Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV(OLD) • EXAMINATION – WINTER 2016

Subject Code:140501 **Date:19/11/2016**

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.**

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

(i) What are the number of phases and components in the following system?

$PCl_5(s) \rightarrow PCl_3 + Cl_2$

(ii) Name few groups imparting negative inductive effect (-I) effect.

(iii) Which type of radiations among infrared and ultraviolet has longer wavelength?

(iv) Define heat of neutralization.

(v) Calculate pH of 0.01 N HCl solution.

(vi) Write any one objective of alloying a metal.

(vii) The electrochemical cell stops working after some time. Why

(b) With a neat and well labeled sketch, explain phase diagram of water system. **07**

Q.2 **(a)** Write principle, instrumentation and working of gas chromatography. **07**

(b) Explain fuel cells in brief. **07**

OR

(b) What do you understand by buffer solution? Write about different types of buffers giving suitable examples **07**

Q.3 **(a)** Write a note on heat treatment of steel. **07**

(b) State Hess's law of constant heat summation. Calculate heat of following reaction: **07**

$CO_2 + H_2 \rightarrow CO + H_2O(g)$

Given the heat of formation of Co, CO_2 and H_2O (g) are -110.5, -393.8 and -241.8 respectively.

OR

Q.3 **(a)** Derive Clausius-Clapeyron equation and mention any of its two applications. **07**

(b) Give a brief account of physical properties of metals. **07**

(c) Define following:

(i) Ligand (ii) Co-ordination number (iii) chelate

Q.4 **(a)** Give classification of explosives with suitable examples. **05**

(b) Define: (i) Resonance (ii) Free radical (iii) Hyperconjugation (iv) Carbocation **05**

	(c)	What do you understand by molecular spectroscopy? Write principle of UV-VIS spectroscopy.	**04**
		OR	
Q.4	**(a)**	Write a short note on rocket propellants	**05**
	(b)	Explain inductive effect stating its applications.	**05**
	(c)	Differentiate between: (i) Chromophore and auxochrom (ii)Stretching and bending vibrations	**04**
Q.5	**(a)**	What do you understand by hydrogen bonding? Explain intermolecular and intramolecular hydrogen bonding giving suitable examples	**07**
	(b)	Write about the safety measures of storing explosives.	**04**
	(c)	Write in brief about eutectic systems	**03**
		OR	
Q.5	**(a)**	Explain covalent bonding in molecules and characteristics of covalent compounds.	**07**
	(b)	Write preparation of following explosives: (i) TNT (ii) Picric acid	**04**
	(c)	Define: (i) Phase (ii) Degree of Freedom (iii) Component	**03**

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