

2019

Full Marks : 80

Time : 3 hours

*The figures in the right hand margin indicate marks.
Answer from both the Section as directed.*

(ADVANCE INORGANIC CHEMISTRY)

SECTION - A

1. Answer any *four* of the following: **(04x04=16)**
- (a) Draw the crystal field splitting energy diagram for Square Planar complex.
 - (b) Explain Curie-Weiss Law.
 - (c) Write briefly the Marcus-Hush theory.
 - (d) Differentiate between stability and lability of metal complex with examples.
 - (e) Write the *trans* effect series.
 - (f) Write two spectroscopic methods for the determination of stability constant of metal complex.

OR

2. Answer *all* questions : **(02x08=16)**
- (a) Write down the short-comings of Valence Bond Theory (VBT).
 - (b) MO Diagram of O₂ molecule.
 - (c) Differentiate between ferromagnetism and ferrimagnetism.

(Turn over)

(2)

- (d) Write correlation between stepwise and overall stability complex.
- (e) Why are $[M^{n+}(en)_3]^{n+}$ complexes more stable than $[M^{n+}(H_2O)_6]^{n+}$?
- (f) Explain inner sphere mechanism with one suitable example.
- (g) How can we predict the lability of complex on the basis of crystal field theory?
- (h) What is anation reaction? Give example.

SECTION - B

Answer all questions

(16x4=64)

3. (a) What is CFSE? Calculate CFSE for an octahedral complex with a suitable example.

OR

- (b) Write notes on:
(i) Crystal field theory
(ii) Sigma - Pi bonding in co-ordination compounds.

4. (a) What is magnetic susceptibility? How can you determine magnetic susceptibility by Guoy's Method?

OR

- (b) Write notes on:
(i) Temperature Independent paramagnetism.
(ii) Anti-ferromagnetism.

(Continued)

(3)

5. (a) Describe various factors affecting the stability of metal complex.

OR

- (b) Write notes on:
(i) Chelate effect.
(ii) Determination of stability constant.

6. (a) Write excited state outer sphere electron transfer reaction mechanism of $[Ru(py)_3]^{+}$ complex. Also discuss its photo-catalytic activity.

OR

- (b) Write notes on:
i) S_N1CB
ii) Trans effect.