Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3130506 Date:26-07-2023

Subject Name:Applied Chemistry

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.**

			Marks
Q.1	**(a)**	Define: Dipole moment, Molality, Osmotic pressure.	**03**
	(b)	Define: Optical activity, Specific rotation, Reaction rate, zero order reaction.	**04**
	(c)	Explain the components of scanning electron microscope.	**07**
Q.2	**(a)**	Explain optical Isomerism of Tartaric acid.	**03**
	(b)	Define Term: Parachor, Viscosity, Carbenes, Carbocations.	**04**
	(c)	Give the types of Organic reaction and discuss Electrophilic Addition reaction.	**07**
		OR	
	(c)	Explain the R, S System for Asymmetric Molecules and E, Z System for Geometrical Isomers.	**07**
Q.3	**(a)**	Discuss SP^2 Hybridization with example.	**03**
	(b)	Derive Heisenberg Uncertainty Principle.	**04**
	(c)	Explain the Molecular Orbital Theory.	**07**
		OR	
Q.3	**(a)**	Define x-ray diffraction. Give the application of XRD.	**03**
	(b)	The heat of combustion of ethylene at 17° C and at constant volume is -332.19 kcal. Calculate the heat of combustion at constant pressure considering water to be in liquid state. ($R = 2$ cal $degree^{-1}$ mol^{-1}).	**04**
	(c)	Draw the phase diagram of ferric chloride – water system with its salient features.	**07**
Q.4	**(a)**	Elaborate Pseudo-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)**	Derive the rate equation for the first order reaction.	**03**
	(b)	Hydrolysis of ethyl acetate by NaOH using equal concentration of the reactants, was studied by titrating 25 ml of the reaction mixture at different time intervals against standard acid. From the data given below, establish that this is a second order reaction.	**04**

Time (minutes)	**0**	**5**	**15**	**25**
ml of acid used	16.0	10.2	6.1	4.3

	(c)	Explain mathematical expression for the rate constant of the second order reaction.	**07**
Q.5	**(a)**	Define: Glass Transition Temperature and Liquid Crystal. What are zeolites?	**03**
	(b)	Discuss the classification of ceramics with their general properties.	**04**
	(c)	Explain the instrumentation of mass spectroscopy.	**07**

OR

Q.5	**(a)**	What are copolymers? Give its uses.	**03**
	(b)	Write a note on refractories with their uses.	**04**
	(c)	Explain the components of Transmission electron microscope.	**07**

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