D 93037 **(Pages : 2)** **Name**

Reg. No.....

FIRST SEMESTER M.Sc. DEGREE EXAMINATION, DECEMBER 2015

(CUCSS)

Chemistry

CH 1C 02—INORGANIC CHEMISTRY-I

(2010-2014 Admissions)

Time : Three Hours Maximum : 36 Weightage

Part A

Answer **all** *questions.*
Each question carries 1 weightage.

1. Identify the conjugate bases of the following acids :

   (a) HS and (b) Si (011_4).

2. Explain Lux-Flood theory of acid and bases.

3. Which is more stable ; B_2H_6 or $[B_2H_6]^{\wedge}$? Substantiate your answer.

4. Classify the following compounds into *closo*/*nido*/*arachino* structures :

   (a) $C_2B_{10}H_{12}$; (b) $C_2B_3H_5$; (c) $B_6H_{11}^+$; and (d) B_4I1_{10}.

5. What are zeolites ? Mention their uses.

6. Account for the water repellent nature of silicones.

7. Account for the abrupt changes in Ellingham diagrams.

8. What is passivity ? Explain with an example.

9. Explain the terms : (a) Students t-test ; and (b) Q-test.

10. Calculate the standard deviation and relative standard deviation for the following set of analytical data : 35.95, 36.00, 36.04, 36.08 and 36.23.

11. Explain the function of a redox indicator with a suitable example.

12. What do you mean by precipitation from homogeneous solution ? Explain.

13. Expain the limitations of valence bond theory.

14. What is meant by spectrochemical series ? Why is it called so ?

(14 x 1 = 14 weightage)

Turn over

Part B

Answer any seven *questions.*
Each question carries 2 *weightage.*

15. Give an account of the structure and bonding in $(PNCl_2)_3$.
16. How silicates are classified ? Explain with suitable examples.
17. What are Pourbaix diagrams ? Discuss the applications of these diagrams.
18. Explain the electrochemical theory of metallic corrosion.
19. Write an account of the classification of errors. How they can be minimised ?
20. Explain the method of least squares for the treatment of analytical data.
21. Differentiate between co-precipitation and post-precipitation with suitable examples.
22. What are the essential requirements for a substance to be used as a metallochromic indicator ?
23. Differentiate between chelate effect and macrocyclic effect giving examples.
24. Explain Jahn-Teller effect with suitable example. Discuss its spectral consequences.

(7 x 2 = 14 weightage)

Part C

Answer two *questions.*
Each question carries 4 *weightage.*

25. Discuss the behaviour of liquid SO_2 as a solvent with respect to acid-base, precipitation and redox reactions.
26. How are N-and B-substituted borazenes prepared ? Compare the reactivity of borazine with that of benzene.
27. Describe the factors that affect the stability of metal complexes. Explain the spectroscopic method for the determination of stability constant of a metal complex.
28. Draw the molecular orbital diagram for $[Co(NH_3)_6]^{+}$ with sigma bonding only and discuss the salient features. What are the factors that affect ligand field splitting ?

(2 x 4 = 8 weightage)