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MSCCH-506

Inorganic Chemistry-II

M.Sc. Chemistry (MSCCH)

2nd Semester Examination, 2022 (June)

Time : 2 Hours] **Max. Marks : 80**

Note : This paper is of Eighty (80) marks divided into two (02) Sections A and B. Attempt the questions contained in these sections according to the detailed instructions given therein.

SECTION–A

(Long Answer Type Questions)

Note : Section 'A' contains Five (05) long answer type questions of Twenty (20) marks each. Learners are required to answer any Two (02) questions only.

(2×20=40)

1. (a) What the factors that influences the rate of acid hydrolysis of octahedral complexes.

(b) Derived the relation between stepwise and overall stability constant.

2. Attempt any two of the following :

(a) Discuss MO diagram for an octahedral complex

(b) What is Crystal Field splitting ? Explain Crystal Field splitting in octahedral complexes.

(c) What is the charge transfer transition ? Classify the charge transfer transition.

3. What is magnetic susceptibility ? Describe the Guoy's method for the determination of magnetic susceptibility of complexes.

4. What is the orgel diagram? Gives its limitations. Draw and explain Orgel diagram of d^1 and d^8 electronic configurations.

5. Attempt any two of the following :

(a) Discuss the theories of the trans effect.

(b) What are inner sphere reactions ? Explain inner sphere reactions with suitable example.

(c) What are the factors that affect the rates of electron transfer reactions?

(d) Discuss the types of magnetic behaviours.

SECTION–B

(Short Answer Type Questions)

Note : Section 'B' contains Eight (08) short answer type questions of Ten (10) marks each. Learners are required to answer any Four (04) questions only. (4×10=40)

1. What is the crystal field theory ? Give the limitations of crystal feild theory.

2. Write short note on the following :

(a) Spectrochemical series.

(b) Microstates.

(c) Anation reaction.

3. Discuss the outer sphere mechanism of electron transfer reactions.

4. Find the ground state term symbol for the ions, d^1, d^2, d^7, d^6 and d^8 electronic configuration.

5. Attempt any two of the following :

(a) Spin selection rule of the d-d transition

(b) What is the crystal field stabilization energy ? Calculate the CFSE for d^6 and d^4 ion in both high and low spin field.

(c) Spin cross over.

6. Discuss briefly $S_N{}^1CB$) mechanism for the reaction :

$[Co(en)_2NH_3Cl]^{+2} + OH^- \rightarrow [Co(en)_2NH_3(OH)]^{+2} + C1^-$

7. State and explain Hunds rule for assigning ground state spectroscopic term with suitable examples.

8. Attempt any two of the following :

(a) Chelate effect.

(b) Laport selection rule.

(c) Explain Marcus theory.