

### Exercise 3.45 – Transition metals summary questions

---

**Q345-01** Transition metals can be distinguished from main group metals by the fact that: transition metals compounds have a greater tendency to form coloured solutions.  
main group metals only have +1 or +2 oxidation states.  
main group metals have higher relative atomic masses than transition metals.  
most main group metals are silvery.

---

**Q345-02** Which of the following salts form coloured solutions when dissolved in water?

- I -  $\text{ScCl}_3$
- II -  $\text{FeCl}_3$
- III -  $\text{NiCl}_2$
- IV -  $\text{ZnCl}_2$

- A. I and II only
  - B. II and III only
  - C. III and IV only
  - D. I, I, III and IV
- 

**Q345-03** Which 'd' block ion is not coloured?

- A.  $\text{Ni}^{2+}$
  - B.  $\text{Fe}^{2+}$
  - C.  $\text{Sc}^{3+}$
  - D.  $\text{Cr}^{3+}$
- 

**Q345-04** Which of the following best explains the colour of a transition metal complex ion in solution?

- A. The transition metal ions transfer electrons to the molecules in water absorbing energy
  - B. The 3d orbitals have different energies and transitions between them are possible absorbing energy.
  - C. Electrons are lost from the transition metal ions absorbing energy
  - D. The ligands transfer electrons to the transition metal ion and loses energy.
- 

**Q345-05** Which complex ion is colourless?

- A.  $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$
  - B.  $[\text{Fe}(\text{CN})_6]^{4-}$
  - C.  $[\text{Cu}(\text{NH}_3)_4]^{2+}$
  - D.  $[\text{Zn}(\text{H}_2\text{O})_4]^{2+}$
- 

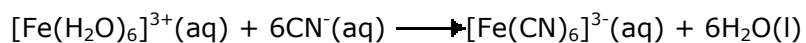
**Q345-06** Which of the following could not act as a ligand in a complex of a d-block element?

- A.  $\text{Cl}^-$
  - B.  $\text{NCl}_3$
  - C.  $\text{PCl}_3$
  - D.  $\text{PCl}_5$
-

### Exercise 3.45 – Transition metals summary questions

---

**Q345-07** In the equation below the cyanide ions act as which of the following?



- A. Brønsted bases
  - B. Lewis acids
  - C. Ligands
  - D. Reducing agents
- 

**Q345-08** Which of the following is an essential feature of a ligand?

- A. A negative charge
  - B. An odd number of electrons
  - C. The presence of two or more atoms
  - D. The presence of a non-bonding pair of electrons
- 

**Q345-09** Which of the following particles can act as ligands in complex ion formation?

- I -  $\text{Cl}^-$
- II -  $\text{NH}_3$
- III -  $\text{H}_2\text{O}$

- A. I and II only
  - B. I and III only
  - C. II and III only
  - D. I, II and III
- 

**Q345-10** Which of the following species involves the transition metal in one of its common oxidation states?

- I       $\text{Cr}_2\text{O}_7^{2-}$
- II      $\text{MnO}_4^{3-}$
- III     $\text{FeCl}_3$

- A. I and II only
  - B. I and III only
  - C. II and III only
  - D. I, II and III
-