

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-III (NEW) EXAMINATION – SUMMER 2024

Subject Code:3132604

Date:29-06-2024

Subject Name: Rubber Physics & its thermodynamics

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) Define the given terms: (i) Enthalpy (ii) Entropy (iii) Gibb's Free Energy 03
(b) What do you mean by 'heat of polymerization'? Also brief out the factors affecting it. 04
(c) Explain in detail about the relationship between molecular weight and thermodynamic properties. 07
- Q.2** (a) What do you mean by ceiling temperature? How is it determined? 03
(b) Distinguish the C_p and C_v . 04
(c) Explain the phase diagram of polymer-polymer system. 07
- OR**
- (c) Explain in detail about the thermodynamics of polymer dissolution. 07
- Q.3** (a) Define the given terms: (i) Reflection (ii) Refraction (iii) Rarefaction 03
(b) List out the four elastic constants associated with rubber. Outline any two. 04
(c) Explain in detail about electrical properties of rubber. 07
- OR**
- Q.3** (a) Define the given terms with respect to rubber: (i) Static Friction (ii) Sliding Friction (iii) Rolling Friction 03
(b) Construct the formula to calculate the shape factor for rectangular and cylindrical rubber article with suitable diagram. 04
(c) Classify different surface tension determination methods. Describe any one in. 07
- Q.4** (a) What do you mean by segmental motion? Brief it with suitable example. 03
(b) Identify an effect of presence of cross linking on solubility of rubber in particular solvent. 04
(c) Explain conditions necessary for rubber like elasticity in polymers. 07
- OR**
- Q.4** (a) What do you mean by translational motion? Brief it with suitable example. 03
(b) List out the general rule of polymer solubility with its practical significance. 04
(c) Explain in detail about characteristic properties of rubber. 07
- Q.5** (a) What do you mean by initiator? Also give its examples. 03
(b) Differentiate the low molecular weight compound and polymer. 04
(c) Explain in detail about emulsion polymerization technique. 07
- OR**
- Q.5** (a) What do you mean by inhibitor? Also give its examples. 03
(b) Differentiate the chain growth polymerization technique and step-growth polymerization technique. 04
(c) Explain in detail about suspension polymerization technique. 07