Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. Sem-IV Examination June- 2011

Subject code: 140501

Subject Name: Physical and Inorganic Chemistry

Date:06/06/2011 **Time: 10.30 am – 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.**

Q.1 **(a)** Answer the following questions: **07**

1. Mention five useful properties of metal.
2. Name some bonds which are usually present in explosive molecules.
3. Define "component" of a phase rule.
4. Name the products formed when fused NaCl is electrolyzed between platinum electrodes.
5. Define coordination compounds.
6. Explain hydrogen bond with its types.
7. Explain propellants with suitable examples

(b) Define the following terms: **07**

1. Liquid crystals
2. Isomerism
3. Transition metals
4. Thermogravimetric analysis
5. pH
6. Calomel electrode
7. Alloys

Q.2 **(a)** What is phase rule? Derive phase rule of Gibbs and explain Eutectic systems with suitable examples **07**

(b) What is electrochemistry? Explain acid - base theories. **07**

OR

(b) What are buffers and buffer capacity? Prove Henderson's equation for acidic buffer. **07**

$$pH = pka + \log \frac{[salt]}{[acid]}$$

Q.3 **(a)** Explain reactive intermediates for a chemical reaction. Also explain inductive and resonance effect with suitable examples. **07**

(b) With the help of the study of thermo chemistry explain energy changes taking place in a chemical reaction with illustrations and justify it. **07**

OR

Q.3 **(a)** Explain following terms with examples. **07**

i. Steric effect
ii. Hyper conjugation

(b) Explain following terms with examples. **07**

i. Calorimetry
ii. Entropy and free energy

Q.4	**(a)**	What is chromatography? Give its principle and write a note on gas chromatography and HPLC.	**07**
	(b)	What is metallurgy? Explain general steps involved in metallurgy. Elaborate on various techniques which are involved in concentration step with suitable diagrams.	**07**
		OR	
Q.4	**(a)**	What is adsorption spectroscopy and Lambert – Beer's Law? Derive Lambert – Beer's Law.	**07**
	(b)	Explain the metallurgy of steel with its heat treatment process.	**07**
Q.5	**(a)**	What are chemical bondings? Mention different types of chemical bonding. Explain any one theory of bonding.	**07**
	(b)	Give classification of explosives with examples	**07**
		OR	
Q.5	**(a)**	Explain Werner's coordination theory for coordination compounds.	**07**
	(b)	What are rocket propellants? Give classification of rocket propellants.	**07**

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