Chapter- 08

Transition and Inner transition elements Marks- 6 with option 8

Multiple Choice Questions (1 Mark)

i) The following ion has the maximum number of unpaired electrons

(a) Sc^{3+} (b) Ti^{3+}

(c) Fe^{3+} (d) Co^{2+}

ii) In 3d series, if nuclear charge increases, the shielding effects will ____

(a) increases (b) decreases

(c) first increase then decrease (d) first decrease then increase

iii) Transition elements have more tendency to form interstitial compounds because of..

(a) defect in their crystal lattice (b) they have reducing property

(c) they have low ionization enthalpy (d) they have same atomic size

iv) The following electronic configuration of elements shows highest oxidation state

(a) $3d^5 4S^2$ (b) $3d^5 4S^1$

(c) $3d^{10} 4S^2$ (d) $3d^{10} 4S^1$

v) Zinc does NOT show variable valency because _____

(a) complete 4S subshell **(b) complete d subshell**

(c) incomplete d subshell (d) incomplete S subshell

vi) The catalyst used for decomposition of $KClO_3$

(a) ZnO **(b) MnO_2**

(c) CuO (d) K_2O

vii) The atomic number of transuranium elements starts from-----

(a) 89-103 (b) 90-103

(c) 91-103 **(d) 93-103**

viii) The following pair of elements has half-filled d-orbitals

(a) chromium and cobalt (b) manganese and nickel

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(c) chromium and manganese (d) cobalt and nickel

Very Short Answer Questions (1 Mark)

i) Write a formula to calculate magnetic moment.

ii) Write the general electronic configuration of 3d series.

iii) Write the name of the radioactive element of Lanthanoid.

iv)What is lanthanide contraction?

v) Write chemical formula of ore of zinc.

vi) Write the name of alloy formed from copper and tin.

vii) Which alloy is used in the Fischer-Tropsch process in the synthesis of gasoline ?

viii)Write the name of catalyst used in the hydrogenation of ethene to ethane .

ix) Write the general electronic configuration of lanthanoids.

Short Answer Questions (Type- Ⅰ) (2 Marks)

Q.1) Salt of Sc^{3+} and Ti^{4+} are colorless. Explain why?

Q.2) Write observed electronic configuration of Europium (Z=63) and Gadolinium (Z=64).

Q.3) Distinguish between lanthanides and actinides.

Q.4) Manganese in the +2 oxidation state is more stable than +3 oxidation state where as iron is stable at +3 oxidation state than +2 oxidation state. Explain why?

Q.5) Explain terms cast iron and wrought iron with their uses?

Q.6) What are the causes of lanthanide contraction?

Q.7) Calculate the spin only magnetic moment of divalent cation of a transition metal with atomic number 26.

Q.8) Write similarities between Lanthanoids and actinoids.

Q.9) Define: a) Ore b) Mineral

Q.10) Define: Gangue. Write chemical composition of Haematite.

Short Answer Questions (Type-II) (3 Marks)

Q.1) Give similarities and differences in the elements of 3d,4d and 5d series.

Q.2) Discuss the position of d-block elements, lanthanoids and actinoids in the periodic table.

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Q.3) Calculate magnetic moment of thorium (Z=90). Is this element diamagnetic or paramagnetic?

Q.4) What are interstitial compounds? write any four properties of it.

Q.5) What are ferrous and non-ferrous alloys? Write any two uses of alloy.

Q.6) What are rare earth elements? Write any two properties and uses of actinides.

Q.7) Define: a) Pyrometallurgy b) Hydrometallurgy c) Electrometallurgy

Long Answer Questions (4 Marks)

Q.1) Ground state electronic configurations of gadolinium and lawrencium are different than expected. Explain why?

Q.2) Explain the trends in: (a) Atomic radii (b) Oxidation state of 3d elements.
Which factors relate to the color of transition metal?

Q.3) Define transuranium and d-block elements. Write two applications of lanthanides and actinides.

Q.4) Write the chemical composition of the following minerals.
i) Haematite ii) Chalcopyrite iii) Calamine iv) Chalcocite

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