



GDE-1751

Seat No. _____

M. Sc. (Sem. I) Examination

December - 2015

Chemistry - I

(CHN-401) (Inorganic)

Time : 3 Hours]

[Total Marks : 70

Instruction : All questions carry equal marks.

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

(1) Using VSEPR theory predict and draw the structure of NO_2^+ , NO_2^- and NO_2 .

(2) Discuss Walsh diagram for AB_2 molecule.

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

(b) Answer any one of the following : 4

(1) Explain free radical reation in covalently bonded molecules.

(2) Explain automic inversion by giving suitable example.

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

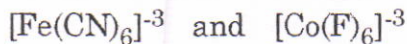
(1) Discuss how the following factors affecting on the stability of complex.

(i) Properties of metal ion

(ii) Properties of ligand

- (2) Discuss the chelate effect and thermodynamics origin for metal complex.
- (3) Explain : Stepwise formation constant and overall stability constant.
- (b) Answer any one of the following : 4
- (1) Describe pH-metric method to determine binary formation constant.
- (2) Determination of stability constant of a metal complex by spectrophotometric absorbance method.
- 3 (a) Answer any two of the following : 10
- (1) Explain : SN^1 conjugate base mechanism in complex.
- (2) What is trans-effect ? Explain electrostatic polarization theory of trans-effect.
- (3) Explain substitution reactions in square planar Pt(II) complexes.
- (b) Answer any one of the following : 4
- (1) Explain : Labile and Inert complexes.
- (2) Explain the following terms affecting the rate of reaction.
- (i) Trans effect
- (ii) Leaving group.
- 4 (a) Answer any two of the following : 10
- (1) Explain : The limitation of CFT.
- (2) Draw the M.O. diagram for $[CO(F)_6]^{-3}$ complex and explain.

(3) Calculate CFSE for following complexes.



(z = 26)

(z = 27)

(b) Answer any one of the following : 4

(1) Explain the effect of π -bonding on the value of splitting of d-orbitals.

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

5 Answer any seven of the following : 14

(1) Why the bond angles in NF_3 and (F_2O) are less than those in NH_3 and H_2O ? Explain.

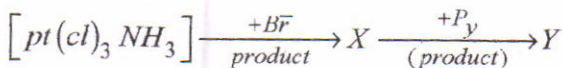
(2) Why the bond length decreasing in the following ions ?



(3) What is thermodynamic stability ?

(4) Why $[\text{Fe F}]^{+2}$ complex more stable than that $[\text{Fe Cl}]^{+2}$?

(5) Complete the reaction



(6) What is steric effect ?

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

(8) Calculate the CFSE for $[\text{Fe}(\text{H}_2\text{O})_6]^{+3}$ complex.

(9) Which orbitals are involved in t_{2g} and e_g ?

(10) State the bond order of CO.