

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III (NEW) EXAMINATION – SUMMER 2021****Subject Code:3133609****Date:16/09/2021****Subject Name:Chemistry & Technology of Polymers****Time:10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

	Marks
Q.1 (a) Explain the concepts: monomer functionality, average molecular weight, and molecular weight distribution.	03
(b) Explain chain termination step and give various ways by which it can occur.	04
(c) Give at least two industrial examples and write at least five salient features of the addition type polymers.	07
Q.2 (a) What is cryoscopy? How is it used in the determination of polymer molecular weight?	03
(b) Write the Mark-Houwink equation and explain all the terms in it.	04
(c) Derive the equations for 'number average and weight average molecular weight' of a polymer sample.	07
OR	
(c) Equal number of molecules with molecular weight = 10,000 and 100,000 are mixed. Calculate number average and weight average molecular weight. What will be the number average and weight average molecular weights, if equal masses of molecules with molecular weight = 10,000 and 100,000 are mixed?	07
Q.3 (a) Name the monomers used in the manufacture of Polyurethane, PVA, and LDPE.	03
(b) Explain with examples the terms coordinate bond, hydrogen bond and the covalent bond in a chemical compound? Which one of them is the mostly found in polymers?	04
(c) Compare and contrast bulk and solution techniques of polymerization.	07
OR	
Q.3 (a) Name the monomers used in the manufacture of Nylon, PVC, and HDPE.	03
(b) What is copolymerization? State two examples of industrial copolymers.	04
(c) Explain the term Critical Micelle Concentration (CMC) in emulsion technique and state advantages of the technique over other techniques of polymerization.	07
Q.4 (a) Explain the terms initiators and inhibitors in reference to polymer synthesis.	03
(b) Why a polymeric substance does not melt at a particular temperature?	04
(c) Explain in detail free radical polymerization.	07

OR

- Q.4** (a) What are crystallites and what is crystallinity? **03**
(b) What are different steps in the polymer dissolution process? **04**
(c) What is the primary requirement for a step growth polymerization reaction to occur? Explain how molecular weight builds up in a step growth polymerization reaction. **07**
- Q.5** (a) Name two processes for manufacturing ethylene and propylene on a large scale. **03**
(b) What is auto-acceleration? **04**
(c) Describe osmometric or ebulliometric experimental method of determination of molecular weight of a polymer sample. **07**
- OR**
- Q.5** (a) What are ADU and VDU in crude distillation process? **03**
(b) What is interfacial polymerization technique? How is it different from other techniques? **04**
(c) Describe ultracentrifugation or end group analysis experimental method of determination of molecular weight of a polymer sample. **07**
