CBSE Class 12 physics
Important Questions
Chapter 8
The d- and f- Block Elements

3 Marks Questions

1. Transition metals generally form coloured ions. Why? Which of the following will be colored? Sc^{3+}, V^{2+}, Mn^{2+}, Cu^{+}, Ni^{2+}

Ans. Transition metals form coloured ions due to d-d transition. Coloured ions will be those which have unpaired electrons.

Sc^{3+}	$3d^0$	Colourless
V^{2+}	$3d^3$	Coloured
Mn^{2+}	$3d^5$	Coloured
Cu^{+}	$3d^{10}$	Colourless
Ni^{2+}	$3d^8$	Coloured.

2. Explain the steps of preparation of potassium dichromate?

Ans. Preparation of potassium dichromate takes place in three steps.

Step 1: Fusion of chromite ore with sodium or potassium carbonate in free excess of air.

$$4FeCr_2O_4 + 8Na_2CO_3 + 7O_2 \rightarrow 8Na_2CrO_4 + 2Fe_2O_3 + 8CO_2$$

Step 2: Conversion of Sodium Chromate to Sodium Dichromate by acidifying it.

$$2Na_2CrO_4 + 2H^+ \rightarrow Na_2Cr_2O_7 + H_2O + 2Na^+$$

Step 3: Conversion of sodium dichromate to potassium dichromate by reaching it with KCl.

$$Na_2Cr_2O_7 + KCl \rightarrow K_2Cr_2O_7 + NaCl$$

3. What is the lanthanoid contraction? What are its causes and consequences?

Ans. Lanthanoid contractions – The cumulative effect of the regular decrease in size or radii of Lanthanoid with increase in atomic number is called Lanthanoid contraction.

Causes - The shape of f orbitals is diffused. They have poor shielding effect due to which the effective nuclear charge increase with increase in atomic number. This causes a decrease in atomic radii

Consequences – Due to Lanthanoid contraction-

1. Radii of the members of the third transition series is similar to those of second transition series.

2. It becomes difficult to separate Lanthanoids.