



**MANAV RACHNA UNIVERSITY
DEPARTMENT OF CHEMISTRY**

"T3, MAY 2017-18."

Semester: IV
Subject: Polymer Chemistry
Branch: BSC. H Chemistry
Course Type: Domain Core
Time: 3 Hours
Max. Marks: 80

Date of Exam: 23/05/2018
Subject Code: CHH 219-T
Session: 1:00 to 4:00 PM
Course Nature: Hard
Program: B.Sc
Signature: HOD/Associate HOD:

Note: All questions are compulsory from Part A (2X10=20 Marks). Attempt any two questions from part B (15 Marks each). Attempt any two questions from part C (15 Marks each).

PART-A

Q.1

- Define the term Glass transition temperature and Degree of Polymerisation.
- List the Factors affecting the T_g of the polymers.
- What is meant by Polydispersity index.
- Give two significances of Molecular Weight Distribution.
- Name the monomers of Nylon 6 and Nylon-66.
- Polystyrene has PDI 6 and Number Average Molecular Weight 2,00,000. What is its Weight Average Molecular Weight?
- What are the various criteria on which polymer solubility depends
- What is the reason for higher flexibility of Polyurethanes as compared to Polyamides?
- What is meant by diffusion and permeability?
- Polymers can't be 100% crystalline. Why? (2X10=20)

Part B

Q.2 (a) What is meant by Osmometry? Discuss how number average molecular can be determined with the help of this technique. (5)

(b) Derive Flory Huggin equation for Polydisperse system using entropy of mixing. (10)

Q3. Write short note on following:

- End Group Analysis
- Viscometry Technique
- Light Scattering Technique (5x3=15)

Q. 4 (a) What is meant by lower and upper critical solution temperature? Explain with the help of diagram. (3)

(b) Explain the relation between structure of polymer and its (i) Chemical reactivity (ii) Mechanical Properties like Impact Strength, Tensile Strength and Elasticity. (5)

(c) A polydisperse sample of polystyrene is prepared by mixing three *monodisperse* samples in the following proportions: (i) 2 g - 20,000 mol. wt.; 3g - 20,000 mol. wt.; 2g - 40,000 mol. wt. Using this information, calculate the number-average molecular weight, weight-average molecular weight, and PDI of the mixture. (7)

Part C

Q.5 (a) Write a note on Conducting Polymers. (5)

(b) What is meant by HDPE & LDPE? How are they prepared? Differentiate the two based on their properties and applications.

(10)

Q.6 Explain the preparation, properties and applications of following polymers:

(i) Silicon Polymers

(ii) Polycarbonates

(iii) Polyurethanes

(5 X3=15)

Q7. Differentiate the following pair of polymers (i) Silicon Polymers

(i) Styrene acrylonitrile copolymer and Acrylonitrile butadiene styrene rubber

(ii) Rigid and Plasticized PVC

(iii) Bakelite and Novalac

(5 X3=15)