

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)
