5. What do you understand by labile and inert complex ? Explain on the basis of the crystal field theory and the laws of lability and inertness of octahedral complexes.

Or

What do you understand by stepwise constant and overall constant ? Explain how to determine formation constant by potentiometric method.

6. Discuss the outer sphere mechanism of electron transfer reaction.

Or

Discuss in detail the mechanism involved in electron transfer reaction. Give suitable example.

Avijit

M.Sc–Chem-IIS- (407)

2017

Time : 3 hours

Full Marks : 80

The figures in the right-hand margin indicate marks.

Answer from both the Groups as directed.

(Advance Inorganic Chemistry)

SECTION—A

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

(*a*) Suggest structure for P_7H_3 and its anion $P_7H_3^{-2}$.

(*b*) Differentiate inert and labile complexes. Give examples.

(*c*) Explain what is mean by S_N1CB mechanism. Give an example.

(*d*) Comment on role of the pi-bonding in determining the geometry of the product formed during the acid hydrolysis of octahedral complexes.

(*e*) Write notes on heterocatetion.

(*f*) Discuss the mechanism of aquation of trans $[CO(en)_2ClOH]^+$ complexes.

Or

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

(*a*) What is metal cluster ? Illustrate giving suitable example.

(*b*) Which one is known as inorganic benzene ? Give reason.

(*c*) What do you mean inert complex ?

(*d*) Write any one synthetic route for the preparation of phosphazine.

(*e*) Calculate the EAN of the central metal atom or ion in

(*i*) $Mn(CO)_5(CH_3)$

(*ii*) $[MN(CO)_5(C_2H_4)]^+$

(*f*) Nickel complexes are observed to undergo substitution much faster than platinum complex. Explain.

(*g*) Hydroxide ion is a stronger base than ammonia and yet it reacts more slowly than ammonia with a square planner complex.

(*h*) What do you mean by Trans effect ?

SECTION—B

Answer *all* questions 16×4

3. Describe the procedure for predicting the skeletal structure of high nuclearity and low nuclearity carbonyl clusters. Are there any exceptions to the Wade's rules used in the above procedure ?

Or

Write the preparation, properties of ferrocene.

4. What are carboranes ? How are boranes and carboranes classified ?

Or

Discuss the structure, bonding, synthesis and properties of borazine.