



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – CHEMISTRY

FIRST SEMESTER – APRIL 2019

CH 1506– BASIC CONCEPTS IN INORGANIC CHEMISTRY

Date: 03-04-2019
Time: 01:00-04:00

Dept. No.

Max. : 100 Marks

PART A

ANSWER ALL QUESTIONS

10x 2 = 20 Marks

1. State Pauli's exclusion principle.
2. Identify the group and period in the modern periodic table for Calcium and Copper.
3. Arrange the following in the increasing order of electro negativity. Cl^- , S^{2-} , F^- and I^- .
4. Identify the following as ionic or covalent compounds: a) Magnesium Chloride b) Carbon tetrachloride.
5. Draw the electron dot formula for Carbondioxide and Sulphuric acid.
6. Mention the bond order and magnetic nature of F_2 ?
7. Which among the following does not form hydrogen bonding? Hydrogen sulphide, water and hydrofluoric acid. Justify your answer.
8. How do you classify solids based on their electrical conductivity?
9. Mention the oxidation state of Mn in Manganese Sulphate and Manganese Dioxide.
10. i) Classify the following as Bronsted Acid or Base i) HCl ii) NH_3 .

PART B

ANSWER ANY EIGHT QUESTIONS

8 x 5 = 40 Marks

11. a) State Heisenberg theory of uncertainty principle. b) Mention the limitations of Bohr's theory. (2+3)
12. What are isoelectronic species? Arrange the following ions in their increasing order of ionic radii and justify your answer. Al^{3+} and Na^+ .
13. What is ionization potential? How does it vary along a period and down a group?
14. Distinguish Valency from Covalency? Mention the covalency of Nitrogen atom in Ammonia and Nitrogen pentoxide.
15. What are the essential criteria for the formation of ionic bond?
16. Predict the shape, number of bond pairs, lone pairs and bond angle in Methane and Borontrifluoride.
17. What are the limitations of Octet rule? Explain the hybridisation in Ammonia. (2+3)
18. What is Bond order? Calculate the bond order for N_2 and He_2 .

19. What is hydrogen-bonding? Sketch the pattern of hydrogen bonding in p-Nitrophenol and o-Nitrophenol.
20. Distinguish n-type from p-type semi conductor with suitable examples.
21. Define acid-base behaviour proposed by Usanovich.
22. Explain Arrhenius concept of Acids and Bases. Classify the following as Strong or Weak Acids HF and HNO₃.

PART C

ANSWER ANY FOUR QUESTIONS

4 x 10 = 40 Marks

23. a) Mention the salient features of Modern Periodic table. (7)
b) What is de Broglie equation? Explain the terms in the equation. (3)
24. a) Identify the symbol and Atomic Number of the following elements i)Lead ii)Tin. (4)
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 [PtCl₄]²⁻.
b) Sketch the Molecular orbital diagram of Oxygen molecule. Why is it paramagnetic in nature? (4+6)
26. a) Mention the geometry, hybridisation and structure of Ammonia and XeF₄. (6)
b) Explain the concept of weak forces with suitable examples. (4)
27. a) Write a note on stoichiometric and nonstoichiometric defects in solids. (5)
b) Mention the reactivity of alkali metals in liquid Ammonia. (5)
28. a) Mention the oxidation state of Oxygen in O₂F₂ and KO₂ii) Balance the following equation by oxidation number method
K₂Cr₂O₇ + Na₂SO₃ giving Cr(III) and SO₄²⁻ in acidic medium. (2+4)
b) Mention any two oxidising and reducing agents. (4)

★★★★★★