Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–I & II EXAMINATION – WINTER 2024

Subject Code:3110001 Date:04-01-2025

Subject Name: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 covalent bond with suitable examples	**03**
	(b)	Describe in detail scale and sludge formation.	**04**
	(c)	State the limesoda process for the removal of hardness of water	**07**
Q.2	**(a)**	Explain hybridization in methane	**03**
	(b)	Discuss the important physical properties of metals	**04**
	(c)	Explain electrochemical theory of corrosion.	**07**
		OR	
	(c)	Discuss any four methods of corrosion control.	**07**
Q.3	**(a)**	Explain term good Fuel	**03**
	(b)	Explain briefly factors influencing corrosion.	**04**
	(c)	What is the basic principle of Electronic spectroscopy? Give any four applications of spectroscopic technique.	**07**
		OR	
Q.3	**(a)**	Define Nanomaterials with two important properties.	**03**
	(b)	Discuss the applications of nanomaterials in catalysis	**04**
	(c)	Write a short note on ‘top down’ and ‘bottom-up approach’ to synthesize Nanomaterials.	**07**
Q.4	**(a)**	Define pH. Calculate pH of 0.01 N HNO_3	**03**
	(b)	What are the differences between gross and net calorific value of a fuel?	**04**
	(c)	Draw a well labeled diagram of fractional distillation of crude petroleum showing its various fractions.	**07**
		OR	
Q.4	**(a)**	Explain the terms :Octane and Cetane numbers	**03**
	(b)	Give the Classification of alloys.	**04**
	(c)	Give classification fuel. Discuss proximate analysis of fuel.	**07**
Q.5	**(a)**	Explain Biodegradable polymers	**03**
	(b)	Discuss Reverse osmosis process for softening of water	**04**
	(c)	Draw a well labeled diagram of Bioreactor and explain fermentation process.	**07**

OR

Q.5	**(a)**	Give Heisenberg's uncertainty principle	**03**
	(b)	Find the air required for complete combustion of coal having C=80% ,H=6%, and S=2.5%	**04**
	(c)	Draw and explain the process flow diagram of ethanol production using fermentation technology	**07**

****