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B.Sc. 3rd Semester (New Scheme) Examination,
November–2016
BIOTECHNOLOGY
Paper–BT-307
Inorganic Chemistry

Time allowed : 3 hours] *[Maximum marks : 40*

Note : *Attempt **five** questions in all. **Question No. 1 is compulsory.** Select **one** question from each section.*

1. (a) Write the general electronic configuration of d-block elements.

   (b) What is Ferri-magnetism ?

   (c) How can you explain the anamalous electronic configuration of chromium ?

   (d) Name the first and last element of Second transition series.

   (e) Why tetrahedral complexes does not show geometrical isomerism ?

   (f) Why does NH_3 readily form complexes but NH_4^+ does not ?

   (g) What are amphoteric solvents ?

   (h) Why solutions of alkali metal in liquid ammonia are blue in colour ? $8 \times 1 = 8$

Section–A

2. (a) The compounds of transition elements are generally coloured. Explain. 2

(b) Describe the magnetic properties of transition elements. 2

(c) Describe the structure and properties of : 4

(i) $CuCl_2$

(ii) $FeCl_3$

3. (a) Why Cu^{2+} is more stable than Cu^{+} ? 2

(b) Explain the catalytic properties of transition elements. 2

(c) Out of Fe^{3+} and Zn^{2+}, which one is coloured and why? 2

(d) Why do transition elements forms a large number of coordination compounds ? 2

Section–B

4. (a) Compare the 3d elements with 4d and 5d elements with reference to :

(i) Oxidation State

(ii) Ionic radii

(iii) Stereochemistry. 6

(b) Why the electronic spectra of first transition series are easy to interpret as compared to second and third transition series ? 2

5. (a) Discuss the general characteristics and properties of second and third transition elements. 4

(b) Complexes of first transition series are mainly high spin while those of second and third transition series are of low spin. Explain. 4

Section–C

6. (a) What are chelates ? Describe the factors which affect the stability of chelates. 4

(b) Write the basic postulates of Werner' coordination theory. Explain the bonding in $CoCl_3.5NH_3$ on the basis of this theory. 4

7. (a) Differentiate between low spin and high spin complexes with suitable examples. 4

(b) Describe the Ionisation and Hydrate isomerism in coordination with suitable examples. 4

Section–D

8. (a) Differentiate : 4

(i) Ionising and non-ionising solvents

(ii) Solvolytic and Solvation reactions

(b) Describe the acid-base reactions in 4

(i) Liquid NH_3

(ii) Liquid SO_2

9. (a) Describe briefly the physical properties of solvent. 4

(b) Discuss the Solvolytic reactions in : 4

(i) Liquid NH_3

(ii) Liquid SO_2