



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – CHEMISTRY

FIRST SEMESTER – NOVEMBER 2016

CH 1807 - CONCEPTS IN INORGANIC CHEMISTRY

Date: 04-11-2016
Time: 09:00-12:00

Dept. No.

Max. : 100 Marks

Part-A

Answer ALL questions.

(10 × 2= 20)

1. What are the factors influencing ionisation energy?
2. Compute the effective nuclear charge felt by 2p electrons of chlorine atom.
3. Differentiate bcc and fcc close packing of ions in crystals.
4. Which of the following compound is readily soluble in water? Give reasons.
(i) SnCl₂ (ii) SnCl₄
5. Define lattice energy.
6. Highlight the application of Bent's rule in discussing the structure of covalent molecules.
7. Account for the fact that the hydride of oxygen, H₂O, is liquid whereas the hydride of sulphur, H₂S is gas.
8. State Bragg's law and its application in predicting crystal structure.
9. What is meant by levelling effect? Cite an example.
10. What are superacids? Cite an example.

Part-B

Answer any EIGHT questions.

(8 × 5= 40)

11. Derive Born-Landé equation.
12. Explain the Allred-Rochow scale of electronegativity and calculate electronegativity of carbon (r_c is 0.77 Å).
13. What is radius ratio rule? Discuss the application of this rule in predicting crystal structure.
14. Discuss the structure of CO₃²⁻ based on hybridization principle.
15. Discuss the structure of (i) ClF₃ (ii) ClO₄⁻ using VSEPR theory.
16. Explain why the bond order of O₂²⁺ ion is greater than O₂ molecule on the basis of MO theory.
17. Explain the types of hydrogen bonding with suitable examples.
18. How is pK_a of a weak acid determined by titration?
19. Explain the principle of neutron diffraction in characterization techniques.
20. What are Miller and Weiss indices? Draw the following planes, whose Miller indices are
(i) (100) (ii) (111)
21. Write a brief note on the types of defects in solids.
22. Highlight the chemistry of alkali metal in NH₃ and its application as reducing agent.

Part-C

Answer any FOUR questions.

(4 × 10= 40)

23. How is lattice energy determined theoretically?
24. How does molecular orbital theory explain the magnetic and strength of following molecules. (i) CO
(ii) NO
25. Explain HSAB principle with suitable examples.
26. Write a note on the structure of (i) Clathrates (ii) Zeolites.
27. Discuss the conducting behaviours of conductors, insulators and semiconductors using band theory.
28. Discuss the unit cell structure of (i) zinc blende and (ii) rutile.
