Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V(New) • EXAMINATION – WINTER 2016

Subject Code:2152306 **Date:22/11/2016**

Subject Name:Chemistry of Plastic Materials

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.**

			MARKS
Q.1		**Short Questions**	**14**
	1	Give one example of alternating and block copolymers with structure.	
	2	What is difference between Buna-N and Buna-S rubber?	
	3	What are cross-linked Polymers? Give two examples of it.	
	4	Define Homopolymer and co-polymer.	
	5	Give the classification of Polymer on the basis of Polymerization process.	
	6	The Mn of Polypropylene is 106gm/mol. Find the DP_n.	
	7	On the basis of forces between their molecules in a Polymer to which class does Nylon-66 belong? (a) thermoset (b) rubber (c) adhesives (d) fibers	
	8	List the generalized steps for polymerization.	
	9	Why should one always use purest monomer in free radical polymerization reaction?	
	10	Polymers formed by addition polymerization are less crystalline than polymers formed by condensation polymerization. Why?	
	11	Which of the following monomer is used in the production of Decron is a (a) Dimethyl Terephthalate (b) Glycesol (c) Bisphenol –A (d) Phosgen	
	12	Living anionic polymerization is used to produce (a) Homo Polymer (b) Block Copolymer (c) Thermosets (d) None of these	
	13	The size of polymer molecules is decided by number of repeat unit present in it which is denoted by (a) M_w (b) M_n (c) D_p (d) D_c	
	14	Define : Monomer	
Q.2	**(a)**	Define : Thermoplastic ,Thermoset and Polymer	**03**
	(b)	Explain about addition polymerization with example.	**04**
	(c)	Give classification of Polymer in detail with example.	**07**
		OR	
	(c)	Discuss Carothers' Equation in detail.	**07**
Q.3	**(a)**	Write chemistry of formation of Melamine Formaldehyde (MF)	**03**
	(b)	Explain the manufacturing process of MF with flow diagram.	**04**
	(c)	Explain the mechanism of Anionic addition	**07**

polymerization in detail.

OR

Q.3	**(a)**	Give chemical structure of the following polymer: (1) PP (2) PVC (3) PET	**03**
	(b)	Explain in brief about Tapping (Extraction) of Latex.	**04**
	(c)	Explain various types of bonding exist in polymers with example.	**07**
Q.4	**(a)**	Calculate the number average degree of polymerisation of an equimolecular mixture of hexamethylenediamine and adipic acid for the extents of reaction 0.5 and 0.8.	**03**
	(b)	In the polymerisation of ω-hydroxy caproic acid, $HO(CH_2)_5COOH$, a 2% impurity present. Calculate the degree of polymerisation of polymer formed.	**04**
	(c)	Derive the following equation for free radical polymerization $R_p = K_p (Kd^{1/2}/Kt^{1/2})\{(f [I]^{1/2}) [M]\}$	**07**

OR

Q.4	**(a)**	What is natural rubber? Give the structure of polyisoprene.	**03**
	(b)	What is compounding. Explain vulcanization of rubber in detail.	**04**
	(c)	Write structure, properties, and application of chlorinated rubber.	**07**
Q.5	**(a)**	Derive the equation between number average degree of polymerisation (P) and Kinetic chain length (γ).	**03**
	(b)	Short note on: Tacticity of Polypropylene.	**04**
	(c)	Differentiate: Crystalline Polymer and Amorphous Polymer.	**07**

OR

Q.5	**(a)**	Short note on: Natural Polymer Starch and Lignin.	**03**
	(b)	Give chemical structure of PTFE. Discuss the properties of PTFE.	**04**
	(c)	Discuss chemistry, properties and application of HDPE.	**07**

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