



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

**M.Sc. DEGREE EXAMINATION – CHEMISTRY**

FIRST SEMESTER – NOVEMBER 2017

**17PCH1MC02 - CONCEPTS IN INORGANIC CHEMISTRY**

Date: 04-11-2017  
Time: 01:00-04:00

Dept. No.

Max. : 100 Marks

**Part-A**

*Answer ALL questions.*

**(10 × 2 = 20)**

1. Define ionization potential. What does happen to ionization energy when size of the atom increases?
2. What is meant by stable octet? Why is an atom highly stable when it has stable octet?
3. What do you mean by F-center?
4. How is Madelung constant calculated for rock salt structure?
5. List out the factors which influence electronegativity of an element.
6. How is atomic weight of an element deduced from its equivalent weight and valency?
7. Mention any two demerits of modern periodic table.
8. What is hybridization? Mention its significance.
9. Comment on the impact of ionizable hydrogens on the  $pK_a$  values of oxyacids.
10. What are Lux-Flood acids and bases?

**Part-B**

*Answer any EIGHT questions.*

**(8 × 5 = 40)**

11. Why is the ionization potential of oxygen smaller than that of nitrogen despite the smaller size of oxygen compared to nitrogen?
12. 14 g of an element was burnt in presence of excess oxygen to produce 30 g of its oxide. Calculate its equivalent weight.
13. Derive Born-Landé equation to compute lattice energy.
14. Give an account of the covalent character in ionic compounds in the light of Fajans' empirical rules.
15. What is a metallic bond?
16. List out unique characteristics of a covalent compound.
17. Predict the geometry of  $OF_2$  using VSEPR theory.
18. Explain the various types of dipole-dipole intermolecular interactions.
19. How are the gas-phase acidity and basicity measured? Explain.
20. Explore the effect of steric strain on proton sponge molecules.
21. Give an account of the solvent properties of molten salts and reactions in such media.

22. Explain Slater's rule with examples.

### Part-C

Answer any **FOUR** questions.

(4 × 10 = 40)

23. Explain the periodic trends observed in

i) atomic radii ii) electron affinity iii) ionization potential among elements in period number two of the modern periodic table.

24. Construct Born-Haber's cycle for the formation of NaCl and discuss all the terms involved in the calculation of lattice energy.

25. Explain metallic conductors and insulators using band theory.

26. Discuss the uses of hydrogen bond in biological molecules.

27a. Enumerate the salient features of ionic liquids as solvents and highlight their importance in chemical reactions.

b. Write the classification of non-aqueous solvents. (5+5)

28a. Describe various methods of measuring the interaction of acids and bases.

b. How is a semiconductor solid artificially prepared? (5+5)

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