Roll No. _____ **Code No. Q-4307**

SECOND SEMESTER EXAMINATION 2021-22

M.Sc. CHEMISTRY

Paper - I

Inorganic Chemistry

Time : 3.00 Hrs. **Max. Marks : 80**

Total No. of Printed Page : 03 **Mini. Marks : 29**

Note:- Question paper is divided into three sections. Attempt question of all three section as per direction Distribution of marks is given in each section.

Section 'A'

Very short answer question (in few words)

Q.1 Attempt any six questions from the following : 6x2=12

(i) How steric factor affect the thermodynamic stability of complexes ?

(ii) Write two important characteristics of exothermic reaction.

(iii) Which complexes are inert and labile according to valence bond theory ?

(iv) Write the factors which favours SN^2 association mechanism in substitution reaction.

(v) What is trans effect ?

(vi) Write a difference between closo carbornaes and Nido Carboranes.

(vii) Write the 3 isomeric focus of Dicarbo closo do deca carboranes $\left(C_2B_{10}H_{12}\right)$.

(viii) Write any three important tertiary phosphine ligands. (with structure)

(ix) Write a method to prepare Metal Carbonyls.

(x) Define Heteropoly acids.

Section 'B'

Short answer type question (in 200 words)

Q.1 Attempt any four questions from the following : 4x5=20

(i) Derive the relation between stepwise formation constant and overall formation constant.

(ii) Explain with example, how trans effect is useful in distinguishing cis and trans isomers.

(iii) Explain the effect of Chelation on the thermodynamic stability of complexx with example.

(iv) Write a note on transition metal Nitrosyls.

(v) What are metalloboranes ? Write two methods to prepare metalloborances.

(vi) Explain mechanism of substitution reaction in square planer complexes.

(vii) Write a note on Isopolyacids of Molybednum.

Section 'C'

Long answer/Essay type question. **4x12=48**

Q.3 Attempt any four questions from the following questions :

(i) What is acid hydrolysis ? Give evidences to support the mechanism.

(ii) Explain the inertness and lability of the complexes on the basis of crystal field theory.

(iii) What are redox reactions ? Explain the inner sphere mechanism of electro transfer reactions.

(iv) Explain the nature of bonding on metal carbonyls. Discuss the applications of vibrational spectra of metal carbonyls.

(v) Explain the types of bonds present in boranes. Draw the structure of Pentaborane and write its methods of preparation.

(vi) Explain the formation of heteropolyacids of tungsten. Explain the structure of heteropolyacids.

(vii) Write a note on the following :

(a) Reactions without metal ligand bond cleavage.

(b) Energy profile of Endothermic reaction.

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