

Assignment
Class -XII Science
d and f Block elements
October 2023

Q-1 When Cu^{2+} ion is treated with KI, a white precipitate is formed. Explain the reaction with

the help of a chemical equation

Q-2 Although fluorine is more electronegative than oxygen, but the ability of oxygen to stabilise higher oxidation states exceeds that of fluorine. Why?

Q-3 Although Zr belongs to 4d and Hf belongs to 5d transition series but it is quite difficult to

separate them. Why?

Q-4 When a chromite ore (A) is fused with sodium carbonate in free excess of air and the product is dissolved in water, a yellow solution of compound (B) is obtained. After treatment of this yellow solution with sulphuric acid, compound (C) can be crystallised from the solution. When compound (C) is treated with KCl, orange crystals of compound (D) crystallise out. Identify A to D and also explain the reactions.

Q-5 When an oxide of manganese (A) is fused with KOH in the presence of an oxidising agent

and dissolved in water, it gives a dark green solution of compound (B). Compound (B) disproportionates in neutral or acidic solution to give purple compound (C). An alkaline solution of compound (C) oxidises potassium iodide solution to a compound (D) and

compound (A) is also formed. Identify compounds A to D and also explain the reactions involved

Q-6 (a) Answer the following questions:

(i) Which element of the first transition series has the highest second ionisation enthalpy?

(ii) Which element of the first transition series has highest the third ionisation enthalpy?

(iii) Which element of the first transition series has the lowest enthalpy of atomisation?

(b) Identify the metal and justify your answer.

(i) Carbonyl $M(CO)_5$

(ii) MO_3F

Q-7 Mention the type of compounds formed when small atoms like H, C and N get trapped

inside the crystal lattice of transition metals. Also give physical and Chemical characteristics of these compounds.

Q-8 A violet compound of manganese (A) decomposes on heating to liberate oxygen and

compounds (B) and (C) of manganese are formed. Compound (C) reacts with KOH in the

presence of potassium nitrate to give compound (B). On heating compound (C) with

conc. H_2SO_4 and NaCl, chlorine gas is liberated and a compound (D) of manganese along

with other products is formed. Identify compounds A to D and also explain the reactions involved.

Q-9 Give similarities and differences between Lanthanides and Actinides.

Q-10 Discuss change in basic character of oxides of transition elements in a series.