CBSE TEST PAPER 01

CLASS XI CHEMISTRY

(Redox Reactions)

General Instruction:

- All questions are compulsory.
- Marks are given alongwith their questions.

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1. Define oxidation reaction? [1]

2. Define reduction reaction? [1]

3. In the reactions given below, identify the species undergoing oxidation and reduction.

$H_2S(g) + Cl_2(g) \rightarrow 2HCl(g) + S_{(s)}$ [1]

4. What is the most essential conditions that must be satisfied in a redox reaction? [1]

5. In the reaction

$MnO_2 + 4HCl \rightarrow MnCl_2 + Cl_2 + 2H_2O$

Which species is oxidized? [1]

6. Why the following reaction is an example of oxidation reaction?

$CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O$ [1]

7. Explain why

$3Fe_3O_4(S) + 8Al(S) \rightarrow 9Fe(S) + 4Al_2O_3$

Is an oxidation reaction? [3]

CBSE TEST PAPER 01

CLASS XI CHEMISTRY (Redox Reactions)

[ANSWERS]

Ans 1. Addition of oxygen /electronegative element to a substance or removal of hydrogen / electropositive element from a substance.

Ans 2. Removal of oxygen / electronegative element form a substance or addition of hydrogen / electropositive element to a substance.

Ans 3. H_2S is oxidized because a more electronegative element, Chlorine is added to hydrogen (or more electropositive element hydrogen has been removed from S). Chlorine is reduced due to addition of hydrogen to it.

Ans 4. In a redox reaction, the total number of electrons lost by the reducing agent must be equal to the number of electrons gained by the oxidizing agent.

Ans 5. HCl is oxidized to Cl_2.

Ans 6. Methane is oxidized owing to the addition of oxygen to it.

Ans 7. Aluminum is oxidized because oxygen is added to it Ferrous ferric oxide (Fe_3O_4) is reduced because oxygen has been removed from it.

CBSE TEST PAPER 02

CLASS XI CHEMISTRY

(Redox Reactions)

General Instruction:

- All questions are compulsory.
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1. Define oxidation in terms of electron transfer. [1]
2. What is meant by reduction? [1]
3. Define an oxidizing agent. Name the best reducing agent. [1]
4. What is meant by reducing? Name the best reducing agent. [1]
5. What is the oxidation number of Mn in $KMnO_4$? [1]
6. What happens to the oxidation number of an element in oxidation? [1]
7. Name one compound in which oxidation number of Cl is + 4. [1]
8. Indicate the oxidizing and reducing agents in the following reaction :

$2Cu^{2+} + 4I^- \rightarrow 2CuI + I_2$. [1]

9. A metal ion M^{3+} loses 3 electrons. What will be its oxidation number? [1]
10. Find the oxidation state of sulphur in the following compounds :

H_2S, H_2SO_4, $S_2O_4^{2-}$, $S_2O_8^{2-}$ and HSO_3^-. [5]

CBSE TEST PAPER 02

CLASS XI CHEMISTRY (Redox Reactions)

[ANSWERS]

Ans 1. Oxidation is a process in which loss of electrons takes place.

Ans 2. Reduction is a process in which gain of electrons take place.

Ans 3. Oxidising agent is a substance which can gain electrons easily. F_2 is the best oxidizing agent.

Ans 4. Reducing agent is a substance which can lose electrons easily. Li is the best reducing agent.

Ans 5. Let oxidation number of Mn be x

1 + x + 4 (-2) = 0

=> x = 7

Ans 6. It increases.

Ans 7. ClO_2

Ans 8. Cu^{2+} : Oxidising agent

I : Reducing agent.

Ans 9. Oxidaton number changes from +3 to + 6.

Ans 10 .

In H_2S

2 + x = o

X = -2

In HSO_3^-

+ 1 + x – 6 = -1

or x-5 = -1

or x = +4

In H_2SO_4

+2 +x – 8 = 0

Or x = + 6

In $S_2O_5^{2-}$

There is peroxide linkage, thus

oxidation state of S is $\underline{6}$

In $S_2O_4^{2-}$

2x – 8 = -2

2x = 6

X = +3

CBSE TEST PAPER 03

CLASS XI CHEMISTRY

(Redox Reactions)

General Instruction:

- All questions are compulsory.
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1. Name the different types of redox reaction. [2]
2. Identify the type of redox reaction this reaction follows.

$3Mg\ (S) + N_2\ (g) \xrightarrow{\Delta} Mg_3N_2\ (S)$ [1]

3. The displacement reactions of Cl, Br, I using fluorine are not generally carried out in aqueous solution. Give reason. [1]
4. Which is the strongest oxidizing agent? [1]
5. Why F^- ions Cannot be converted to F_2 by chemical means? [1]
6. Define disproportionation reaction. [1]
7. Why ClO_4^- does not show disproportionation reaction where as ClO^-, ClO_2^- , ClO_3^- shows? [2]
8. Identify the reaction

$2H_2O_2\ (aq) \rightarrow 2H_2O(e) + O_2\ (g)$ [1]

9. Which gas is produced when less reactive metals like Mg and Fe react with steam? [1]
10. All decomposition reactions are not redox reactions. Give reason. [1]

CBSE TEST PAPER 03

CLASS XI CHEMISTRY (Redox Reactions)

[ANSWERS]

Ans 1. The different types of redox reactions are

(i) Combination reactions

(ii) Decomposition reactions

(iii) Displacement reactions

(iv) Disproportionation reactions.

Ans 2. The given equation represents a combination reaction.

Ans 3. Fluorine is so reactive that it can replace chloride bromide and iodide ions in solution and when aqueous solution is taken it attacks water and displaces the oxygen of water.

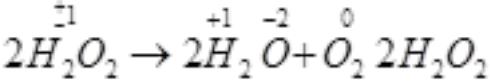
Ans 4. Fluorine is the strongest oxidizing agent due to it's smallest size and highest electronegativity together.

Ans 5. F- ions cannot be converted to F_2 by chemical means because fluorine is the strongest oxidizing agent.

Ans 6. In a disproportionation reaction an element in one oxidation state is simultaneously oxidized and reduced.

Ans 7. ClO_4^- does not disproportionate because in this oxoanionic chlorine is present in its highest oxidation state that is +7 whereas in ClO^-, ClO_2^- and ClO_3-, chlorine exists in + 1, +3 and +5 respectively.

Ans 8. The decomposition of hydrogen peroxide is an example of disproportionation reaction where oxygen experiences disproportionation reaction.



Ans 9. Less reactive metals such as Mg and Fe react with steam to produce dihydrogen gas

$Mg + 2H_2O \xrightarrow{\Delta} Mg(OH)_2 + H_2$

$Fe + 3H_2O \xrightarrow{\Delta} Fe_2O_3 + 3H_2$.

Ans10. Decomposition of calcium carbonate is not an example of redox reaction.