

M.Sc.(Chem.) Semester - 1 (CBCS) Examination
Nov/Dec-2023 (SYLLABUS YEAR JUNE-2018)
INORGANIC CHEMISTRY (CORE)

Time: 2:30 Hours**Marks: 70****Instructions:**

1. Figures to the right indicate marks.
 2. All questions are compulsory.
-

Que.1(A) Answer the following. (04)

- 1) What is d-d overlapping? Give example and drawing.
- 2) Calculate average bond order of NO_3^- .

Que.1(B) Answer any two questions out of three. (10)

- 1) Explain $[\text{Co}(\text{Cl})_4]^{2-}$ and $[\text{Co}(\text{NH}_3)_4]^{+6}$ according to VBT theory.
- 2) Discuss the Walsh diagram in detail.
- 3) Explain AB_4 molecule with one lone pair based on VBT and VSEPR.

Que.2(A) Answer the following. (04)

- 1) Briefly discuss the amphoteric nature of Al.

Que.2(B) Answer any two questions out of three. (10)

- 1) Write a note on chemical properties of oxygen group.
- 2) Discuss the oxide and carbide of alkaline earth metal.
- 3) Discuss the physical properties of nitrogen family.

Que.3(A) Answer the following. (04)

- 1) Write a note on optical isomerism in square planar complexes.

Que.3(B) Answer any two questions out of three. (10)

- 1) Discuss electronic spectra in d^1 and d^6 configuration in high spin complex.
- 2) Explain the Werner theory with the help of $[\text{Pt}(\text{NH}_3)_6]^{+4}$.
- 3) Discuss the geometrical isomerism in 6 C.N. compounds.

Que.4(A) Answer the following. (04)

- 1) Briefly discuss electronic effect of inert ligands.

Que.4(B) Answer any two questions out of three. (10)

- 1) Discuss $\text{S}_\text{N}1$ and $\text{S}_\text{N}2$ reaction in 6 C.N. complexes.
- 2) Discuss the trans effect in metal complex with suitable example.
- 3) What are the factors affecting substitution reaction in metal complex?

Que.5(A) Answer the following. (04)

- 1) Write a note on recoilless emission in MB spectroscopy.

Que.5(B) Answer any two questions out of three. (10)

- 1) Discuss the use of MB Spectra in Prussian Blue and Turnbull's Blue.
- 2) What is quadrupole splitting in MB spectroscopy? Explain in detail with example.
- 3) What is Mossbauer effect? Discuss the theory of MB spectroscopy.
