

KATWA COLLEGE
5th SEMESTER HONOURS COURSE
INTERNAL ASSESSMENT EXAMINATION – 2021
DEPARTMENT: CHEMISTRY

SUBJECT: Inorganic Chemistry

COURSE CODE: CC-XI

FULL MARKS: 10

TIME: 10.00 A.M. – 11.00 A.M.

DATE: 10.01.2022

Answer any two questions.

2x5 = 10

1. (a) 0, +1 and -1 oxidation states of titanium are stabilised in its tris-chelate complexes with 2,2'-bipyridine - explain why it happens so!
(b) State the characteristics of the tetrakis- complex of titanium with $C_5H_5^-$ (cyclopentadienyl anion).
2. (a) How would you differentiate between Fe(+2) and Fe(+3) salts using the ferrocyanide/ferricyanide as the reagents. Write relevant chemical reactions.
(b) "Two different complexes are formed when manganous iodide is allowed to react with alkyl isocyanide."- Comment.
3. (a) Find the ground state term for Pr^{3+} ion. Use that term to find the theoretical magnetic moment of that ion.
(b) Why experimental magnetic moment of Sm^{3+} differs from the theoretical value (calculated using Lande formula) ?
4. (a) The enthalpy of hydration of Cr^{2+} is -460 Kcal/mol. In the absence of crystal field stabilization energy the value of ΔH would be -435 Kcal/mol. Estimate the Δ for $[Cr(H_2O)_6]^{2+}$.
(b) The aqueous solution of $[Ti(H_2O)_6]^{3+}$ shows a maximum absorption around 20300 cm^{-1} in its electronic spectrum. Express the band position in nm. Is the complex visible in colour ?
5. (a) What are the pre-requisites for coordination complex to be amenable to spin crossover? Discuss with an example.
(b) On addition of conc. HCl, the pink aqueous solution of Co^{2+} ion changes to blue- explain.

Send your answer script in a single .pdf file to the E-mail id: gtm.icbu@gmail.com mentioning your

Roll Number in the subject line.