ABR-1651 Seat No. _____

M. Sc. (Sem. I) Examination

November/December - 2016

CHN-401 - Chemistry : Paper - I

(Inorganic)

Time : 3 Hours] [Total Marks : 70

Instruction : All questions carry **equal** marks.

1 (a) Answer any **two** : **10**

(1) Explain the valence shell Electron Pair Repulsion theory.

(2) Explain : $d\pi - p\pi$ bond.

(3) Explain Walsh diagram with example.

(b) Answer any **one** : **4**

(1) Derive the wave functions for SP^3-hybrid orbitals. Determine the bond angle.

(2) Explain : Bent rule.

2 (a) Answer any **two** : **10**

(1) Write short note on Chelate effect.

(2) Discuss the factors affecting from metal side on the stability of the complexes.

(3) Discuss the difference between stepwise and overall formation constants.

(b) Answer any **one** : 4

(1) Explain the spectrophotometric method for determining binary formation constant.

(2) Desribe : Job's method.

3 (a) Answer any **two** : 10

(1) Explain the factors affecting on acid hydrolysis.

(2) Short note on Marcus-Hush theory.

(3) Explain the following mechanism : A, D & I.

(b) Answer any **one** : 4

(1) Explain : Labile and Inert metal complexes.

(2) What is trans effect ? Discuss the π-bonding theory of trans effect.

4 (a) Answer any **two** : 10

(1) Describe the effect of π-bond in complex compound.

(2) Explain M.O. diagram for Td complex.

(3) Explain the M.O. diagram of Co (III) ions in strong field for Oh. Complex/

(b) Answer any **one** : 4

(1) Explain : Tanabe-Sugano diagram for the d^2-configuration.

(2) Explain the limitations of crystelfield theory.

5 Answer any **seven** : 14

(1) Give the order of repulsive energies between lone pairs and bond pairs electrons.

(2) Write L.P. and B.P. electrons in $[TeF_5]^-$, CH_4 and H_2O molecules.

(3) Limitation of Walsh diagram.

(4) Draw the actual moelcular structure of COF_2 and SOF_4.

(5) Why Mi^{II} with 8-hydroxy quinoline is more stable than that of Mi^{II} with 2-methyl, 8-hydroxy quinoline ?

(6) Stable and unstable terms are used for _____ stability.

(7) What is hydrolysis reactions ?

(8) State the bond order of CO.

(9) Calculate the CFSE for $Mi(CO)_4$ complex.

(10) Which orbital are involved in t_{2g} and eg.