Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–I & II(NEW) EXAMINATION – WINTER 2022

Subject Code:3110001 Date:04-03-2023

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)**	Discuss the periodic trends of followings- a. Electron affinity b. Atomic size c. Electron negativity	**03**
	(b)	Explain hard and soft acid base concept and its applications.	**04**
	(c)	Explain the proximate analysis to estimate the percentage of moisture, volatile matter and ash content in a coal sample.	**07**
Q.2	**(a)**	What do you understand by temporary and permanent hardness of water?	**03**
	(b)	Write the chemical reaction for synthesis of polyvinyl chloride and polystyrene.	**04**
	(c)	What is corrosion? Explain the electrochemical theory of corrosion.	**07**
		OR	
	(c)	What are alloys? Explain their applications and advantages over pure metals.	**07**
Q.3	**(a)**	Explain the basic principle of Uv-vis spectroscopy?	**03**
	(b)	Explain octane and cetane number.	**04**
	(c)	What are the synthetic fibers? Explain synthesis, properties and application of a polyester.	**07**
		OR	
Q.3	**(a)**	Explain the working principle of pH meter.	**03**
	(b)	Differentiate between sludge and scale.	**04**
	(c)	Explain the liquid crystals, their types and applications.	**07**
Q.4	**(a)**	Write any three applications of nanomaterials.	**03**
	(b)	What are biodegradable polymers? Explain with examples.	**04**
	(c)	Explain the importance of bio-fuel, bio-fertilizers and bio-surfactant	**07**
		OR	
Q.4	**(a)**	Discuss the any three applications of fullerenes.	**03**
	(b)	Write free radical addition mechanism of polymerization.	**04**
	(c)	Explain the role of enzymes in various industries.	**07**
Q.5	**(a)**	Write the any three advantages of natural polymers.	**03**
	(b)	Explain a method for synthesis of nano-materials.	**04**
	(c)	Explain the basic principle of conductometric titration of acid base. Give its advantages over conventional method.	**07**
		OR	
Q.5	**(a)**	Write any six characteristic of good fuel.	**03**
	(b)	Explain the specific properties of nano-materials.	**04**

(c) What is infra-red (IR) spectroscopy? Explain the basic principle and applications. **07**