Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III • EXAMINATION – WINTER • 2014

Subject Code: 2133602 Date: 18-12-2014

Subject Name: Polymer Chemistry

Time: 02.30 pm - 05.00 pm Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Explain in detail the Gel Permeation Chromatography(GPC) method for determining the molecular weight of polymer	**07**
	(b)	i) What are the different ways of expressing molecular weight of a polymer? Give the formulas for expressing them.	**04**
		ii) Write a short note on poly dispersity and molecular weight distribution in polymers.	**03**
Q.2	**(a)**	Explain solution polymerisation and bulk polymerisation with examples of polymers produced using these methods of polymerisation.	**07**
	(b)	Compare emulsion and suspension polymerisation.	**07**
		OR	
	(b)	Derive an expression for the rates of all the reactions involved in cationic polymerisation. Also derive expressions for degree of polymerisation in cationic polymerisation	**07**
Q.3	**(a)**	Explain LCST and UCST with proper phase diagrams.	**07**
	(b)	i) Why should distillation of crude oil done in two stages.	**02**
		ii) Draw a neat flowchart of distillation of crude oil. Explain in detail the fraction of crude oil that is used as starting material for polymer and rubber industry	**05**
		OR	
Q.3	**(a)**	i) Define glass transition temperature.	**01**
		ii) What is the difference between melting point and glass transition temperature?	**03**
		iii) Write a note on glass transition temperature and factors affecting it.	**03**
	(b)	What are the different components present in crude oil? Explain in detail	**07**
Q.4	**(a)**	i) For a compound to undergo polymerisation reaction it must be bi functional or at least have a double bond. Justify this statement.	**04**
		ii) What are the end uses of polymers? Explain.	**03**
	(b)	How are the following synthesized: i) Phenol ii) Terephthalic acid iii) Melamine.	**07**
		OR	
Q.4	**(a)**	a) Define the following: i) Monomer ii) Polymer iii) Repeating unit iv) Degree of polymerisation v) Isotactic polymer vi) homo polymer vii) copolymer.	**07**
	(b)	How are the following synthesized? i) Caprolactum ii) Vinyl Chloride iii) Methacrylate	**07**
Q.5	**(a)**	Write a note on characteristics on copolymerization.	**07**

	(b)	Write in detail the reactions involved in anionic polymerization and determine the rate of propagation and degree of polymerisation for the same	**07**

OR

Q.5	**(a)**	Write in detail the reactions involved in free radical polymerization and determine the rate of propagation and degree of polymerisation for the same.	**07**
	(b)	Describe in detail the characteristics of addition and condensation polymerization.	**07**

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