

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-III (NEW) EXAMINATION – WINTER 2021

Subject Code:3130506

Date:19-02-2022

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) Explain the mechanism of S_N1 (Unimolecular Nucleophilic Substitution) Reaction.	03
	(b) Discuss the SP^2 hybridization with suitable example.	04
	(c) Discuss Parachor and Explain role of Parachor in determining the chemical constitution of a compound.	07
Q.2	(a) Define terms: (i) Carbenes (ii) Optical Activity (iii) Covalent bond	03
	(b) Explain the bonding and anti-bonding molecular orbitals and differentiate between them.	04
	(c) Gives the types of Organic reaction and discuss electrophilic aromatic substitution reaction.	07
OR		
	(c) Draw the phase diagram of one component system and discuss its salient features.	07
Q.3	(a) Explain pseudo first order reaction with the help of an example.	03
	(b) The vapor pressure of water at $20^\circ C$ is 17.54 mm. When 20 gm. of a nonvolatile solute is dissolved in 100 gm. of water, the vapour pressure is lowered by 0.30 mm what is the molecular weight of substance?	04
	(c) Explain Stereochemistry and discuss the Stereochemistry of Tartaric acid.	07
OR		
Q.3	(a) Explain terms: (i) Carbonium ion (ii) Heat of combustion (iii) Enthalpy	03
	(b) Assign R and S Configuration for each of the following compounds.	04
	(i) $\begin{array}{c} \text{Br} \\ \\ \text{H}-\text{C} \\ / \quad \backslash \\ \text{I} \quad \text{Cl} \end{array}$ (ii) $\begin{array}{c} \text{Br} \\ \\ \text{H}-\text{C} \\ / \quad \backslash \\ \text{Cl} \quad \text{I} \end{array}$ (iii) $\begin{array}{c} \text{COOH} \\ \\ \text{H}-\text{C} \\ / \quad \backslash \\ \text{H} \quad \text{CH}_3 \end{array}$ (iv) $\begin{array}{c} \text{COOH} \\ \\ \text{H}-\text{C} \\ / \quad \backslash \\ \text{H}_3\text{C} \quad \text{OH} \end{array}$	
	(c) Draw the phase diagram of Zn-Cd system. Describe its importance.	07
Q.4	(a) Predict the number of signals in the NMR spectrum of (i) $\text{CH}_3\text{CH}_2\text{OH}$ (ii) $\text{CH}_2\text{Cl}-\text{CHCl}_2$ (iii) $\text{CH}_3-\text{CH}_2-\text{CH}_3$	03
	(b) Write a note on refractories with their uses.	04
	(c) Explain the principle and instrumentation of TEM.	07

OR

- Q.4** (a) What are the basic principles involved in the Nuclear Magnetic Resonance(NMR). **03**
(b) Discuss the properties of insulators.. **04**
(c) What are the factors affecting glass transition temperature? **07**
- Q.5** (a) Give the application of Mass spectroscopy. **03**
(b) What is Bomb Calorimeter? Explain the construction of Bomb Calorimeter. **04**
(c) Explain mathematical expression for the rate constant of the second order reaction. **07**
- OR**
- Q.5** (a) Draw and explain the shape of *p*-orbitals. **03**
(b) A first order reaction takes 40 min for 30% decomposition. Calculate $t_{1/2}$. **04**
(c) State the Hess law and illustrate with suitable examples. **07**
