BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP/2025)

CLASS: BTECH **SEMESTER: IV**
BRANCH: CHEMICAL ENGINEERING **SESSION: SP/2025**

SUBJECT: CL229A MACROMOLECULAR SCIENCE

TIME: 02 Hours **FULL MARKS: 25**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**

			CO	BL
Q.1(a)	Classify polymers based on their Sources and Applications. Give one example of each of the classes.	[2]	1	1
Q.1(b)	If 100gm of a polymer of MW 1,00,000gm/mole is mixed with a 500gm polymer of the same kind having MW 10,00,000gm/mole, evaluate its average M_w. Write the significance of the Polydispersity Index.	[3]	2	4
Q.2(a)	How the thermal properties of polymers are dependent on their chemical structure? Explain with a suitable example.	[2]	1	2
Q.2(b)	Discuss the principle for the determination of viscosity average molecular weight.	[3]	1	2
Q.3(a)	What is average functionality? Deduce the average functionality for manufacturing of polyamide manufacturing using triamine and tetraacid monomers.	[2]	2	3
Q.3(b)	Construct the kinetic expressions for self-catalyzed condensation polymerization.	[3]	1	3
Q.4(a)	Write down the characteristic features of condensation polymerization.	[2]	1	1
Q.4(b)	A diacid and triol are used to manufacture polyester. What will be the extent of the reaction at its gelation point? Construct a plot degree of polymerization vs. extent of reaction for this reaction.	[3]	2	5
Q.5(a)	Deduce the rate of polymerization for addition polymerization process.	[2]	1	2
Q.5(b)	What are the criteria for Ideal Copolymerization, Alternating Copolymerization, and Azeotropic Copolymerization? Discuss.	[3]	1	1

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