Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (NEW) EXAMINATION – WINTER 2023

Subject Code:3130506 Date:16-01-2024

Subject Name:Applied Chemistry

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.**

			Marks
Q.1	**(a)**	Show the measurement of Boiling point Elevation.	**03**
	(b)	Define: Reaction rate, Molecularity of a reaction, Enantiomers & Specific rotation.	**04**
	(c)	Explain with principle, instrumentation of mass spectroscopy.	**07**
Q.2	**(a)**	Explain the E and Z designation of Geometrical isomers.	**03**
	(b)	Define Term: Molality, Dipole Moment, Carbenes, Heterolytic fission.	**04**
	(c)	Give the types of Organic reaction and discuss Electrophilic Substitution reaction.	**07**
		OR	
	(c)	Describe the optical activity of Lactic acid and Tartaric acid.	**07**
Q.3	**(a)**	Derive Schrodinger Wave Equation.	**03**
	(b)	Discuss SP^2 Hybridization with suitable example.	**04**
	(c)	Explain the Molecular Orbital Theory.	**07**
		OR	
Q.3	**(a)**	Give the application of XRD.	**03**
	(b)	Determine ΔH of the reaction: $C(s) + 2H_2(g) \rightarrow CH_4(g)$ from the following data: (i) $C(s) + O_2(g) \rightarrow CO_2(g)$ $\Delta H = -393.7$ kJ (ii) $H_2(g) + ½\ O_2(g) \rightarrow H_2O(l)$ $\Delta H = -285.7$ kJ (iii) $CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(l)$ $\Delta H = -890.3$ kJ	**04**
	(c)	Draw the phase diagram of Ferric chloride-Water system. Describe its importance.	**07**
Q.4	**(a)**	Elaborate zero order reaction with suitable example.	**03**
	(b)	Define: Phase, Eutectic point, heat of neutralization, Exothermic reaction.	**04**
	(c)	Draw the phase diagram of one component system and discuss its salient features.	**07**
		OR	
Q.4	**(a)**	Discuss Pseudo order reaction.	**03**
	(b)	A solution of H_2O_2 when titrated against $KMnO_4$ solution at different time intervals gave the following results:	**04**

T(minutes)	**0**	**10**	**20**
Vol. of $KMnO_4$ used for 10 ml H_2O_2	23.8 ml	14.7 ml	9.1 ml

Selecting the above data, show that the decomposition of H_2O_2 is a first order reaction.

(c) Explain mathematical expression for the rate constant of the second order reaction. **07**

Q.5 **(a)** Write a note on zeolite. **03**

(b) Discuss the classification of ceramics with their general properties. **04**

(c) Describe each section of Transmission Electron Microscope. **07**

OR

Q.5 **(a)** What are liquid crystals and types? Give its uses. **03**

(b) Write a note on Insulators with their uses. **04**

(c) Explain the principle, instrumentation of Nuclear magnetic resonance spectroscopy. **07**

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