

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-IV (NEW) EXAMINATION – SUMMER 2021****Subject Code:2140501****Date:08/09/2021****Subject Name:Physical And Inorganic 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
<b>Q.1</b>	(a) Enlist the types of chemical bond with suitable examples.	<b>03</b>
	(b) Define the Endothermic and Exothermic reaction with example.	<b>04</b>
	(c) Develop the rate expression for First order reaction.	<b>07</b>
<b>Q.2</b>	(a) Define the term: Phase, Degree of freedom, Triple point.	<b>03</b>
	(b) Discover $\Delta H$ of the reaction, $C_{(s)} + 2H_{2(g)} \rightarrow CH_{4(g)}$ from the following data:	<b>04</b>
	i) $C_{(s)} + O_{2(g)} \rightarrow CO_{2(g)} \quad \Delta H = -393.7 \text{ KJ}$	
	ii) $H_{2(g)} + \frac{1}{2} O_{2(g)} \rightarrow H_2O_{(l)} \quad \Delta H = -285.7 \text{ KJ}$	
	iii) $CH_{4(g)} + 2O_{2(g)} \rightarrow CO_{2(g)} + 2H_2O_{(l)} \quad \Delta H = -890.3 \text{ KJ}$	
(c) What do you understand by reduced phase rule? Construct a neat phase diagram of zinc-cadmium eutectic system and discuss its salient features.	<b>07</b>	
<b>OR</b>		
(c) Explain the Hess's Law of constant heat summation and its application.	<b>07</b>	
<b>Q.3</b>	(a) Make use of Standard Hydrogen Electrode with diagram.	<b>03</b>
	(b) Find the pH of a buffer solution containing 0.20 mole per litre $CH_3COONa$ and 0.15 mole per litre $CH_3COOH$ . $K_a$ for acetic acid is $1.8 \times 10^{-5}$ .	<b>04</b>
	(c) Develop Handerson – Hasselbatch equation for buffer solutions.	<b>07</b>
<b>OR</b>		
<b>Q.3</b>	(a) Give the unit of rate constant for first, second and third order reaction.	<b>03</b>
	(b) Discuss Pseudo-order reaction with example..	<b>04</b>
	(c) Describe any one method for extraction of aluminum from its ore.	<b>07</b>
<b>Q.4</b>	(a) Differentiate between Nuclear fission & Nuclear fusion reaction.	<b>03</b>
	(b) Write the important properties of steel.	<b>04</b>
	(c) What is a nuclear reactor? With a neat diagram of light – water reactor, describe its main parts briefly.	<b>07</b>
<b>OR</b>		
<b>Q.4</b>	(a) Describe the process of ore dressing by Froth flotation.	<b>03</b>
	(b) Write a note on radioactive decay.	<b>04</b>
	(c) Explain the method of detection and measurement of radioactivity.	<b>07</b>
<b>Q.5</b>	(a) Write the precautions during the storage of explosives.	<b>03</b>
	(b) Discuss the method of preparation and uses of explosives.	<b>04</b>
	(c) What is adsorption spectroscopy? Derive Lambert's-Beer's law related equations in detail and state its limitation.	<b>07</b>

**OR**

- Q.5** (a) Define the term: Order of a reaction, Molecularity of a reaction. **03**
- (b) What is the basic principle used in conductometry titration? Briefly discuss any two of its applications. **04**
- (c) What is chromatography? Explain HPLC in detail with neat and well labeled diagram. **07**

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