D 72973 (Pages : 2) Name.....

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Reg. No.....

FIRST SEMESTER M.Sc. DEGREE EXAMINATION, DECEMBER 2014

(CSS)

Chemistry

CH 1C 02—INORGANIC CHEMISTRY—I

Time : Three Hours Maximum : 36 Weightage

Part A

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

1. Arrange BF_3, BI_3, BBr_3 and BCI_3 in the increasing order of acid strength. Justify your answer.
2. Which is more acidic; H_2CrO_4 or $HMnO_4$? Justify.
3. An acid that is weak in water may appear strong in a solvent that is a stronger proton acceptor. Substantiate this answer with an example.
4. What happens when 1, 2-dicarba-doso-dodecaborane (12) is heated ?
5. What is heterocatenation ? Illustrate with an example.
6. What are methanides ? Give an example.
7. What are Pourbaux diagrams ? Mention their uses.
8. Differentiate between absolute error and relative error.
9. What is an adsorption indicator ? Explain its functioning.
10. What is meant by 'aging of a precipitate' ?
11. Find out the standard deviation for the following set of data obtained for metal percentage in a copper ore : 15.14, 15.00, 15.04, 15.08 and 15.23.
12. Explain macrocyclic effect with a suitable example.
13. Why I^- and CO are located on opposite ends for the spectrochemical series ? Explain.
14. What is chelate effect ? Why is it called an entropy effect ?

(14 × 1 = 14 weightage)

Part B

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

15. Explain the levelling effect of solvents.
16. What are the different types of hydrogen atoms present in carboranes ? Comment on the acidity of these hydrogen atoms.

Turn over

17. Give an account of the classification of carbides.
18. Write a note on passivity.
19. Discuss the method of least squares in the treatment of analytical data.
20. What is a metallochromic indiacator ? Discuss the essential requirements for a substance to be used as metallochromic indiacator.
21. Differentiate between chelate effect and macrocyclic effect.
22. Explain Jahn-Teller effect with an example.
23. Differentiate between spectrochemical series and nephelauxetic series.
24. Write a note the classification of silicates.

(7 × 2 = 14 weightage)

Part C

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

25. Explain the classification of Lewis acids and bases into hard and soft acid and bases. Comment on the chemical consequences of this concept in the formation of coordination compounds.
26. Discuss the important chemical reactions that can occur in liquid sulphur dioxide. Mention the important advantages which liquid SO_2 Possesses as a solvent.
27. What are the factors that affect the stability of metal complexes ? Discuss the spectroscopic method for determining the stability constant of a metal complex.
28. Construct the molecular orbital diagram with σ bonding only for $[Ni(NH_3)_6]^{2+}$ species and discuss the salient features. What is the effect of π-bonding on the 10 Dq value of an octahedral complex ?

(2 × 4 = 8 weightage)