Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV • EXAMINATION – WINTER 2013

Subject Code: 140501 Date: 19-12-2013

Subject Name: Physical and Inorganic Chemistry

Time: 02:30 pm to 05:00 pm Total Marks: 70

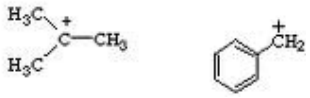
Instructions:

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 is transmittance?

ii. Which is more stable carbocation among the following?



iii. pH of 0.01 N H_2SO_4 is ……..

iv. What is meant by eutectic point?

v. Give example of a ferrous and a nonferrous alloy.

vi. H_2O is liquid at room temperature while H_2S is gas. Why?

vii. Which among the following is transition element?
Zn, Cr, Be, Se, Xe

(b) What do you mean by spectroscopy? Mention essential components of UV-VIS spectroscope and explain its principle and working. **07**

Q.2 **(a)** State phase rule. Draw and explain phase diagram of Pb-Ag system. **07**

(b) Define explosives? Give classification of explosives with suitable examples and write preparation of following explosives: **07**

(i) PETN (b) RDX

OR

(b) State and explain Hess's law of constant heat summation. Calculate heat of formation (ΔH_f°) of acetic acid(CH_3COOH) if its heat of combustion is 890.0 kJ/mol. The heat of formations (ΔH_f°) of CO_2 (g) and H_2O(l) are -395.0 kJ/mol and -285.0 kJ/mol respectively. **07**

Q.3 **(a)** Establish relationship between pH and pOH. Calculate pH of .05 N acetic acid (CH_3COOH)[Given dissociation constant of acetic acid is 1.75×10^{-5}] **07**

(b) Discus salient features of molecular orbital theory. Explain magnetic behaviour of O_2 molecule on the basis of molecular orbital theory. **07**

OR

Q.3 **(a)** Answer the following: **2+5**

i. Differentiate between sigma (σ) and Pi (π) bond.

ii. Define Hydrogen bonding and differentiate between intermolecular and intramolecular hydrogen bonding giving suitable example.

(b) Write short note on: **4+3**

i. Heat treatment of steel

ii. Werner's theory of coordination compounds.

Q.4 **(a)** What are different types of batteries? Give a brief account of lead storage battery. **07**

(b) What is EMF? Explain taking example of galvanic cell. The standard electrode potential of Ni^{2+}/ Ni = - 0.25V and Au^{3+}/Au = 1.5 V **07**

respectively. Calculate the E.M.F. of following cell at 25°C:
Ni/ Ni^{2+} (0.01 M)|| Au^{3+} (0.1 M)/Au

OR

Q.4 **(a)** Answer the following: **04**

i. Melting points of ionic compounds are higher than those of covalent compounds. Why?

ii. Salt bridge is used in electrochemical cell. Why?

iii. Discuss inductive effect. **03**

(b) What is chromatography? Explain HPLC giving neat and well labeled diagram. **07**

Q.5 **(a)** Answer the following: **07**

(i) Write principle of paper chromatography.

(ii) Write a note on inner transition elements?

(b) What are rocket propellants? Give its classification with suitable examples. **07**

OR

Q.5 **(a)** Write short note on: **07**

(i) Concentration Cell

(ii) Conductometric titration

(b) Answer the following: **07**

(i) Define the term "Heat of neutralization". Explain why heat of neutralization of weak acid verses weak base is lower than expected value.

(ii) Explain acidic and basic nature of a compound on the basis of Conjugated acid –base theory and Lewis theory.

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