Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV EXAMINATION – WINTER 2015

Subject Code: 140501 **Date:22/12/2015**

Subject Name: Physical and Inorganic Chemistry

Time: 02:30pm to 05:00pm **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**

1. State Beer - Lambert law.
2. Write down structural formula of RDX.
3. What do you understand by the term 'degree of freedom'?
4. Define hydrogen bond, with an illustration.
5. What is 'dry ice'? Why is it called so?
6. Define dipole moment.
7. Mention five useful properties of metal.

(b) What do you understand by Eutectic point? Give detailed about two component systems with one example. **07**

Q.2 **(a)** Answer the following: **07**

1. Define 'hybridization' with an illustration.
2. Write two non-ferrous alloys and their applications.
3. Define "component" of a phase rule.
4. Give the region of visible range.
5. Give the principle of thermo gravimetric analysis.
6. Define the term 'standard heat (enthalpy) of reaction'.
7. Define 'cell constant'.

(b) Draw the phase diagram of water system. Discuss its salient features. **07**

OR

(b) Differentiate between resonance and inductive effect, with an illustration. **07**

Q.3 **(a)** Give Instrumental set up of spectrophotometer describing its components with diagram. **07**

(b) Define heat (enthalpy) of reaction. Derive Kirchoff's equations representing the variation of heat change of reaction with temperature at constant volume and at constant pressure. **07**

OR

Q.3 **(a)** What are buffers and buffer capacity? What are the two common types of buffer solutions? How do they operate? **07**

(b) Explain Hess's law of constant heat summation, with a suitable example. Discuss about its important applications. **07**

Q.4 **(a)** What is chromatography? Explain Gas Chromatography in brief with schematic diagram. **07**

(b) What are explosives? Describe the manufacture of lead azide and **07**

trinitrotoluene (TNT).

OR

Q.4	**(a)**	What are the advantages of conductometric titrations? How does the conductance change when a strong acid like hydrochloric acid is titrated against a strong base like sodium hydroxide? Explain the variation.	**07**
	(b)	Discuss the classification of explosives with examples. State the precautions to be taken while storing the explosives.	**07**
Q.5	**(a)**	Discuss cast iron and wrought iron along with their uses for different engineering purposes.	**07**
	(b)	Give a brief account of valence bond (VB) and molecular orbital (MO) theories of bonding.	**07**

OR

Q.5	**(a)**	Explain the metallurgy of steel with its heat treatment process.	**07**
	(b)	What are liquid crystals? How are they different from true liquids?	**07**

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