

M.Sc.(Chem.) Semester - 1 (CBCS) Examination
OCT/NOV-2025 (AS PER SYLLABUS YEAR JUNE-2018)
INORGANIC CHEMISTRY (CORE)

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

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

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- Q.1 (A) Answer the following (04)**
(1) What are bond parameters? Give suitable examples.
- Q.1 (B) Answer any two questions out of three. (10)**
(1) Explain NO molecule via MOT theory.
(2) Explain important features and limitations of VBT theory with extension from Pauling and Slater's Theory.
(3) Discuss the overlapping of different orbitals with suitable example.
- Q.2 (A) Answer the following. (04)**
(1) Write a note on O.S. and nature of Carbon family elements.
- Q.2 (B) Answer any two questions out of three. (10)**
(1) Discuss size of atoms and ionization energy of boron family.
(2) Give explanation of O.S. and inert pair effect of Boron family.
(3) Explain the chemical properties of nitrogen family.
- Q.3 (A) Answer the following. (04)**
(1) Briefly explain linkage and ligand isomerism.
- Q.3 (B) Answer any two questions out of three. (10)**
(1) Discuss the Warner theory Co-ordination compounds via $[\text{Co}(\text{NH}_3)_6]^{3+}$.
(2) Discuss geometrical isomerism in 6 Co-ordination number compounds.
(3) Explain term symbol and its calculation with suitable example.
- Q.4 (A) Answer the following. (04)**
(1) Discuss the factors affecting the labile/inert nature of complexes.
- Q.4 (B) Answer any two questions out of three. (10)**
(1) Discuss the substitution reaction in square planar complexes.
(2) Write a note on oxidation-reduction reaction of metal complexes.
(3) Explain the trans effect and theory of trans effect in square planar complexes.
- Q.5 (A) Answer the following (04)**
(1) What is recoil energy? Discuss condition for recoil less emission:
- Q.5 (B) Answer any two questions out of three. (10)**
(1) Explain Mossbauer instrumentation.
(2) Explain the valance state identification of Prussian Blue –Turnbul's Blue by use of MB Spectroscopy.
(3) Discuss the effect of ligand bonding by use of MB Spectra.
