

- 1.(D)** NH_4^+ ions are increased to suppress release of OH^- ions, hence solubility product of $\text{Fe}(\text{OH})_3$ is attained. Colour of precipitate is different.
- 2.(D)** A more basic ligand forms stable bond with metal ion, Cl^- is most basic amongst all.
- 3.(A)** According to their positions in the periods, these values are in the order :

	Yb^{3+}	<	Pm^{3+}	<	Ce^{3+}	<	La^{3+}
Atomic numbers	70		61		58		57
Ionic radii (pm)	86		98		103		106

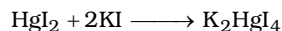
Ionic size decreases from La^{3+} to Lu^{3+} due to lanthanide contraction.
- 4.(C)** The common stable oxidation state of all lanthanides is +3. The oxidation states of +2 and +4 are also exhibits and these oxidation states are only stable in those cases where stable $4f^0$, $4f^7$ or $4f^{14}$ configurations are achieved. Ce^{4+} is stable due to $4f^0$ configuration.
- 5.(A)** $\text{Mn}^{2+}(3s^2 3p^6 3d^5)$ has the maximum number of unpaired electrons (5) and therefore has maximum magnetic moment.
- 6.(A)** Mercury is such a metal which exists as liquid at room temperature.
- 7.(D)** When heated at red heat, AgNO_3 decomposes to metallic silver.

$$2\text{AgNO}_3 \longrightarrow 2\text{Ag} + 2\text{NO}_2 + \text{O}_2$$
- 8.(D)** Due to lanthanide contraction, the ionic radii of Ln^{3+} (lanthanide ions) decrease from La^{3+} to Lu^{3+} . Thus, the lowest value (here 0.85 Å) is the ionic radius of Lu^{3+} .
- 9.(B)** Dilute nitric acid converts chromate into dichromate and H_2O .

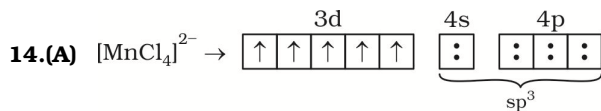
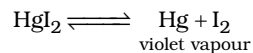
$$2\text{K}_2\text{CrO}_4 + 2\text{HNO}_3 \longrightarrow \text{K}_2\text{Cr}_2\text{O}_7 + 2\text{KNO}_3 + \text{H}_2\text{O} \quad \text{or} \quad 2\text{CrO}_4^{2-} \xrightleftharpoons{\text{H}^+} \text{Cr}_2\text{O}_7^{2-} + \text{H}_2\text{O}$$

yellow orange
- 10.(D)** $_{26}\text{Fe} = 1s^2 2s^2 2p^6 3s^2 3p^6 3d^6 4s^2$
 $\text{Fe}^{2+} = 1s^2 2s^2 2p^6 3s^2 3p^6 3d^6$
 The number of d-electrons retained in $\text{Fe}^{2+} = 6$
- 11.(B)** The second ionisation potential values of Cu and Cr are sufficiently higher than those of neighbouring elements. This is because of the electronic configuration of Cu^+ which is $3d^{10}$ (completely filled) and of Cr^+ which is $3d^5$ (half-filled), i.e., for the second ionisation potentials, the electron is to be removed from very stable configurations.
- 12.(C)** With increase in atomic number i.e., in moving down a group, the number of the principal shell increases and therefore, the size of the atom increases. But in case of f-block elements there is a steady decrease in atomic size with increase in atomic number due to lanthanide contraction.
 As we move through the lanthanide series, 4f-electrons are being added one at each step. The mutual shielding effect of f-electrons is very little. This is due to the shape of the f-orbitals.
 The nuclear charge, however increases by one at each step. Hence, the inward pull experienced by the 4f-electrons increases. This causes a reduction in the size of the entire 4f-shell.

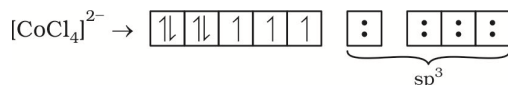
- 13.(B)** The precipitate of mercuric iodide dissolves in excess of potassium iodide forming a complex, K_2HgI_4 .



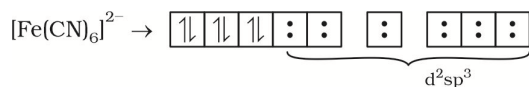
HgI_2 on heating liberates I_2 gas.



Number of unpaired electrons = 5



Number of unpaired electrons = 0



Number of unpaired electrons = 0

$$\text{Magnetic moment} = \sqrt{n(n+2)}$$

where n = number of unpaired electrons

i.e., greater the number of unpaired electrons, greater will be the paramagnetic character.

- 15.(C)** +4 oxidation state of cerium is also known in solutions.