

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034



B.Sc. DEGREE EXAMINATION – CHEMISTRY

FIRST SEMESTER – NOVEMBER 2019

16/17/18UCH1MC01 – BASIC CONCEPTS IN INORGANIC CHEMISTRY

Date: 30-10-2019

Dept. No.

Max. : 100 Marks

Time: 09:00-12:00

PART- A

Answer **ALL** questions

10X2 = 20

1. State Heisenberg's uncertainty principle.
2. What is inert pair effect?
3. Find the oxidation number of (i) As in H_3AsO_4 (ii) Cr in $\text{Cr}_2\text{O}_7^{2-}$
4. Calculate the equivalent mass of KMnO_4 in alkaline medium.
5. State octet rule.
6. What is Pauling Slater rule?
7. What are piezoelectric and pyroelectric crystals?
8. Which of the following has higher bond order?
 N_2 , N_2^+ and N_2^-
9. HF cannot be stored in glass bottles. Why?
10. How does chlorine react with ammonia?

PART- B

Answer any **EIGHT** questions

8 x 5 = 40

11. Discuss the postulates of Bohr's atom model.
12. (i). K^+ and Cl^- are isoelectronic, yet their ionic radii are different. Why?
(ii). Calculate the ionic radii of Na^+ and Cl^- in NaF crystal, whose interionic distance and screening constant are 231 pm and 4.15 respectively. (3+2)
13. a) Balance the following equation using ion electron method:-
 $\text{FeSO}_4 + \text{H}_2\text{SO}_4 \rightarrow \text{Fe}_2(\text{SO}_4)_3 + \text{MnSO}_4 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$ (3+2)
b) Which among the following is oxidizing and reducing agent. i) KMnO_4 ii) LiAlH_4
14. Write notes on (i) Disproportionation reaction (ii) Double decomposition
15. Explain the following theories of acids and bases with examples:- (2.5+ 2.5)
(i) Arrhenius theory (ii) Lowry- Bronsted theory
16. Mention the postulates of VSEPR theory.
17. Explain the geometry of PCl_5 molecule using its hybridisation.

18. (i) Define Sidgwick- Powell theory of molecules.
(ii) State Fajan's rule. (2.5+2.5)
19. Draw the MO diagram of CO molecule and calculate its bond order.
20. Discuss the theory and mechanism involved in super conducting materials.
21. (i) Account for the anomalous behaviour of fluorine.
(ii) How will you prepare bleaching powder? (3+2)
22. Explain the structure of IF₇ using VSEPR model.

PART- C

Answer any **FOUR** questions 4x10 = 40

23. Explain the following periodicity properties:- (4+3+3)
(i) Ionisation potential (ii) Electron affinity (iii) Electronegativity
24. Discuss the role of liquid ammonia in the following:- (4+3+3)
(i) Precipitation reaction (ii) Complexation reaction (iii) Acid- base reaction
25. Describe the structure and shape of SF₄ and XeO₃ using VSEPR theory.
26. Give a brief account on n- and p- type semi conductors with examples.
27. (i). What are pseudo halogens? (2)
(ii). Discuss the structure and properties of azide. (4)
(iii). Find out the oxidation state of halogens from the following:- (4)
a. OF₂ b. O₂F₂ c. Cl₂O₃ d. I₂O₄
28. (i) What are direct and indirect redox reactions? Mention its importance. (6+4)
(ii) Explain the effect of bonding and non-bonding electrons on the structure of ammonia molecule using VSEPR theory.
