Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III EXAMINATION – SUMMER 2025

Subject Code:3130506 Date:29-05-2025

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 Viscosity and Normality.	**03**
	(b)	Explain the importance of zeolites in catalysis.	**04**
	(c)	Differentiate between S_N and S_E reactions. Give one example of each.	**07**
Q.2	**(a)**	Explain resonance effect with example.	**03**
	(b)	Explain Beer-Lambert law.	**04**
	(c)	Draw the phase diagram of water and describe in detail.	**07**
		OR	
	(c)	Derive the expression for half-life period of the first order reactions.	**07**
Q.3	**(a)**	How the nematic phase differ from smectic phase.	**03**
	(b)	Suggest a method for resolution of racemic mixture of a base.	**04**
	(c)	What is chirality? Explain the optical isomerism in tartaric acid.	**07**
		OR	
Q.3	**(a)**	List the characteristics of refractories.	**03**
	(b)	Draw molecular orbital diagram of the N_2 molecule.	**04**
	(c)	Predict the shape of H_2O and XeF_4 with the help of VSEPR theory.	**07**
Q.4	**(a)**	State basic principle of Mass spectroscopy.	**03**
	(b)	Describe the Hess's Law of constant heat summation with example.	**04**
	(c)	Explain principle, working and applications of the TEM.	**07**
		OR	
Q.4	**(a)**	Calculate the mole fraction of ethylene glycol (MW=62), if its 3.1 g is dissolved in 18 g of water.	**03**
	(b)	Enthalpy of combustion of carbon to carbon dioxide is –393.5 J/mol. Calculate the heat released upon formation of 44 g of CO_2 from carbon and oxygen gas.	**04**
	(c)	Explain working principle of XRD. List its applications in the chemistry.	**07**
Q.5	**(a)**	Draw structure of R and S isomers of lactic acid.	**03**
	(b)	Explain the stability order of 1^o, 2^o and 3^o carbocation and carbanion species.	**04**
	(c)	Explain: (a) Molecularity of reaction. (b) Glass transition temperature	**07**
		OR	
Q.5	**(a)**	What is Nanocomposite materials?	**03**
	(b)	Explain specific rotation.	**04**
	(c)	Derive Schrödinger wave equation and explain the importance of ψ.	**07**

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