

CHEMISTRY PAPER-IX

(Inorganic Chemistry-A)

Time Allowed : Three Hours

Maximum Marks : 22

Note : Attempt five questions in all. One question from each Unit.
Question number IX is compulsory.

UNIT-I

1. (a) Why do the transition metal compounds are coloured ? Account for the colourless nature of Zn and Cd compounds. 2
- (b) How will you prepare KMnO_4 ? 1
- (c) What is the use of V_2O_5 ? 1
2. (a) How does $\text{Cr}_2\text{O}_7^{2-}$ ion react with SO_2 ? 1
- (b) Discuss the factors due to which transition elements have great tendency to form complexes ? 2
- (c) Calculate the magnetic moment (spin only) of Fe^{2+} ion. 1

UNIT-II

- 3. (a) Why is $ZrCl_4$ the most stable chloride of Zirconium, while for Palladium it is $PdCl_2$? 2
- (b) What are hetero polyanions? Give one example. 1
- (c) Write the electronic configuration of Pt ($Z = 78$). 1

- 4. (a) What happens when $AgCl$ is dissolved in NH_3 ? 1
- (b) Draw the structures of :
 - (i) Nb_2Cl_{10}
 - (ii) $[Re_2Cl_8]^{2-}$2
- (c) What is Wilkinson's Catalyst? 1

UNIT-III

- 5. (a) Discuss the factors affecting the stability of Chelates. 2
- (b) Briefly explain geometrical isomerism in Octahedral complexes. 1
- (c) Write IUPAC names of the following :
 - (i) $[Cr(PPL_3)(CO)_5]$
 - (ii) $Hg[CO(NCS)_4]$1

- 6. (a) Explain giving one example of each kind of the following isomerism:
 - (i) Coordinate isomerism
 - (ii) Linkage isomerism. 2
- (b) Why oxalic acid is used to remove rust stains? 1
- (c) Calculate EAN of central atom in the following :
 - (i) $[Fe(H_2O)_6]^{2+}$
 - (ii) $[Mn(CN)_6]^{4-}$1

UNIT-IV

- 7. (a) On the basis of Valence Bond Theory, explain the diamagnetic behaviour of $[Co(CN)_6]^{3-}$ 2
- (b) What are the limitations of valence bond theory? 2

- 8. (a) How will you account for the fact that nickel forms the tetrahedral complex with carbon monoxide? 2
- (b) What are the applications of coordinate compounds in Chemistry? 2

UNIT-V

- 9. (i) Write electronic configuration of inner transition elements. 1
- (ii) What is the geometry of the complex $[Co(NH_3)_4]^{2+}$? 1

- (iii) Write IUPAC name of the anti cancer drug cis-platin. 1
- (iv) Draw the structure of $[\text{Co}(\text{EDTA})]^{-}$ ion. 1
- (v) What is so unique about osmium other than its highest oxidation state ? 1
- (vi) Why do transition metals exhibit various oxidation states ? 1