

## INORGANIC CHEMISTRY - II PAPER - I

(Common with B.Sc., B.Sc. (Bio-tech.),  
B.Sc. Industrial Microbiology - Part - II)

Time : Three Hours]

[Maximum Marks : 75

**Note :** Attempt *five* questions in all. Select at least *one* but not more than *two* questions from Section A, B, and C. Q. No. 9 of Section D is compulsory. All questions carry equal weightage.

### Section : A

1. Explain the following :
    - (a)  $\text{Cu}^{2+}$  is coloured and paramagnetic while  $\text{Zn}^{2+}$  is colourless and diamagnetic. 4
    - (b) Zn, Cd and Hg are not included in transition metals. 4
    - (c) Transition metals form alloys. 3
    - (d) 4s-orbital is filled prior to 3d-orbital but on ionisation, the 4s, electrons are lost first. 5
  2.
    - (a) Give main differences of Technetium and Rhenium from Manganese. 5
    - (b) What makes the chemistry of Zr and Hf so similar ? Explain. 5
    - (c) Write a note on Isopoly anions and Heteropoly anions. 5
- ### Section : B
3.
    - (a) Discuss geometrical isomerism in co-ordination isomerism. Illustrate with examples. 4
    - (b) Why tetrahedral complexes do not show optical isomerism ? 4
    - (c) Write IUPAC names of the following :
      - (i)  $[\text{Rn}(\text{NH}_3)_2\text{N}_2]\text{Cl}_2$  (ii)  $\text{Na}_3[\text{Co}(\text{NO}_2)_6]$
      - (iii)  $\text{K}_2[\text{HgCl}_4]$  3½
    - (d) Write short notes on the following :
      - (i) Linkage Isomerism. (ii) Hydration Isomerism.3½
  4.
    - (a) Discuss the extraction of Lanthanides by Ion-exchange method. 5
    - (b) What is Lanthanide contraction ? Mention its cause. 5
  5.
    - (a) Discuss the extraction of Uranium from monazite. 6
    - (b) Actinides show oxidation state higher than 3. Explain. 4½
    - (c) What is Nuclear fission ? Explain giving examples. 4½
- ### Section : C
6.
    - (a) What are Latimer diagrams ? What are their applications ? 5
    - (b) Discuss Disproportionation giving examples. 5
    - (c) Explain implications of Redox reactions. 5
  7.
    - (a) Comment on the statement—Strong acid has a weak conjugate base, and vice-versa. 4
    - (b)  $\text{Cl-OH}$  is acid,  $\text{NaOH}$  is base, why ? 4
    - (c) Out of trimethyl amine and ammonia, which is a stronger base, and why ? 3
    - (d)  $\text{BF}_3$  acts as a Lewis acid whereas  $\text{NF}_3$  does not. Why ? 3
  8.
    - (a) What are Non-aqueous solvents ? Give examples. 5
    - (b) Discuss acid-base reactions in Liquid ammonia. 5
    - (c) Explain why  $\text{SO}_2$  is a better solvent for organic compounds. 5
- ### Section : D
9. Write short answers of the following :
    - (a) Define EAN rule.
    - (b) Wgy  $\text{HOCN}$  is a stronger acid than  $\text{HCN}$  ?

- (c) Account for the solubility of AgI in  $\text{NH}_3(l)$ .
- (d) Which would be a better oxidising agent –  $\text{Co}^{+2}$  or  $\text{Co}^{+3}$  in water?
- (e) Why Hg is a liquid at room temperature?
- (f) Can pyridine behave as a ligand? Explain.
- (g) Complete the reaction :
- $$\text{HgI}_2 + \text{KI} \xrightarrow{\text{Liquid SO}_2} ?$$
- (h) Calculate the magnetic moment of  $\text{Cr}^{+3}$ .
- (i) What are Nuclear fuels?
- (j) Complete the reaction :  $\text{PCl}_5 + \text{SO}_2 \rightarrow ?$
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$10 \times 1\frac{1}{2} = 15$