Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:2143602 **Date:22/11/2016**

Subject Name:Rubber Chemistry & Natural Polymers

Time:02:30 PM to 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.**

			MARKS
Q.1		**Short Questions**	**14**
	1	What is Natural Rubber?	
	2	Draw structure of Butyl Rubber.	
	3	Monomer of Epoxy Resin?	
	4	Best use of NBR?	
	5	What is Phenol formaldehyde resin?	
	6	What is the value of Tg for NR?	
	7	Give two examples of synthetic polymers?	
	8	Give example of Fillers.	
	9	What is the function of antiozonants?	
	10	What is Functionality?	
	11	Give example of accelerators for curing.	
	12	Why vulcanization is Done?	
	13	Draw structure of SBR?	
	14	Give function of Plasticizer?	
Q.2	**(a)**	Write chemical structures of following: NBR, SBR, CR.	**03**
	(b)	Explain drawbacks of NR and development of synthetic rubbers.	**04**
	(c)	Elaborate the process of vulcanization.	**07**
		OR	
	(c)	How is polyester resin different from alkyd resins? Explain with chemical reaction.	**07**
Q.3	**(a)**	Write down the Classification of Natural Polymers.	**03**
	(b)	What is polyester-amide? How ester-amide ratios effect the properties of PEA?	**04**
	(c)	Give examples of natural polyester and natural polyamide. Explain with chemical reaction	**07**
		OR	
Q.3	**(a)**	How natural rubber is obtained, write its detailed process of preservation and coagulation.	**03**
	(b)	Write down various techniques of polymerization.	**04**
	(c)	Give examples of diene in EPDM rubber? Explain its properties and major applications.	**07**
Q.4	**(a)**	Explain mastication, compounding and curing.	**03**
	(b)	Why modification is important for natural polymers and rubbers? Explain with example	**04**
	(c)	How E and S-SBR are different. Write their manufacture process in detail.	**07**
		OR	

Q.4	**(a)**	Which polymer is widely used for bio-medical applications? Explain its synthesis.	**03**
	(b)	What is Neoprene? Write a note on manufacturing of Neoprene including synthesis of its monomer.	**04**
	(c)	Suggest a oil resistant rubber, its preparation and reactions involved.	**07**
Q.5	**(a)**	Explain synthesis of Saturated and unsaturated Polyester.	**03**
	(b)	Suggest a Rubber for the making of linning of Tank used for hexane. State its manufacturing process and other applications also.	**04**
	(c)	Write about the raw materials and chemical reactions for epoxy and amino resin.	**07**

OR

Q.5	**(a)**	Write in detail preparation and uses of Poly urethane.	**03**
	(b)	Write short notes on following: lignin & cellulose.	**04**
	(c)	Write notes on any two: Hypalon, NR, limited olefinic functionality	**07**

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