

(i) Printed Pages : 3 Roll No. ....

(ii) Questions : 9 Sub. Code : 

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B.A./B.Sc. (General) 3<sup>rd</sup> Semester  
(2124)

**CHEMISTRY**

Paper : IX (Inorganic Chemistry A)

(Same for B.Sc. Microbial & Food Technology)

Time Allowed : Three Hours] [Maximum Marks : 22

**Note :**— Attempt FIVE questions in all, selecting ONE question each from Units I-IV and question 9 is compulsory.

**UNIT—I**

1. (a) Why do transition elements :
  - (i) Show variable oxidation states
  - (ii) Form a large number of complexes ? 2
- (b)  $\text{Cu}^{2+}$  ions are coloured and paramagnetic while  $\text{Zn}^{2+}$  ions are colourless and diamagnetic. Explain. 2
2. (a) Draw the structure of Chromium (II) acetate,  $[\text{Cr}(\text{CH}_3\text{COO})_2\text{H}_2\text{O}]_2$ . What is the bond multiplicity between two atoms in it ? 2
- (b) First ionisation energies of 5d elements are higher than those of 3d and 4d elements. Give reasons. 2

## UNIT—II

3. (a) Complexes of first transition series are mainly high spin while those of 2nd and 3rd transition series are of Low spin. Explain. 2
- (b) Draw the structure of  $\text{Nb}_2\text{Cl}_{10}$ . 1
- (c) Write electronic configuration of  $\text{Ru}(Z=44)$ . 1
4. (a) Compare second and third transition series with first series in terms of :
- (i) Oxidation states
- (ii) Magnetic properties. 2
- (b) Out of  $\text{Au(I)}$  and  $\text{Au(III)}$ , which state disproportionates and how ? 1
- (c) Draw the structure of  $\text{Re}_2\text{Cl}_8$  ion. 1

## UNIT—III

5. (a) Calculate the EAN of the central metal in the following complexes and tell which of them obeys EAN rule
- (i)  $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$  (ii)  $[\text{Mn}(\text{CN})_6]^{4-}$ . 2
- (b) Write IUPAC names of :
- (i)  $[\text{Cr}(\text{en})_2\text{Cl}_2]\text{Cl}$
- (ii)  $\text{Hg}[\text{Co}(\text{CNS})_4]$ . 2
6. (a) Explain giving one example of each kind of the following isomerism :
- (i) Ionisation isomerism (ii) Hydrate isomerism. 2
- (b) Draw all possible isomers of  $[\text{Rh}(\text{en})_2\text{Cl}_2]^+$ . 2

## UNIT—IV

7. (a) Why  $[\text{Mn}(\text{CN})_6]^{4-}$  is paramagnetic while  $[\text{Fe}(\text{CN})_6]^{4-}$  is diamagnetic ? Explain on the basis of VBT. 3
- (b) Name the Hybridization in  $[\text{Ni}(\text{CO})_4]$ . 1
8. (a) Which of the two :  $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$  or  $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$  has higher magnetic moment ? 2
- (b) Name the metals present in the following :
- (i) Vitamin  $\text{B}_{12}$
- (ii) Chlorophyll. 2

### (Compulsory Question)

9. (a) Which of the two  $[\text{Pt}(\text{CN})_4]^{2-}$  or  $[\text{Zn}(\text{NH}_3)_4]^{2+}$  is square planar and diamagnetic ?
- (b) What is the co-ordination number of Fe in  $[\text{Fe}(\text{EDTA})]^-$  ?
- (c) Name the first and the last element of the 2nd transition series.
- (d) How many  $\text{Cl}^-$  ions will be precipitated by  $\text{AgNO}_3$  in  $\text{CoCl}_3 \cdot 3\text{NH}_3$  complex ?
- (e) Name the divalent ion of the first transition series which has maximum magnetic moment.
- (f) Name a transition element which is liquid at room temperature.  $1 \times 6 = 6$