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Sem-I **MEB-4691** Seat No._____

M. Sc. (Sem. II) Examination

November / December - 2018

Inorganic Chemistry

(New Course)

Time : 3 Hours] [Total Marks : 70

Instruction : All questions carry equal marks.

1 (a) Answer any **two** of the following : **10**

(1) Explain valence shell electron pair repulsion (VSEPR) theory by taking suitable examples.

(2) Explain : Energy of hybridization.

(3) Explain : Walsh diagram for an AB_2 triatomic molecule.

(b) Answer any **one** of the following : **4**

(1) Explain "Bent rule" by giving suitable example.

(2) Derive the wave function and bond angles in CH_4.

2 (a) Answer any **two** of the following : **10**

(1) Discuss briefly how the following factors affecting the stability of metal complexes.

(a) Electronic configuration of central metal ion.

(b) Basicity of ligand.

(2) Explain chelate effect and thermodynamic origin for complexes.

(3) Explain : Stepwise formation constant.

(b) Answer any **one** of the following : 4

(1) Describe Job's method to determine Binary formation constant.

(2) Explain : Overail formation constant.

3 (a) Answer any **two** of the following : 10

(1) Explain trans effect with suitable examples.

(2) Propose efficient routes to obtain cis and trans $\left[Ptcl_2(NH_3)(PPh_3)\right]$

(3) Explain with suitable examples inner sphere and outer sphere reaction.

(b) Answer any **one** of the following : 4

(1) Give definition of trans effect. Discuss the polarization theory of trans effect.

(2) Explain : stable, instable, labile and inert metal complexes.

4 (a) Answer any **two** of the following : 10

(1) Explain Tanebe – Sugano diagram for d^2 – configuration.

(2) Explain M.O. diagram for oh-complexes.

(3) Explain the limitation of crystal field theory.

(b) Answer any **one** of the following : 4

(1) Write a note on π – bonding.

(2) Explain the factor affecting the value of Δ_0.

5 Answer any **seven** of the following : 14

(1) Predict the shape of H_2O molecule on the basis of Walsh diagram.

(2) Give the definition of trans influence.

(3) Using VSEPR theory predict the shape of NH_3 and SF_4.

(4) What is hybridization ? State hybridization in oh and in $Fe(CO)_5$.

(5) What is CFSE ? Calculate the CFSE for $\left[Co(H_2O)_6\right]^{+2}$ complex.

(6) What is bond order ? Calculate bond order in co-molecule.

(7) Which orbitals are involved in t_{29} and e_9.

(8) What is ligand ? Give an example of hexadentate ligand.

(9) Limitation of Walsh diagram.

(10) Calculate the μ_s for d^4 in weak oh field.