INORGANIC CHEMISTRY

d-BLOCK

1. H_2S (5 moles) reacts completely with acidified aqueous potassium permanganate solution. In this reaction, the number of moles of water produced is **x**, and the number of moles of electrons involved is **y**. The value of (**x** + **y**) is ____. **[JEE(Advanced) 2023]**

2. Which of the following combination will produce H_2 gas? **[JEE(Advanced) 2017]**

(A) Zn metal and NaOH(aq)

(B) Au metal and NaCN(aq) in the presence of air

(C) Cu metal and conc. HNO_3

(D) Fe metal and conc. HNO_3

3. Consider the following list of reagents : **[JEE(Advanced) 2014]**

Acidifeid $K_2Cr_2O_7$, alkaline $KMnO_4$, $CuSO_4$, H_2O_2 , Cl_2, O_3, $FeCl_3$, HNO_3 and $Na_2S_2O_3$.

The total number of reagents that can oxidise aqueous iodide to iodine is

SOLUTIONS

1. Ans. (18)

Sol. $2\overset{+7}{K}\overset{+7}{Mn}O_4 + 5H_2S + 3H_2SO_4 \rightarrow K_2SO_4 + 2\overset{+2}{Mn}SO_4 + 5S + 8H_2O$

x = 8 (moles of H_2O produced)

y = 14 – 4 = 10 (number of electrons involved)

x + y = 10 + 8 = 18

2. Ans. (A)

Sol. (A) $Zn + 2NaOH \longrightarrow Na_2ZnO_2 + H_2$

(B) $4Au + 8NaCN + O_2 + 2H_2O \longrightarrow 4Na[Au(CN)_2] + 4NaOH$

(C) $Cu + 4HNO_3 \longrightarrow Cu(NO_3)_2 + 2NO_2 + 2H_2O$

(conc.)

(D) Formation of passive layer of Fe_2O_3 on the surface of Fe and NO_2 gas is evolved.

3. Ans. (7)

Sol. Acidified $K_2Cr_2O_7$, $CuSO_4$, H_2O_2, Cl_2, O_3 $FeCl_3$, HNO_3 oxidise aq. iodide to iodine.

Alkaline $KMnO_4$ oxidise aq. iodide to IO_3^-

No reaction between iodide & $Na_2S_2O_3$