



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

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

**FIRST SEMESTER – NOVEMBER 2016**

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

Date: 05-11-2016

Dept. No.

Max. : 100 Marks

Time: 01:00-04:00

**PART- A**

Answer **ALL** questions

(10x2 = 20 marks)

1. 'K<sup>+</sup> and Cl<sup>-</sup> are isoelectronic, yet ionic radii differ'. Why?
2. Define inert pair effect. Cite an example.
3. How is ionic bond formed?
4. Define enthalpy of solution.
5. Why does He<sub>2</sub><sup>+</sup> exist whereas He<sub>2</sub> does not?
6. Write the electron dot formula of ammonia molecule.
7. What are London forces?
8. What are clathrates? Give an example.
9. What is conjugate acid base pair? Give an example.
10. Classify the following as acid and base on the basis of Lowry- Bronsted concept:  
NH<sub>3</sub>, H<sub>2</sub>S, H<sub>3</sub>PO<sub>4</sub>, HCO<sub>3</sub><sup>-</sup>

**PART- B**

Answer any **EIGHT** questions

(8x5 = 40 marks)

11. Write notes on the postulates of Bohr's theory of atoms.
12. State and explain Pauling scale of electronegativity.
13. (i) What is dual character? Derive De Broglie equation.  
(ii). Mention the factors which affect lattice energy.
14. State and explain Fajan's rule.
15. Describe Born- Haber cycle for the formation of ionic compounds.
16. Explain the geometry of ammonia using valence bond theory.
17. Discuss the structure of XeF<sub>6</sub> using valence shell electron pair repulsion theory.
18. Explain the electron sea model of metallic atoms.
19. Write notes on Vanderwaal's forces and dipole – dipole interaction.
20. What happens when alkali metals are treated with liquid ammonia?
21. Balance the following redox reaction, using oxidation number method:  
$$\text{MnO}_4^- + \text{C}_2\text{O}_4^{2-} \rightarrow \text{Mn}^{2+} + \text{CO}_2$$
22. (i). What are the limitations of octet rule?  
(ii) What is double decomposition reaction? Give an example.

**PART- C**

Answer any **FOUR** questions

(4x10 = 40 marks)

23. State modern periodic law. Give a brief account on long form of periodic table.
24. Write notes on the factors favoring the formation of ionic compound.
25. Account the magnetic property and stability of  $O_2$  and  $N_2$  using Molecular Orbital diagram.
26. What is hydrogen bond? Give a brief account on the type of hydrogen bond with suitable example.
27. Compare and contrast the following reactions in liquid ammonia and aqueous medium:
- (i). Precipitation reaction between  $KCl$  and  $AgNO_3$
  - (ii). Neutralisation reaction with  $HCl$
  - (iii). Urea
  - (iv). Complex formation reaction
  - (v). Metallic salt
28. (i). State Allred and Rochows approach of electronegativity.
- (ii). Define lattice energy.
- (iii). Of the species  $O_2$ ,  $O_2^+$ ,  $O_2^-$ ,  $O_2^{2-}$  which would have the maximum bond strength?
- (iv). Mention the unique properties of water.
- (v). State the Arrhenius concept of acids and bases.

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