

These problems are intended to *supplement* the problems in the textbook, not *replace* them.

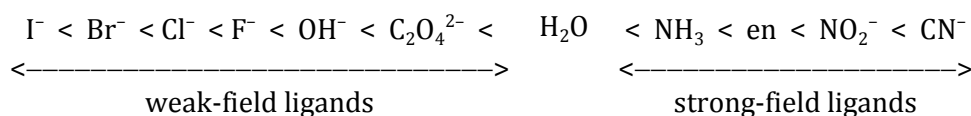
Questions

What is the coordination number and oxidation state for the central metal atom in each of the following complexes?

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|---|---|
| 1. K [Au(CN) ₄] | 6. [Fe(en) ₃] ³⁺ |
| 2. [Cu(NH ₃) ₄] SO ₄ | 7. [Ni(NH ₃) ₆] (ClO ₄) ₂ |
| 3. [Cr(H ₂ O) ₆] Cl ₃ | 8. Na [Co(EDTA)] |
| 4. Al [CuI ₂] ₃ | 9. [Fe(CN) ₂ (NH ₃) ₂ (H ₂ O) ₂] NO ₃ |
| 5. [Pt(C ₂ O ₄)(H ₂ O) ₂] | 10. K [VCl ₂ (CN) ₄] |

For each of the following complexes, indicate whether it has color or not, and whether it is diamagnetic or paramagnetic.

Spectrochemical series:



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|---|--|
| 11. [V(C ₂ O ₄)(H ₂ O) ₄] | 14. [Fe(CN) ₆] ⁴⁻ |
| 12. [Rh(en) ₃] ³⁺ | 15. [OsCl ₄ F ₂] ⁴⁻ |
| 13. [PbF ₆] ²⁻ | 16. [Zn(OH) ₄ (H ₂ O) ₂] ²⁻ |

Which member of each pair absorbs light at the longer wavelength?

17. [Cu(H₂O)₆]²⁺ or [Cu(NH₃)₄(H₂O)₂]²⁺
 18. [Cr(H₂O)₆]³⁺ or [CrBr₆]³⁻
 19. [Ni(NH₃)₄(H₂O)₂]²⁺ or [Ni(CN)₆]⁴⁻

Answers

If you cannot figure out how to get the correct answer, go to your instructor, Science Tutoring Center, etc.

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|----------|-----------------------------|--|
| 1. 4, +3 | 8. 6, +3 | 14. yes color, diamagnetic |
| 2. 4, +2 | 9. 6, +3 | 15. yes color, paramagnetic |
| 3. 6, +3 | 10. 6, +5 | 16. no color, diamagnetic |
| 4. 2, +1 | 11. yes color, paramagnetic | 17. [Cu(H ₂ O) ₆] ²⁺ |
| 5. 4, +2 | 12. yes color, diamagnetic | 18. [CrBr ₆] ³⁻ |
| 6. 6, +3 | 13. no color, diamagnetic | 19. [Ni(NH ₃) ₄ (H ₂ O) ₂] ²⁺ |

7. 6, +2 Note: in 17-19 the ligand causing the *smallest* energy gap, Δ will have the largest λ