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B. Sc. EXAMINATION

(Fifth Semester)

CHEMISTRY

CH-301

Inorganic Chemistry

Time : Three Hours   *Maximum Marks : 27*

Note : Q. No. **1** is compulsory. Attempt *Five* questions in all, selecting *two* questions from each Section.

1. Short answer type questions :

   (a) Give relationship between Δ_t and Δ_0.
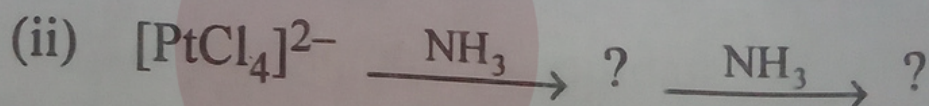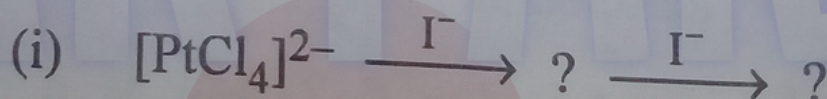
   (b) Calculate CFSE value for d^4 and d^5 tetrahedral ion.

   (c) What is $\log \beta$? How is it related to stability of complexes ?

(d) What is Magnetic Susceptibility ?

(e) What is the term symbol of p^6 and d^{10} ?

(f) Calculate the number of microstates in p^4 configuration.

(g) Define Curie's point. $1 \times 7 = 7$

Section A

2. (a) What is the magnitude of crystal field splitting in tetrahedral complexes Δ_t smaller than octahedral complexes, Δ_0 ?

2

(b) Draw and explain the splitting of d-orbital in octahedral crystal field of ligands. 3

3. (a) What is chelate effect ? How does chelation increase the stability of a complex ?

3

(b) Predict the product of the following reactions :

2

(i) $[PtCl_4]^{2-} \xrightarrow{I^-} ? \xrightarrow{I^-} ?$

(ii) $[PtCl_4]^{2-} \xrightarrow{NH_3} ? \xrightarrow{NH_3} ?$

4. (a) Explain Kurnakov test for the complexes of type $[PtA_2X_2]$.   2

(b) Calculate CFSE value for the following :   3

    (i) d^7 (high spin octahedral)

    (ii) $[Cr(CN)_6]^{4-}$

    (iii) d^3 (tetrahedral)

Section B

5. (a) Calculate spin magnetic moment for Fe^{3+} and Cu^+ ion.   2

(b) Discuss briefly the Gouy's method for measuring magnetic susceptibility.   3

6. (a) Discuss orbital contribution to magnetic moment in octahedral complexes.   2

(b) Calculate the term symbol for ground state of :   3

    (i)   Cr $(3d^5 4s^1)$

    (ii)   Ni $(3d^8 4s^2)$

7. (a) Explain in brief Orgel diagram of d^1, d^4, d^6 and d^9 complexes in octahedral and tetrahedral field. 3

(b) Derive term symbol for p^2 configuration. 2

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