Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2162602 **Date: 01/05/2017**

Subject Name: Synthetic Rubbers

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.**

Q.1		Answer the following.	(14)
	1	Mention any two objectives behind the development of Synthetic rubbers.	
	2	Give basic reaction mechanism for Polysulfide rubber synthesis.	
	3	Write the name of monomers in Copolymer grade of Fluorocarbon Elastomer.	
	4	List any two important properties of Viton.	
	5	How Polypentenamer is obtained?	
	6	Name the basic monomers present in Acrylic rubbers.	
	7	List any one type of Thiokol rubber with its sulfur content.	
	8	Write the chemical name of the Hypalon Rubber.	
	9	Which Coagent is used in the curing of Ethylene Vinyl Acetate rubber (EVA)?	
	10	List out the monomers used in Hydrogel rubber.	
	11	Give any two important application of Ethylene Vinyl Acetate (EVA).	
	12	Write any one limitation of the Epichlorohydrin Rubber.	
	13	Give the chemical name of the GPO Rubber.	
	14	Write the important feature of carboxylated modified rubbers.	
Q.2	(a)	Why the presence of Metal Oxide is essential in Fluorocarbon compounds?	(03)
	(b)	Draw the basic structure of Isoprene Rubber (IR) and also draw their other possible microstructures and label it.	(04)
	(c)	Discuss about chemistry of vulcanization of Chloroprene Rubber with necessary reaction steps.	(07)
		OR	
	(c)	Give a detailed process description for production of Polychloroprene with flow diagram.	(07)
Q.3	(a)	Why Butyl rubber is having excellent Air impermeability property? Give reason.	(03)
	(b)	Mention the advantages of Halogenated Butyl rubber over conventional grades of Butyl rubber.	(04)
	(c)	Discuss about the importance of third monomer in Ethylene-Propylene Diene Methylene (EPDM) Rubber and also write about the technical requirements to be fulfilled by this third monomer.	(07)
		OR	
Q.3	(a)	Why the blends of Butyl rubber with other Diene rubbers are not possible? Give reason.	(03)
	(b)	How Bromobutyl rubber is produced? Explain with reaction mechanism.	(04)
	(c)	Describe the effect of E/P ratio on various properties of Ethylene-Propylene Diene Methylene (EPDM) Rubber.	(07)
Q.4	(a)	Draw the Flow Diagram for the manufacturing of Styrene Butadiene Rubber by Batch Process.	(03)
	(b)	Write a brief note on Oil Extended Styrene Butadiene Rubber (OESBR).	(04)
	(c)	Name the Polymerization method used for production of Polybutadiene Rubber and explain with flow diagram.	(07)

OR

Q.4	(a)	Mention the principal differences between Styrene Butadiene Rubber and Natural Rubber.	(03)
	(b)	Give the advantages and disadvantages of the carbon black master batch of SBR.	(04)
	(c)	Discuss the characteristic properties of Polybutadiene Rubber in detail.	(07)
Q.5	(a)	How molecular weight can influence the properties of Nitrile rubber?	(03)
	(b)	Short Note on: Carboxylated Nitrile rubber (XNBR)	(04)
	(c)	"Silicon rubber is the versatile Rubber." Justify the statement.	(07)

OR

Q.5	(a)	List out the general vulcanizate properties of Acrylonitrile Butadiene Rubber (NBR).	(03)
	(b)	Short Note on: Hydrogenated Nitrile rubber (HNBR).	(04)
	(c)	Discuss about the Mixing operation, Processing Problem and their remedies for Silicone rubber.	(07)

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