Week 3: Assignment 3

The due date for submitting this assignment is passed.

As per our records you have not submitted the assignment.

Due on 2023-02-19, 23:59 EST.

1. Given the molecular formulas of the two coordinated complexes
   (i) Fe(CO)₅Cl₂ and
   (ii) Co(NH₃)₆Cl₂
   Write the molecular formula(s) of the complexes.
   - (i) Fe(CO)₅Cl₂
   - (ii) Co(NH₃)₆Cl₂

2. Using crystal field theory, identify the following complex ions that shows spin-only magnetic moment values.
   - [Fe(CN)₆]³⁻
   - [Co(NH₃)₆]²⁺
   - [Ni(NH₃)₆]²⁺
   - [Cu(NH₃)₄]²⁺

3. Calculate the magnetic moment of an octahedral Co(III) complex is 4.8 BM. The electronic configuration of the complex is
   - [Co(NH₃)₆]³⁻
   - [Co(NH₃)₅Cl]²⁻
   - [Co(NH₃)₄Cl₂]⁺
   - [Co(NH₃)₃Cl₃]⁻

4. Which of the following complexes is Jahn-Teller distorted?
   - [Fe(O₂)₂Cl₂]²⁻
   - [Ni(NH₃)₅Cl]²⁻
   - [Co(NH₃)₅Cl₂]⁻
   - [Cu(NH₃)₄Cl]²⁻

5. Consider the two complexes (A) [Ni(NH₃)₆]²⁺ and (B) [Ni(NH₃)₆]³⁻, the right statement is
   - Complex (A) is diamagnetic and complex (B) is paramagnetic.
   - Both are diamagnetic.
   - Both are paramagnetic.
   - Complex (A) is diamagnetic and complex (B) is diamagnetic.

6. The correct spin state of [Cr(CN)₆]³⁻ is
   - 1/2
   - 3/2
   - 5/2
   - 7/2

7. The correct spin-only magnetic moment of [MoO₄]²⁻ is
   - 4.8 BM
   - 4 BM
   - 6 BM
   - 8 BM

8. The complex that shows orbital contribution to the magnetic moment is
   - [Fe(CN)₆]³⁻
   - [Ni(NH₃)₆]²⁺
   - [Co(NH₃)₆]³⁻
   - [Cu(NH₃)₄Cl]²⁻