LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – CHEMISTRY

FIRST SEMESTER – NOVEMBER 2007

CH 1503 - CONCEPTS IN INORGANIC CHEMISTRY

AD 3

Date : 03/11/2007   Dept. No.   Max. : 100 Marks
Time : 1:00 - 4:00

PART – A

(10 x 2 = 20 marks)

Answer ALL the questions.

1. State Hund's rule.

2. Define electron affinity.

3. What are the factors affecting the lattice energy?

4. State and explain Born – Lande equation.

5. What is Sidwick – Powell theory of the shapes of molecules?

6. Write the structure of SF_6 on the basis of VSEPR theory.

7. What is ion dipole – dipole interaction?

8. State Hume – Rothery's rules.

9. Give an example for the oxidation – reduction reaction and explain it.

10. State Lux – Flood definition of acids and bases.

PART – B

(5 x 8 = 40 marks)

Answer any EIGHT questions.

11. Write schrodinger wave equation. Explain the significance of wave function.

12. Describe the froth floation process for concentrating an ore.

13. How does the ionization energy of an element vary across the period and down the group in a periodic table?

14. What is lattice energy? How is it determined for the formation of KCl using Born – Haber's cycle?

15. Explain the Fajan's rule.

16. What is hybridization? Based on hybridization discuss the structure of BF_3 and NH_3 molecule.

17. Draw the M.O diagram of nitrogen molecule and explain its bond order.

18. What are the consequences of hydrogen bonding?

19. Describe the interstitial and substitutional alloys.

20. Compare Arrhenius and Bronsted–Lowry theories of acids and bases.

21. Explain HSAB principle.

22. Compare VB and MO theories of covalent bond.

[p.t.o]

PART – C

(4 x 10 = 40 marks)

Answer any FOUR questions.

23. (a) What are the postulates of Bohr theory? (5)
    (b) Define electronegativity. Explain Pauling scale of electronegativity (5)

24. (a) Calculate the lattice energy of one mole of NaCl from the following data. Heat of formation of
       NaCl = - 410 kj/mole; Sublimation energy of Na is 108.8 kj/mole;
       Ionization Energy of Na=493.7 kj/mole; Dissociation energy of Cl_2 = 242.7 kj/mole;
       Electron affinity = 368.2kj/mole (6)
    (b) What are the factors affecting the lattice energy? (4)

25. (a) Based on VSEPR theory, explain the structure of PCl_5 and ClF_3 (5)
    (b) What are bonding and anti bonding orbitals? (5)

26. (a) Write M.O diagrams of one homo and one hetero diatomic molecules. (6)
    (b) What is octet rule? Explain its limitations. (4)

27. (a) Explain the bonding in metals using free electron theory and VB theory. (5)
    (b) Write a note on (a) van der waals force (b) ion dipole-dipole interaction. (5)

28. (a) Explain Lewis theory of acids and bases with examples. (5)
    (b) What are the different types of non-aqueous solvents? Explain with examples. (5)

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