NAVRACHANA UNIVERSITY
a UGC recognized University

School: School of Science
Program: B. Sc. (Elective Course)
Year: 3rd **Semester:** 5th
Examination: End Semester Examination
Examination year: December - 2022

Course Code: SE218 **Course Name:** Introduction to Polymer Science and Engineering
Date: 07/12/2022 **Total Marks:** 40
Time: 14:30 to 16:30 pm **Total Pages:** 2

Instructions:

→ *Write each answer on a new page.*
→ *Use of a calculator is not required.*
→ ** COs=Course Outcome mapping. # BTL=Bloom's Taxonomy Level mapping*

Q. No.	Details	Marks	COs*	BTL#

Q.1	Q. Match the following (write complete options in answer sheet)
	
	 Sr. No.
		Column A **Column B**
		 1 Number average a) Solution viscosity
		 2 Weight average b) End group analysis
		 3 Average molecular weight c) Poly dispersity index
		 4 Fractional method d) Extraction
		 5 Relative method e) Gel Permeation chromatography
		     f) Distillation
		     g) Light scattering
		     h) Ultracentrifugation
			5	CO1	BT1, BT2, BT3

Q.2	Fill in the blanks (Write complete statements in answer book) 1. The term n in polymerization refers to .... 2. The Zeigler Natta catalyst is ...... 3. Two different methods used to determine viscosity is .... and ...., respectively. 4. Primary recycling of plastics is also known as .... 5. If a constant load is applied and later when the stress is released, the deformation is reversible in nature. This type of deformation is known as .... 6. Full form of HDPE is	7	CO1, CO2, CO3, CO4	BT1, BT2, BT3

	7. Refractive index is ...... related to number average molecular weight.			

Q.3	Answer the following
	
	   a) Discuss composites, its properties and various terms associated to composites.
	
	   b) Define thermoplastic and thermosetting polymers with examples.
	
	   c) Discuss viscoelastic behaviour of Polymers.
	
	   d) State the differences between addition and condensation polymerization.
		8	CO1,
			CO2,
			CO3,
			CO4
				BT1,
				BT2,
				BT3

Q.5	Explain the following in detail (Any four)
	
	   (a) Discuss viscosity and various methods to determine with appropriate diagrams and formulas.
	
	   (b) Explain free radical and ionic polymerization in detail with an example.
	
	   (c) Discuss the theory of crystallization, glass transition temperature and melting behaviour of polymers in detail.
	
	   (d) Discuss plastic recycling and various methodology used in recycling.
	
	   (e) Calculate M_n, M_w and M_z for a polymer where N_1, N_2, M_1 and M_2 is 30, 100, 900 and 6000, respectively.
		20	CO1,
			CO3,
			CO4
				BT1,
				BT2,
				BT3

************End of Question Paper************