Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3130506 Date:19-07-2024

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)**	Define the followings: Mole Fraction, Normality and Molarity	**03**
	(b)	What is Osmotic pressure? Write the applications of osmotic pressure?	**04**
	(c)	Show that Elevation of Boiling point is colligative properties. How to molecular mass of a substance is calculated using Elevation of Boiling point? Write importance of the Elevation of Boiling point	**07**
Q.2	**(a)**	Summarize the importance of Electron displacement effect.	**03**
	(b)	Define: Specific rotation, Optical activity, Diasteromer and Enantiomer.	**04**
	(c)	Explain the R, S System for Asymmetric Molecules and E, Z System for Geometrical Isomers.	**07**
		OR	
	(c)	Give the type of organic reactions and discuss Nucleophilic aromatic substitution reaction (SN^1).	**07**
Q.3	**(a)**	Define degree of freedom, component and phase	**03**
	(b)	Derive Gibbs phase rule thermodynamically	**04**
	(c)	Explain the Molecular Orbital Theory and discuss it salient features with suitable examples.	**07**
		OR	
Q.3	**(a)**	Describe Heisenberg Uncertainty Principle	**03**
	(b)	Discuss the SP^3 hybridization with suitable examples.	**04**
	(c)	Outline the phase diagram of the one component system and explain its salient features.	**07**
Q.4	**(a)**	Distinguish the order of reaction and molecularity	**03**
	(b)	Enthalpy of combustion of carbon to carbon dioxide is –393.5 J/mol. Calculate the heat released upon formation of 22 g of CO_2 from carbon and oxygen gas.	**04**
	(c)	What is the half-life period of a reaction? Derive the equation for first order reaction.	**07**
		OR	
Q.4	**(a)**	Explain the followings by taking suitable examples. i) Internal Energy and ii) Endothermic reaction.	**03**
	(b)	A first order reaction is 10% completed in 20 minutes. How long will it take to be 70% complete?	**04**
	(c)	Explain mathematical expression for the rate constant of the second order reaction.	**07**
Q.5	**(a)**	Write a short note on the Nano Composites.	**03**
	(b)	Write down the properties and uses of ceramics.	**04**
	(c)	Explain the principle, instrumentation and applications of TEM.	**07**
		OR	
Q.5	**(a)**	Write down the properties and uses of Zeolites.	**03**
	(b)	Explain the principles of Florescence spectroscopy	**04**
	(c)	Explain the principle, instrumentation and applications of NMR.	**07**

****