



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – CHEMISTRY

FIRST SEMESTER – NOVEMBER 2016

16PCH1MC02 / CH 1813 - CONCEPTS IN INORGANIC CHEMISTRY

Date: 04-11-2016
Time: 01:00-04:00

Dept. No.

Max. : 100 Marks

Part-A

Answer ALL questions.

(10 × 2= 20)

1. What is the effective nuclear charge felt by 2p electrons of nitrogen atom?
2. Arrange the following acids in the order of increasing acid strength. Give suitable explanation.
HOCl, HClO₃, HClO₂, HClO₄
3. Compare the bond length of NO and NO⁺ using MO theory.
4. Predict the geometry of SF₆ using hybridization principle.
5. Differentiate p-type and n-type semiconductors.
6. What is radius ratio? What is its application?
7. Mention the importance of Madelung constant.
8. What are van der Waals forces?
9. How are super acids formed? Give an example.
10. What is leveling effect?

Part-B

Answer any EIGHT questions.

(8 × 5= 40)

11. How are, ionization potential, electron affinity and electronegativity related to atomic radius and how do they vary in a group and period?
12. Calculate the electronegativity of lead using Allred–Rochow procedure (atomic number of Pb is 82; $r_{pb}=1.53\text{\AA}$)
13. How does molecular orbital theory explain the stability and magnetic properties of the following species: O₂, O₂⁻, O₂²⁻, O₂⁺, and O₂²⁺.
14. How does valence bond theory explain the formation of NH₃ molecule?
15. Discuss the structure of XeO₃ using hybridization.
16. What is meant by LCAO principle? Explain with suitable examples.
17. How is ABC ABC type lattice different from AB AB type?
18. Account for the fact that AgCl dissolves in NH₄OH, whereas AgI does not.
19. Give the composition and preparation of magic acid.
20. How are solvents classified? Cite example for each class.
21. Describe auto ionization in (i) water (ii) ammonia.
22. Calculate pH of 10⁻⁸ M solution of HCl.

Part-C

Answer any FOUR questions.

(4 × 10= 40)

- 23 a. Discuss the different scales of electronegativity.
- b. Calculate the partial ionic character of HF bond. The electronegativity difference of the elements in HF is 1.9. **(6+4)**
24. Explain why CO molecule is diamagnetic while NO is paramagnetic on the basis of molecular orbital theory.
25. How does band theory explain the conducting properties of metals, insulators and semiconductors?
26. What are the postulates of VSEPR theory? Discuss the exact geometry of
(i) ClF_3 (ii) ICl_4^- (iii) SO_2 (iv) I_3^-
27. Derive Born-Landé equation.
- 28 a. How is Lattice energy determined experimentally? **(8+2)**
- b. Explain the importance of hydrogen bond in proteins.
