

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE - SEMESTER-VI • EXAMINATION – SUMMER 2013**

**Subject Code: 162602**

**Date: 27-05-2013**

**Subject Name: Synthetic Rubbers**

**Time: 10.30 am - 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)**

- (i) Give the two important methods for production of carboxylated Rubber.
- (ii) How sulphur rank is important for the properties of Thiokol?
- (iii) Write the two important types of fluoro carbon elastomers.
- (iv) Discuss the relationship between the glass transition temperature and vinyl acetate content of EVA Rubber and show it by graph.
- (v) Give the reaction mechanism for synthesis of polynorbornene Rubber.
- (vi) List the types of Epichlorohydrin Rubber and give comparisons between them.
- (vii) How rubberiness has been introduced in chloro sulphonated polyethylene (CSM)?

**Q. 2** (a) List the initiator system used for Isoprene Rubber (IR). Explain the production of IR by any one initiator system. **(07)**

(b) Answer the following.

- (i) Draw the flow sheet for the manufacturing process of Styrene Butadiene Rubber (SBR) by continuous process. **(04)**
- (ii) Give comparison between Hot SBR & Cold SBR. **(03)**

**OR**

- (b) Explain the manufacturing process of Carbon black master batch Styrene Butadiene Rubber (CBMBSBR) with flow chart and write its advantages & disadvantages. **(07)**

**Q. 3** (a) List the grades of Neoprene Rubber and discuss all in detail. **(07)**

- (b) Discuss the following for Ethylene Propylene Diene Methylene Rubber (EPDM). (i) Effect of E/P ratio on tensile strength, (ii) Effect of E/P ratio on Rebound Resilience, (iii) Effect of E/P ratio on Glass transition temperature. **(07)**

**OR**

**Q. 3** (a) "Polymerization Temperature is an important variable during manufacturing of Chloroprene Rubber by Emulsion polymerization." Justify the statement. **(07)**

- (b) Write a detailed note on vulcanization of EPDM. **(07)**

**-----P.T.O.-----**

**Q. 4** (a) Describe all the methods for vulcanization of Isobutene Isoprene Rubber (IIR). **(07)**

- (b) Explain the manufacturing process of Nitrile Butadiene Rubber (NBR) with flow sheet. **(07)**

**OR**

- Q. 4** (a) Answer the following.
- (i) Write about the processing problems occurred in IIR during compounding and processing. **(05)**
- (ii) “Butyl Rubber has excellent impermeability property” Justify the statement. **(02)**
- (b) Discuss in detail about the plasticization, processing and blending of NBR. **(07)**
- Q. 5** (a) List the possible microstructure in Butadiene Rubber (PBR). Explain their effects on properties of PBR. **(07)**
- (b) Write a detailed note on vulcanization of Silicone Rubber. **(07)**
- OR**
- (a) Draw the flow diagram for cis-1,4 polybutadiene by solution polymerization method and explain the process in detail. **(07)**
- (b) Discuss the production of Silicone Rubber by giving reaction mechanisms and process flowsheet. **(07)**

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