Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–III (NEW) EXAMINATION – WINTER 2020

Subject Code:3130506 Date:10/03/2021

Subject Name:Applied Chemistry

Time:10:30 AM TO 12:30 PM Total Marks:56

Instructions:

1. **Attempt any FOUR questions out of EIGHT questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			Marks
Q.1	**(a)**	Show the measurement of Boiling point Elevation.	**03**
	(b)	Define: Optical activity & Specific rotation. Order of reaction, Reaction rate.	**04**
	(c)	Explain the principle, instrumentation of Nuclear magnetic resonance spectroscopy.	**07**
Q.2	**(a)**	Explain the R, S System for Asymmetric Molecules.	**03**
	(b)	Define Term: Normality, Viscosity, Carbenes, Homolytic fission.	**04**
	(c)	Give the types of Organic reaction and discuss Nucleophillic Substitution (SN^2) reaction.	**07**
Q.3	**(a)**	Describe Heisenberg Uncertainty Principle	**03**
	(b)	Discuss SP^3 Hybridization with suitable example.	**04**
	(c)	Explain the Molecular Orbital Theory.	**07**
Q.4	**(a)**	Give the application of XRD.	**03**
	(b)	The heat of combustion of ethylene at 17° C and at constant volume is -332.19 kcal. Calculate the heat of combustion at constant pressure considering water to be in liquid state. ($R = 2$ cal $degree^{-1}$ mol^{-1}).	**04**
	(c)	Draw the phase diagram of Zinc-Cadmium system. Describe its importance.	**07**
Q.5	**(a)**	Elaborate zero order reaction with suitable example.	**03**
	(b)	Define: Degree of freedom, Eutectic point, heat of combustion, Endothermic reaction.	**04**
	(c)	Draw the phase diagram of one component system and discuss its salient features.	**07**
Q.6	**(a)**	Discuss Pseudo order reaction.	**03**
	(b)	A solution of H_2O_2 when titrated against $KMnO_4$ solution at different time intervals gave the following results:	**04**

T(minutes)	**0**	**10**	**20**
Vol. of $KMnO_4$ used for 10 ml H_2O_2	23.8 ml	14.7 ml	9.1 ml

Selecting the above data, Show that the decomposition of H_2O_2 is a first order reaction.

	(c)	Explain mathematical expression for the rate constant of the second order reaction.	**07**

Q.7	**(a)**	What is the role of reinforcement in composites?	**03**
	(b)	Discuss the classification of ceramics with their general properties.	**04**
	(c)	Describe the each section of Scanning Electron Microscope.	**07**
Q.8	**(a)**	What are copolymers? Give its uses.	**03**
	(b)	Write a note on refractories with their uses.	**04**
	(c)	Explain with principle, instrumentation of mass spectroscopy.	**07**

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