LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **CHEMISTRY**

FIRST SEMESTER – APRIL 2017

CH 1506 / CH 1503 - CONCEPTS IN INORGANIC CHEMISTRY

Date: 18-04-2017   Dept. No.   Max. : 100 Marks
Time: 01:00-04:00

PART –A

Answer ALL the questions   **(10 x2 =20 marks)**

1. State Pauli's exclusion principle
2. What is Pauling's electronegativity scale?
3. List the factors favouring formation of ionic compound.
4. Noble gases have high I.E. Give reason.
5. Give Born-Lande equation.
6. Draw the structure of SF_4.
7. Calculate the bond order for CO molecule.
8. Define Bronsted –Lowry theory of acid and base,
9. What are aprotic solvents?
10. Mention any two oxidizing agents.

PART –B

Answer any EIGHT questions   **(8x5 =40 marks)**

11. Construct the molecular orbital diagram for NO molecule.
12. Explain Pearson concept of hard and soft acids. Give examples.
13. Which of the following can act as Lewis acids

    i)H_2O ii) $CaCl_2$ iii) OH^- iv) CO_2 v)NH_4^+
14. Define the following and explain their trends in a period and in a group.

    i) electronegativity   ii) ionization energy iii) covalent radius
15. On the basis of hybridization, discuss the geometry of the following molecules.

    i) NH_3 ii) SF_6
16. Discuss in detail the band model of metallic bond
17. Balance the following equation by oxidation number method.

    $K_2Cr_2O_7 + FeSO_4 + H_2SO_4 \rightarrow Cr_2(SO_4)_3 + H_2O + Fe_2(SO_4)_3 + K_2SO_4$
18. Sodium dissolves in liquid ammonia to form paramagnetic and blue colored solution. Give reason.
19. How are acids and bases defined in terms of Arrhenius concept and Lux-Flood concept?

20. What are semiconductors? Explain what is meant by n-type and p-type semiconductors.

21. Calculate the lattice energy of NaCl. (Given: heat of Sublimation of Na 108.5KJmol⁻¹, dissociation energy of Cl_2 is 243.0KJmol⁻¹, IE of Na 495.2 5KJmol⁻¹, EA of chlorine -348.35KJ mol⁻¹ and enthalpy of formation of NaCl is -381.85KJmol⁻¹)

22. Tl(I) compounds are more stable than Tl(III) compounds. Explain.

PART –C

Answer any FOUR questions   **(4x10 =40 marks)**

23. a) Define the following i) Hunds rule ii) Heisenberg uncertainty principle.

    b) The chemistry of Li has similarities to Mg. Give reason.

24. a) Discuss the geometry of the following based on VSEPR theory

     i) XeF_4 ii) ICl_4^-

    b) Pick out the conjugate acid base pair

    H_2O, CH_3COOH, H_3O^+, CH_3COO^-, NH_4Cl, H_2O, OH^-, NH_4OH (6+4)

25. Describe the following reactions in liquid ammonia giving suitable examples : i) acid –base reactions ii) precipitation reactions iii) complex formation iv) ammonolysis

26. Explain the bond order, magnetic property and stability of CO on the basis of MO theory.

27. a) Explain inter and intra molecular H-bonding with a suitable example.

    b) Explain Fajans rule with suitable examples.

28. a) Discuss the factors affecting ionic size.

    b) Explain the various electronegativity scales.

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