



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions. (15x2=30)

- (i) What is the electronic configuration of the Lanthanides and Actinides?
- (ii) Why are the Lanthanides and Actinides also known as Rare Earth elements?
- (iii) Where are the Lanthanides and Actinides found in the periodic table?
- (iv) Differentiate between inner and outer orbital complexes?
- (v) Give limitations of VBT?
- (vi) Explain the magnetic behavior complexes by comparing its VBT and MOT picture of iron (II) complexes?
- (vii) Give two applications of metal complexes in biological systems?
- (viii) What is a bent bond?
- (ix) Give the names of the sub groups of the elements of Lanthanide ores?
- (x) How CFT explains magnetic properties of metal complexes?
- (xi) Explain the structure of $[\text{Ni}(\text{CN})_4]^{2-}$ according to valence bond theory?
- (xii) What is the role of spectrochemical series?
- (xiii) What are the uses of Lanthanides and Actinides in industries and technology?
- (xiv) Draw the structure of following molecules as per VSEPR model?
AB₇ and AB₄E
- (xv) What are geometrical isomers, explain with examples?

Q.2 Explain following with suitable examples. (3x10=30)

- (a) What is Lanthanide contraction? How it effects the properties of Lanthanides?
- (b) How coordination complexes are prepared. Give details with examples.
- (c) Explain the geometry of AB₈ and AB₉ type of molecules with reference to hybridization theory.