Or

Write notes on

(*i*) Borazines

(*ii*) Phosphorazine.

5. Describe valence bond and crystal field theories with examples to understand the lability of complex.

Or

Write notes on the following topic in view of stability of metal complex (*i*) charge to radius ratio (*ii*) Steric effect.

6. How one can produce H_2 from H_2O using $[Ru(py)_3]^+$ complex as catalyst ? Also discuss its excited state outer sphere mechanism.

Or

Discuss kinetics and mecahnism of basic catalyzed hydrolysis reaction of octahedral complex. Also explain S_N1CB reaction.

M.Sc.–Chem-IIS (407)

2018

Time : 3 hours

Full Marks : 80

Answer from **both** the Sections as per direction

The figures in the right-hand margin indicate marks

Candidates are required to answer in their own words as far as practicable

(ADVANCE INORGANIC CHEMISTRY)

SECTION–A

1. Answer any *four* of the following : 4 × 4

(*a*) Write the structure of $Mn_2(CO)_{10}$ and calculate effective atomic number.

(*b*) Write first metal complex with N_2 and describe how it is prepared.

(*c*) Describe briefly the determination of stability constants by spectrophometrically.

(*d*) How is CFT helpful for explanation of lability of complex ?

(*e*) Define trans effect with examples.

(*f*) What are anation reactions ? Give two examples.

Or

2. Answer *all* questions from the following : 2 × 8

(*a*) What do you mean by heterocatenation ? Give two examples.

(*b*) Show by the pictorial diagram of M-CO back bonding.

(*c*) What is quadruple bond in metal cluster give one example ?

(*d*) Differentiate between thermodynamic and kinetic stability of complex.

(*e*) What is driving force for more stability of chelate complex ?

(*f*) Write nature of bonding in ferrocene.

(*g*) Give one example of each inner sphere and outer sphere electron transfer reactions in metal complexes.

(*h*) What is S_N1 and S_N2 reaction in view of ligand substitution reactions in octahedral complex ?

SECTION–B

Answer **all** questions : 16 × 4

3. Describe synthesis, characterization and applications of polynuclear metal clusters. Write Wade's rule too.

Or

Write notes on

(*i*) Ferrocene

(*ii*) Metal nitrosyl.

4. Describe synthesis, properties and structure of Metallacarboranes including metal-metal multiple bonds.