Recd 26/11/2024 morn

(i) Printed Pages : 3

Roll No. .....

(ii) Questions : 9

Sub. Code : 1 7 4 5 1

Exam. Code : 0 0 0 5

B.A./B.Sc. (General) 5th Semester

(2124)

CHEMISTRY

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

Paper—XVII : Inorganic Chemistry–A

Time Allowed : Three Hours] **[Maximum Marks : 22**

Note :— Attempt ***five*** questions in all selecting at least ***one*** question from each Unit 1–4. Q. No. **9** (Unit-5) is compulsory.

UNIT—1

1. (a) Giving a neat diagram, explain the splitting of d-orbitals in Octahedral and Tetrahedral Complexes.

   (b) Define crystal field stabilization energy. Calculate its value for following systems :

   (i) $[Co(CN)_6]^{3-}$.

   (ii) d^3 low spin tetrahedral. 2+2

OR

2. (a) How will you predict a complex to be high spin or low spin on the basis of crystal field spliting (Δ_0) and pairing energy (P) ?

(b) Why Ti^{3+} is purple in aqueous solution while Zn^{2+} is colourless.

(c) Why anyhydrous $CuSO_4$ is colourless whereas hydrated $CuSO_4$ is coloured. 4

UNIT—2

3. (a) Discuss the Polarisation Theory of Trans effect.

(b) Suggest the synthesis of two isomers of $[PtCl_2NH_3NO_2]$ starting from $[PtCl_4]^{2-}$ on basis of Trans effect and bond strength. 2+2

OR

4. (a) Name the factors affecting stability of complex. Explain any one.

(b) Derive the general relationship between stepwise and overall stability constant. 2+2

UNIT—3

5. (a) What is Hapticity ? Give examples of ligands of various Hapticity.

(b) Calculate EAN for the following :

(i) $Fe\ (\pi - C_5H_5)_2$

(ii) $[Pt(NH_3)_5Cl]^{3+}$ 2+2

OR

6. (a) How is homogenous hydrogenation of C_2H_4 carried out by using Wilkinson's Catalyst ?

(b) Discuss the structure of $Fe_2(CO)_9$. 2+2

UNIT—4

7. (a) What is a Porphyrin ? Draw the structure of Heme.

(b) Discuss in detail and a Na^+-K^+ Pump in biological system. 2+2

OR

8. (a) What is Bohr's effect. Discuss Hb-O_2 binding curve at different pH.

(b) Write a short note on Biological Fixation of N_2. 2+2

UNIT—5

9. (a) What are nitrogenase ?

(b) What is IUPAC name of $Ni(\pi - C_5H_5)_2$?

(c) What is Wilkinson catalyst ? Give its geometry.

(d) Define Chelate Effect.

(e) What is Spectrochemical Series.

(f) What is Kurnakov Test for the complex of type PtA_2X_2?

$6 \times 1 = 6$