

## Quiz for Video 11 – Complex Ions and Combining K values

1. What is a complex ion?
  - a) A neutral molecule with multiple charges
  - b) A single ion with no attached molecules
  - c) A mixture of cations and anions in solution
  - d) A central metal ion bonded to one or more ligands
2. What is the term for a molecule or ion that donates a pair of electrons to a metal ion in a complex ion?
  - a) Catalyst
  - b) Precipitate
  - c) Reducing agent
  - d) Ligand
3. Which of the following is a common ligand in complex ion formation?
  - a)  $\text{Na}^+$
  - b)  $\text{Cl}_2$
  - c)  $\text{CO}_2$
  - d)  $\text{NH}_3$
4. What is the coordination number of a metal ion in a complex?
  - a) The number of oxidation states the metal can have
  - b) The number of ligands the metal ion is bonded to
  - c) The total number of atoms in the metal complex
  - d) The number of donor atoms directly attached to the metal ion
5. What is the name of the equilibrium constant associated with the formation of a complex ion?
  - a)  $K_a$
  - b)  $K_{sp}$
  - c)  $K_w$
  - d)  $K_f$
6. The formation constant ( $K_f$ ) for a complex ion is typically:
  - a) Very small
  - b) Equal to 1
  - c) Negative
  - d) Very large
7. How does adding a ligand such as  $\text{NH}_3$  affect the solubility of  $\text{AgCl}$  in water?
  - a) It has no effect
  - b) It decreases solubility
  - c) It causes precipitation
  - d) It increases solubility by forming a complex ion
8. If a reaction consists of multiple equilibrium steps, how do you determine the overall equilibrium constant?
  - a) Add the equilibrium constants
  - b) Subtract the equilibrium constants
  - c) Take the reciprocal of each equilibrium constant
  - d) Multiply the equilibrium constants
9. What happens to the equilibrium position if additional binding ligand is added to a complex ion solution?
  - a) The complex ion decomposes
  - b) The complex ion remains unchanged
  - c) The reaction shifts toward reactants
  - d) The reaction shifts toward product formation, increasing complex ion concentration
10. Why do transition metals often form complex ions?
  - a) They have low electronegativity
  - b) They are highly reactive
  - c) They lack available orbitals
  - d) They have empty or partially filled d-orbitals that can accept electron pairs