Answer any five questions   [2×5=10]

1. The lanthanide (III) ion having the highest partition coefficient between tri-n-butylphosphate and concentrated HNO_3 is:

(a) La (III)   (b) Eu (III)   (c) Nd (III)   (d) Lu (III)

2. According to crystal field theory, Ni^{2+} can have two unpaired electrons in

a) Octahedral geometry only   b) Square-planar geometry only

c) Tetrahedral geometry only   d) Both octahedral & tetrahedral geometry

3. The electronic spectrum of $[CrF_6]^{3-}$ shows three bands at 14900, 22400, 34800 cm^{-1}. The value of Δ_0 in this case is:

a) 5500 cm^{-1} b) 14900 cm^{-1} c) 22400 cm^{-1} d) 34,800 cm^{-1}

4. What distortion is expected for octahedral d^9-ion? State with reason.

5. Green coloured $Ni(PPh_2Et)_2Br_2$, has a magnetic moment of 3.20 B.M. The geometry and the number of isomers possible for the complex respectively, are

a) Square-planar and one   b) Tetrahedral and one

c) Square-planar and two   d) Tetrahedral and two

6. State and explain dynamic Jahn-Teller effect with example.

7. Anomalous magnetic properties are exhibited by some lanthanide elements-Explain.

8. The pair of lanthanides with the highest third-ionization energy is:

(a) Eu, Gd   (b) Eu, Yb   (c) Dy, Yb   (d) Lu, Yb