GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER– III(NEW) EXAMINATION – WINTER 2022

Subject Code:3132604   **Date:24-02-2023**
Subject Name:Rubber Physics & its thermodynamics
Time:02:30 PM TO 05:00 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)**	Brief out the given terms: - (1) Energy (2) Enthalpy (3) Entropy.	**03**
	(b)	Outline First and Second law of Thermodynamics with suitable example.	**04**
	(c)	Derive the formula for entropy change of an ideal gas.	**07**
Q.2	**(a)**	Write down any three limitations of first law of thermodynamics.	**03**
	(b)	What are the factors responsible for spontaneity of a reaction? Explain it.	**04**
	(c)	Write a note on Ceiling temperature.	**07**

OR

	(c)	Explain in detail about factors affecting Heat of Polymerisation.	**07**
Q.3	**(a)**	Explain the effect of cross linking on solubility.	**03**
	(b)	Derive the Scott's Equation with respect to Three component systems.	**04**
	(c)	Discuss in detail about the characteristic properties of rubber.	**07**

OR

Q.3	**(a)**	Explain the configuration of molecules with respect to polymer chain flexibility.	**03**
	(b)	Derive the Flory–Huggins Equation with respect to Entropy of mixing.	**04**
	(c)	Discuss in detail about the conditions necessary for rubber like elasticity in polymers.	**07**
Q.4	**(a)**	Give classification of polymer based on its origin with suitable examples.	**03**
	(b)	Brief out N-Class rubber and Q-class rubber respectively with their structure.	**04**
	(c)	Describe the salient features of Emulsion Polymerization technique.	**07**

OR

Q.4	**(a)**	Give classification of polymer based on its application with suitable examples.	**03**
	(b)	Define the term 'shape factor'. Also give it's practical significance. Give formula to calculate the shape factor for rectangular and cylindrical rubber test specimen.	**04**
	(c)	Describe the salient features of Suspension Polymerization technique.	**07**
Q.5	**(a)**	With schematic diagram, state Archimedes principle of floatation for solid body (Rubber).	**03**
	(b)	How surface Tension determination is carried out by Lectone du Nouy tensiometer?	**04**
	(c)	Give the name of method used to determine the viscosity of polymer solution and discuss it in detail.	**07**

OR

Q.5	**(a)**	With schematic diagram, state laws of regular reflection.	**03**
	(b)	Brief out the given terms:(1) Number Average Molecular Weight(2) Weight Average Molecular Weight	**04**
	(c)	Discuss in detail about different types of friction observed in rubber.	**07**

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