



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – CHEMISTRY

FIRST SEMESTER – NOVEMBER 2017

17/16UCH1MC01 – BASIC CONCEPTS IN INORGANIC CHEMISTRY

Date: 06-11-2017

Dept. No.

Max. : 100 Marks

Time: 01:00-04:00

PART A

ANSWER ALL QUESTIONS

10x 2 = 20 Marks

1. The second ionization energy of sodium is greater than that of first ionization energy whereas in the case of magnesium it is not so. Justify your answer
2. Write the electronic configuration of copper and mention the group and period in which it is located in the modern Periodic table.
3. Mention the oxidation state of chromium in potassium dichromate and chromium sulphate.
4. Mention any two oxidising agents and write their chemical formula.
5. Draw the electron dot formula for ammonia and methane.
6. Mention the bond order and magnetic nature of F_2 .
7. Predict the hybridisation and geometry of ammonia molecule.
8. How do you classify solids based on their electrical conductivity?
9. Draw the structure of ClF_3 and IF_7 .
10. Classify the following as Bronsted acid or bases. i) HCl ii) NH_3 iii) NH_4^+ iv) Cl^-

PART B

ANSWER ANY EIGHT QUESTIONS

8 x 5 = 40 Marks

11. a) State Heisenberg theory of uncertainty principle. b) State Pauli's exclusion principle.
12. Write a brief note on the various factors that affect ionisation energy.
13. Explain Arrhenius concept of acids and bases. With examples.
14. Balance the redox reaction by ion-electron method
 $Cr_2O_7^{2-}$ (aqueous) + SO_2 (g) \rightarrow Cr^{3+} (aqueous) + SO_4^{2-} (aqueous)
15. Assign the oxidation number of the following underlined elements in the following species, i) $NaH_2\underline{P}O_4$ ii) $Na\underline{B}H_4$ iii) $Ca\underline{O}_2$ (2+2+1)
16. What is covalency? Mention the covalency of nitrogen atom in ammonia and ammonium ion.
17. Mention the shape, number of bond pairs and lone pairs in methane and water.
18. Arrive at the hybridisation and geometry of i) SF_6 ii) PCl_3

19. What is bond order? Calculate the bond order for O_2 , and O_2^{2+}
20. Distinguish n-type from p-type semi conductor with suitable examples.
21. Write a note on interhalogen compounds of iodine.
22. Explain the following with suitable examples i) Pseudohalogens ii) Halogen oxides

PART C

ANSWER ANY FOUR QUESTIONS

4 x 10 = 40 Marks

23. a) Mention the salient features of modern periodic table (6)
b) How do electron affinity and Ionisation energy vary across a period and down a group (4)
24. a) What are isoelectronic species? Arrange the following in the increasing order of ionic radii Al^{3+} , Cl^- , Na^+ , Mg^{2+} (2+2)
b) Explain the diagonal relationship between magnesium and lithium. (6)
25. a) What are the postulates of Valence bond theory? Predict the shape of $[PtCl_4]^{2-}$
b) Sketch the Molecular orbital diagram of nitrogen molecule and calculate the bond order. (5+5)
26. a) Mention the geometry, hybridisation and structure of ammonia and XeF_4 (6)
b) Explain any two types of chemical reactions with suitable examples (4)
27. a) Mention the criteria to be followed in assigning the oxidation number of elements based on their position in the Modern periodic table (4)
b) Mention the postulates of VSEPR Theory . and predict the structure of ICl_4^- and Cl_2O . (6)
28. a) Write a note on the anomalous behaviour of fluorine (5)
b) Mention the reactivity of alkali metals in liquid ammonia. (5)
