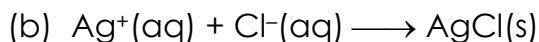


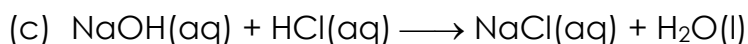
Quiz (Define Redox Reaction by Oxidation Number)

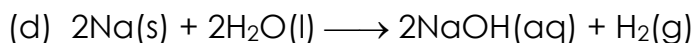
1. Decide and explain whether the following reactions are redox reactions or not.
 (a) $C(s) + O_2(g) \longrightarrow CO_2(g)$

It is a redox reaction because the oxidation number of _____ increases from _____ to _____ and that of _____ decreases from _____ to _____.

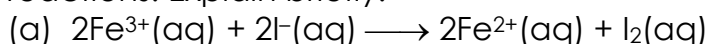


It is not a redox reaction because the oxidation number of every element _____ during the reaction.

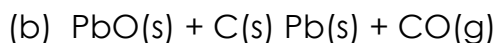




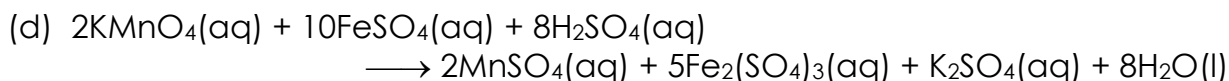
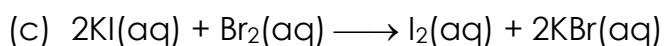
2. Identify the oxidizing agent and the reducing agent in each of the following reactions. Explain briefly.



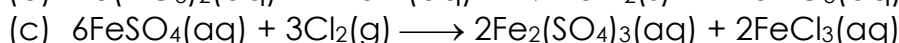
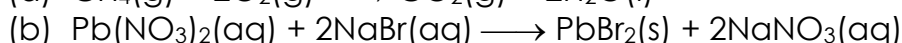
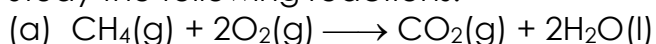
$Fe^{3+}(aq)$ is the _____ agent because the oxidation number of iron decreases from +3 to +2. $I^-(aq)$ is the _____ agent because the oxidation number of iodine increases from -1 to 0.



$PbO(s)$ is the _____ agent because the oxidation number of lead _____ from _____ to _____. $C(s)$ is the reducing agent because the oxidation number of carbon _____ from _____ to _____.



3. Study the following reactions.



In each case, state

- (i) whether the reaction is a redox reaction or not.
- (ii) the formula of the oxidizing agent (if applicable).
- (iii) the formula of the reducing agent (if applicable).
- (iv) the name of the element which is oxidized (if applicable).

4. The oxidation number of iron in its compounds can be +2 or +3.

(a) (i) What would be observed when a few drops of sodium hydroxide solution are added to a solution of iron(III) compound?

(ii) Write a balanced ionic equation for the reaction.

(iii) State whether the reaction is a redox reaction or not. Explain your answer in terms of changes in oxidation number.

(b) When a piece of zinc metal is added to a solution of iron(III) compound, the colour of the solution changes from yellow to pale green.

(i) Write a balanced ionic equation for the reaction.

(ii) State whether the reaction is a redox reaction or not. Explain your answer in terms of changes in oxidation number.

(iii) Which species acts as the oxidizing agent in the reaction if it is a redox reaction?

Suggested Answer

1.
 - (a) It is a redox reaction because the oxidation number of **carbon** increases from **0** to **+4** and that of **oxygen** decreases from **0** to **-2**.
 - (b) It is not a redox reaction because the oxidation number of every element **does not change** during the reaction.
 - (c) **It is not a redox reaction because the oxidation number of every element does not change during the reaction.**
 - (d) **It is a redox reaction because the oxidation number of sodium increases from 0 to +1 and that of hydrogen decreases from +1 to 0.**

2.
 - (a) $\text{Fe}^{3+}(\text{aq})$ is the **oxidizing** agent because the oxidation number of iron decreases from +3 to +2. $\text{I}^{-}(\text{aq})$ is the **reducing** agent because the oxidation number of iodine increases from -1 to 0.
 - (b) $\text{PbO}(\text{s})$ is the **oxidizing** agent because the oxidation number of lead **decreases** from **+2** to **0**. $\text{C}(\text{s})$ is the reducing agent because the oxidation number of carbon **increases** from **0** to **+2**.
 - (c) **$\text{Br}_2(\text{aq})$ is the oxidizing agent because the oxidation number of bromine decreases from 0 to -1. $\text{KI}(\text{aq})$ is the reducing agent because the oxidation number of iodine increases from -1 to 0.**
 - (d) **$\text{KMnO}_4(\text{aq})$ is the oxidizing agent because the oxidation number of manganese decreases from +7 to +2. $\text{FeSO}_4(\text{aq})$ is the reducing agent because the oxidation number of iron increases from +2 to +3.**

3.
 - (a)
 - (i) Redox
 - (ii) O_2
 - (iii) CH_4
 - (iv) Carbon

 - (b)
 - (i) Not redox
 - (ii) Not applicable
 - (iii) Not applicable
 - (iv) Not applicable

 - (c)
 - (i) Redox
 - (ii) Cl_2
 - (iii) FeSO_4 (or Fe^{2+})
 - (iv) Iron

4. (a) (i) A reddish brown precipitate forms.
(ii) $\text{Fe}^{3+}(\text{aq}) + 3\text{OH}^{-}(\text{aq}) \longrightarrow \text{Fe}(\text{OH})_3(\text{s})$
(iii) The reaction is not a redox because the oxidation number of every element does not change during the reaction.
- (b) (i) $\text{Zn}(\text{s}) + 2\text{Fe}^{3+}(\text{aq}) \longrightarrow \text{Zn}^{2+}(\text{aq}) + 2\text{Fe}^{2+}(\text{aq})$
(ii) The reaction is a redox reaction because the oxidation number of iron decreases from +3 to +2 while that of zinc increases from 0 to +2.
(iii) $\text{Fe}^{3+}(\text{aq})$