

B.Sc. 3rd Semester New Scheme

Examination, November-2017

(Bio-Technology)

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) What is Ferromagnetism? 1 × 8 = 8
(b) Write the electronic configuration of copper.
(c) Calculate the spin magnetic moment for Fe³⁺.
(d) Why Cu²⁺ is more stable than Cu⁺.
(e) Define Salvation reactions.
(f) What is bidentate ligand? Give one example.
(g) Why KCN is highly toxic whereas K₄[Fe(CN)₆] is not.
(h) Why AgI is soluble in liquid ammonia?

Section A

2. (a) Why do transition elements: 6
(i) form a large number of complexes
(ii) give coloured and paramagnetic ions
(iii) form interstitial compounds.

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- (b) The salts of Zinc, Cadmium and Mercury are white. Explain. 2
3. (a) Describe the structure and important properties of: 4
(i) FeCl_3 (ii) $\text{Ni}(\text{CO})_4$
- (b) The transition elements show variable oxidation states. Explain. 2
- (c) Out of Co^{2+} and Co^{3+} , which one is better oxidising agent in water and why? 2

Section B

4. (a) Discuss the variation of ionic radii and oxidation state in 3d, 4d and 5d-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
5. (a) Compare the stereochemistry and spectral properties of 3d elements with 4d and 5d-elements. 4
- (b) Discuss the general characteristics of second and third transition series. 4

Section C

6. (a) Differentiate between linkage and ionisation isomerism with suitable examples. 4
- (b) Describe: 4

- (i) Chelates
 - (ii) Outer orbital complexes.
7. (a) According to Valence bond theory, $[\text{Ni}(\text{CN})_4]^{2-}$ is square planar while $[\text{NiCl}_4]^{2-}$ is tetrahedral. Explain. 4
- (b) What is effective atomic number? Calculate the EAN for the complexes: 4
- (i) $[\text{Cu}(\text{CN})_4]^{3-}$
 - (ii) $[\text{Fe}(\text{CN})_6]^{4-}$

Section-D

8. (a) Describe the classification of solvent as: 4
- (i) Protonic and non-protonic solvents
 - (ii) Acidic, basic and amphoteric solvents
- (b) Discuss the precipitation and acid-base reactions in liquid ammonia. 4
9. (a) Compare the properties of liquid ammonia with water. Why liquid ammonia is a better solvent than water? 4
- (b) Describe briefly the Solvolytic and precipitation reactions in liquid SO_2 . 4