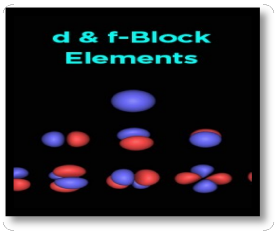


National Institute of Open Schooling
Senior Secondary Course : Chemistry
Lesson 21 : d-Block and f-Block Elements
Worksheet-21

1. People residing near villages have a tendency to dispose waste in water A person was disposing mercury cells in water. A student Raju, asked the person not to do so.

(i) What are the harmful effects of mercury?

(ii) What values are associated with the above discussion?

2. $KMnO_4$ is commercially obtained from ore Pyrolusite. It exists in the form of dark purple crystals. It is moderately soluble in water at room temperature and its solubility increases with the rise in temperature. $KMnO_4$ is useful oxidising agent and oxidises under neutral, acidic and basic conditions.

(i) What happens when $KMnO_4$ is heated?

(ii) What is Baeyer's reagent?

(iii) How does it act as a test for unsaturation?

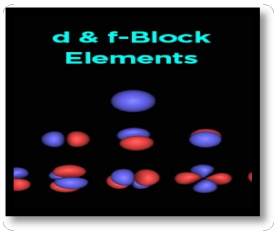
(iv) What is value associated with the use of $KMnO_4$in our daily life?

3. Nickel is the second most abundant element by weight in earth crust. The Mond's process provides us high purity of nickel. Most of the nickel produced is used to make ferrous and non ferrous alloys. Nickel provides both the strength of steel and its resistance to chemical attack. Nickel is used in making alloys for coins in USA. It is widely used as a catalyst especially in hydrogenation of vegetable oils to get vegetable ghee. Nickel is also used in Ni-Cd cell?

(i) What is the use of Nickel steel and why?
(ii) How is Nickel of high purity, obtained by Mond's process?
(iii) Why is Ni-Cd cell preferred over lead storage cell?
(iv) Why is vegetable oil better than vegetable ghee? What values are possessed by people, taking vegetable oils?
(v) Why is nickel used for alloys used in making coins?

4. Why do transition elements show variable oxidation states? How is the variability in oxidation states of d-block different from that of the p-block elements?

5. Why do transition elements show variable oxidation states? In 3d series (Sc to Zn), which element shows the maximum number of oxidation states and why?



National Institute of Open Schooling
Senior Secondary Course : Chemistry
Lesson 21 : d-Block and f-Block Elements
Worksheet-21

6. **(i)**MnO is basic whereas Mn_2O_7 is acidic in nature. Why?
(ii) Transition metals form alloys. Why?
(iii) Complete the following equation:
$2MnO_4 + 4KOH + O_2 \longrightarrow$

7. **(a)** How would you account for the following:
(i) Actinoid contraction is greater than lanthanoid contraction.
(ii) Transition metals form coloured compounds.
(b) Complete the following equation:
$2MnO_4 + 6H+ + 5NO_2 \longrightarrow$

8. Explain the following observations :

(i) Generally there is an increase in density of elements from titanium (Z = 22) to copper (Z = 29) in the first series of transition elements.

(ii) Transition elements and their compounds are generally found to be good catalysts in chemical reactions.

9. Assign reasons for the following :

(i) Copper (I) ion is not known in aqueous solution.
(ii) Actinoids exhibit greater range of oxidation states than lanthanoids.

10. An aqueous solution of a compound (A) is acidic towards litmus and (A) sublimes at about 300^0C. (A) on treatment with an excess of NH_4SCN gives a red coloured compound (B) and on treatment with a solution of $K_4(Fe(CN)_6)$ gives a blue coloured compound (C). (A) on heating with excess of $K_2Cr_2O_7$ in the presence of concentrated H_2SO_4 evolves deep red vapour of (D). On passing the vapours of (D) into a solution of NaOH and d then adding the solutions of acetic acid and lead acetate a yellow precipitate of compound (E) is obtained. Identify A to E and give chemical equations involved.