessor and its role in microcomputer? Explain flowchart of microprocessor and block diagram of a microcomputer. Explain five characteristics of 8085 microprocessor and its applications.