Roll No.							

25-CH-21

M.Sc. II SEMESTER [MAIN/ATKT] EXAMINATION MAY - JUNE 2025

CHEMISTRY

Paper - I

[Inorganic Chemistry - II]

[Max. Marks : 75] *[Time : 3:00 Hrs.]* *[Min. Marks : 26]*

Note : Candidate should write his/her Roll Number at the prescribed space on the question paper.
Student should not write anything on question paper.
Attempt all five questions. Each question carries an internal choice.
Each question carries **15 marks.**

Q. 1 a) Derive ground state terms for d^1 to d^{10} configuration. **(5 Marks)**

b) Draw and explain orgel diagrams for $[V(H_2O)_6]^{+3}$ and $[Ni(H_2O)_6]^{+2}$ Complexes. **(8 Marks)**

c) What are the limitations of orgel diagram. **(2 Marks)**

OR

a) How Tanabe - Sugano diagrams are differ from orgel diagrams ? **(5 Marks)**

b) Draw and explain Tanabe Sugano diagrams for d^2 and d^3 octahedral complexes. **(10 Marks)**

Q. 2 Define Quenching of orbital contribution and explain the conditions responsible for it. **(15 Marks)**

OR

Explain magnetic exchange coupling and spin - cross over. **(15 Marks)**

Q. 3 Draw and explain molecular orbital energy level diagram of Co as suggested by Coulson. **(15 Marks)**

OR

Explain reactivity and biological importance of dioxygen and dinitrogen complexes. **(15 Marks)**

Q. 4 a) Define metal clusters and explain various factors which favour metal - metal bonding. **(05 Marks)**

b) Explain quadruple bonds for $[Re_2Cl_8]^{-4}$ compound. **(10 Marks)**

P.T.O.

OR

a) Explain Wade's rule with suitable example. State the relation between closo, nido and arachno structure of boranes. **(05 Marks)**

b) Explain 4 digit coding system (styx) of bonding in boranes. Codify $B_2 H_6$ using 4 digit coding system. **(10 Marks)**

Q. 5 Explain the followings - **(15 Marks)**

i) Ellipticity and circular dichroism.

ii) Isomerisation due to non - planarity of chelate ring.

OR

Explain Faraday and Kerr effect and its applications. **(15 Marks)**