



**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**

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

**FIRST SEMESTER – NOVEMBER 2014**

**CH 1506/CH 1503/CH 1500 - BASIC CONCEPTS IN INORGANIC CHEMISTRY**

Date : 10/11/2014

Dept. No.

Max. : 100 Marks

Time : 01:00-04:00

**PART A**

**ANSWER ALL QUESTIONS:**

**(10x 2 = 20 Marks)**

1. Write the electronic configurations of  $Mg^{2+}$  and  $Zn^{2+}$ .
2. Mention the oxidation state of manganese in  $MnSO_4$  and  $KMnO_4$ .
3. Arrange the following in the increasing order of electron affinity:  $Cl^-$ ,  $Br^-$ ,  $F^-$  and  $I^-$ .
4. Identify the following as ionic or covalent compounds: (a) potassium chloride (b) carbon tetrachloride (c) aluminium chloride (d) iodine heptafluoride.
5. Draw the electron dot formula for water and carbondioxide.
6. Helium molecule does not exist. Explain?
7. Distinguish insulator from conductor.
8. What is hydrogen bonding?
9. Mention any two oxidising agents.
10. i) Acetonitrile is an example of \_\_\_\_\_ solvent and ii) methanol is \_\_\_\_\_ solvent.

**PART B**

**ANSWER ANY EIGHT QUESTIONS:**

**(8 x 5 = 40 Marks)**

11. Define lattice energy. Explain the factors which influence lattice energy.
12. Mention the salient features of Modern Periodic table.
13. Explain (a) inert pair effect and (b) ionization potential.
14. Distinguish electrovalency from covalency with suitable example.
15. What are the factors governing the formation of ionic bond.
16. Mention the shape, number of bond pairs and lone pairs in methane and water.
17. What are the limitations of Octet rule?
18. What is bond order? Calculate the bond order for  $N_2$  and  $N_2^+$ .
19. Write a note on the consequence of hydrogen-bonding on association and dissociation properties.
20. Distinguish n-type from p-type semiconductor with suitable examples.
21. Explain Arrhenius concept of acids and bases. Mention any two strong bases.
22. Explain the following terms (i) oxidant (ii) reductant

**PART C**

**ANSWER ANY FOUR QUESTIONS:**

**(4 x 10 = 40 Marks)**

23. (a) Mention the postulates of Bohr's Theory. (6)
- b) How does ionization potential and electron affinity vary across a period and down a group in the modern periodic table? (4)
24. a) What are isoelectronic species? Arrange the following in the increasing order of ionic radii  $\text{Al}^{3+}$ ,  $\text{Si}^{4+}$ ,  $\text{Na}^+$ , and  $\text{Mg}^{2+}$  (2+2)
- b) Explain the formation of sodium chloride using Born-Haber cycle. (6)
25. a) What are the postulates of Valence bond theory and predict the shape of  $[\text{PtCl}_4]^{2-}$
- b) Sketch the Molecular orbital energy level diagram of oxygen molecule and calculate the bond order. (5+5)
26. a) Mention the geometry, hybridisation and structure of ammonia and  $\text{XeF}_4$ . (6)
- b) Distinguish intermolecular from intramolecular hydrogen-bonding with suitable examples. (4)
27. a) Write a note on defects in solids. (4)
- b) Mention the reactivity of alkali metals in liquid ammonia. (6)
28. a) Balance the following equation by oxidation number method.  
 $\text{K}_2\text{Cr}_2\text{O}_7 + \text{Na}_2\text{SO}_3$  giving  $\text{Cr(III)}$  and  $\text{SO}_4^{2-}$  in acidic medium. (5)
- b) Explain, in brief, the theory of acid and bases proposed by Bronsted and Lowry. (5)

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