

GUJARAT TECHNOLOGICAL UNIVERSITY
BE- SEMESTER-VII (NEW) EXAMINATION – WINTER 2024

Subject Code:3172616

Date:19-11-2024

Subject Name: Silicone Rubber Technology

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.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) Give the Nomenclature of Organo silicone Compounds. **03**
(b) Write the definition of silicones according to their general structural principles. **04**
(c) Discuss in detail about the Direct synthesis process. **07**

- Q.2** (a) Give the general properties of silicone rubber. **03**
(b) Write the Syntheses by the Reaction of Hydrocarbons with Silanes. **04**
(c) Discuss in detail about Grignard Syntheses. **07**

OR

- (c) Explain the syntheses with organic compounds of the alkali metals. **07**

- Q.3** (a) Draw chemical structures of the following: (i) Ashby catalyst, (ii) Dimethyl fumarate **03**
(b) List out chemical names of 5 peroxides that can be used to cure silicones for a molding process and explain any one in detail. **04**
(c) Formulate a 30kg compound to manufacture silicone hot water bags and justify the reasons for including every ingredient you choose. Explain the mixing process – machinery, sequence and process. **07**

OR

- Q.3** (a) Draw chemical structures of the following: (i) Karstedt catalyst, (ii) Dimethyl maleate **03**
(b) Write the hydrolysis process of dimethyl dichlorosilane. **04**
(c) Explain the mechanism of platinum curing using chemical equations and describe them in your own words. Also trace out the pros and cons of platinum curing over peroxide curing. **07**

- Q.4** (a) Describe the functions of these compounding ingredients in silicone: (i) BaZrO₃, (ii) TiO₂, (iii) PTFE **03**
(b) List out silicone products manufactured using blow molding and explain blow molding process in brief. **04**
(c) Explain the complete injection molding process of silicone rubber. **07**

OR

- Q.4** (a) Describe the functions of these compounding ingredients in silicone: (i) BaSO₄, (ii) ZnO, (iii) MDH **03**
(b) What is mold shrinkage? Explain mold shrinkage adjustment for silicone in case of compression molding assuming any suitable example. **04**
(c) Explain the manufacturing of a fabric wrapped silicone hose in detail. **07**

- Q.5 (a)** List out the applications of silicone rubber in textile and apparel industry. **03**
- (b)** Explain the types of silicone water-based elastomers based on curing mechanism. **04**
- (c)** Differentiate RTV-1 silicones & RTV-2 silicones. **07**
- OR**
- Q.5 (a)** Explain the function of silicone rubber used in paints and architectural coatings. **03**
- (b)** List out the process for preparing silicone water-based elastomers and explain in brief. **04**
- (c)** Differentiate addition curing RTV-2 silicones and condensation curing RTV-2 silicones. **07**
