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PG (CBCS)
M.SC. Semester-IV Examination, 2021
CHEMISTRY
PAPER: CEM-403

(ADVANCED INORGANIC CHEMISTRY-II)

Full Marks: 40 **Time: 2 Hours**

Answer any <u>FOUR</u> questions from the following: 4X10= 40

1. (a) What is intimate (I) mechanism?What are the differences between I_a and I_d mechanism?

   (b) Explain the base hydrolysis of $[Co(NH_3)_5Cl]^{2+}$ complex and derive the rate equation. 5 + 5

2. (a) What is complementary and non-complementary redox reaction? Give an example of each.

   (b) State the important factors which affect the rate of inner sphere reaction. 5 + 5

3. (a) What is electroprotic reaction? Give an example.

   (b) Explain mechanistically the oxidation of Cr (III) to Cr (IV) by peroxodisulphate, catalyzed by Ag^+. 5 + 5

4. (a) Write advantages and disadvantages of dropping mercury electrode(DME).

   (b) What are polarized and depolarized electrodes?

   (c) Write the characteristics of supporting electrolyte for the cyclic voltammetry. 4 + 3 + 3

5. Deduce the relationship between half wave potential and standard redox potential of a system. 10

6. What is Franck-Condon principle of electron transfer reaction?How do we distinguish an inner sphere from an outer sphere mechanism? Describe inner sphere electron transfer reaction mechanism with an example. 3+3+4

7. (a) Write down an inner and outer sphere mechanism for the reduction of $[Co(NH_3)_5Cl]^{2+}$ ion by $[Cr(H_2O)_6]^{2+}$ ion.
   (b) Explain the TG curve for $CaC_2O_4.H_2O$ (calcium oxalate) 5 +5

8. (a) Derive the rate equation for associative mechanism for L_5MX complex where seven coordinate intermediate has appreciable life time. Consider Y as attacking molecule.

   (b) Acid catalysed aquation of chromium complex of ethylenediammine is slower than that of the biguanide complex. Explain. 5 +5

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