



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – CHEMISTRY

FIRST SEMESTER – NOVEMBER 2016

16UCH1MC01 – BASIC CONCEPTS IN INORGANIC CHEMISTRY

Date: 05-11-2016

Dept. No.

Max. : 100 Marks

Time: 01:00-04:00

PART A

ANSWER ALL QUESTIONS

(10x 2 = 20 Marks)

1. Arrange the following orbitals in the increasing order of energy based on Aufbau Principle. 3s, 5d, 6s and 4f.
2. Classify the elements as solid/liquid / gas. i) Iodine ii) Bromine iii) Chlorine iv) Fluorine.
3. Arrange the following in the increasing order of first ionisation energy. Na, Mg and Al.
4. Mention the oxidation number of Mn in Potassium permanganate and Manganese dioxide.
5. Draw the electron dot formula for H₂O and NH₃.
6. Draw the structure of Phosphorus pentachloride and mention its hybridisation.
7. Calculate the bond order of NO and predict the magnetic nature.
8. How do you classify solids based on their electrical conductivity?
9. What is Bleaching powder? Mention its importance.
10. Give reasons for the anomalous behaviour of fluorine compared to other elements in the same group.

PART B

ANSWER ANY EIGHT QUESTIONS

(8 x 5 = 40 Marks)

11. a) State Heisenberg theory of uncertainty principle. b) Pauli's exclusion principle.
12. Discuss the concept of diagonal relationship in the periodic table with a suitable example.
13. a) Classify the following as Bronsted Acid or Bases. i) HCl ii) NH₃ iii) NH₄⁺ iv) Cl⁻ v) KOH.
14. Explain Arrhenius concept of Acids and Bases. Mention any two strong bases
15. a) Calculate the oxidation number of Oxygen in Li₂O, OF₂, O₂F₂, Cl₂O₇, KO₂ and MgO.
b) Mention any two oxidising agents with their molecular formula. (3+2)
16. Explain how the molecular shapes are predicted using Sidgwick-Powell theory.
17. Mention the shape, bond angle, number of bond pairs and lone pairs in XeF₄ and NH₃
18. Apply hybridisation principle to predict the geometry of SF₆.
19. What is Bond order? Calculate the bond order for N₂ and He₂.
20. Distinguish n-type from p-type semi conductor with suitable examples.
21. Write a note on the reactivity of halides with i) water ii) phosphorus.
22. Predict the structures of ClF₃ and ICl₄⁻ using VSEPR theory.

PART C

ANSWER ANY FOUR QUESTIONS

(4 x 10 = 40 Marks)

23. Mention the salient features of Modern Periodic table over Mendeleev Periodic table and also mention the drawbacks of the Modern Periodic table.
24. a) What are the criteria employed for the calculation of oxidation number of elements. (6)
b) Mention the postulates of VBT and predict the shape of $[\text{PtCl}_4]^{2-}$ (4)
25. a) Explain the hybridisation and geometry in XeO_3 and CO_3^{2-} . (6)
b) What are the rules for linear combination of Atomic Orbitals. (4)
26. a) Sketch the Molecular orbital diagram of Oxygen molecule and calculate the bond order. (5)
b) Write a note on stoichiometric and nonstoichiometric defects in solids (5)
27. a) Mention any four pseudohalogens and explain the properties of CN^- (6)
b) Write a note on the oxidation states of various hypohalous acids (4)
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 Cr(III) and SO_4^{2-} in acidic medium. (6)
b) Explain the role of Liquid ammonia as a solvent. (4)
