

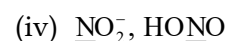
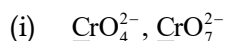
## CHEMISTRY-2

## Redox Reactions

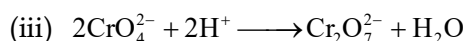
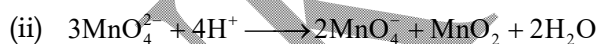
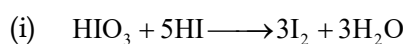
## [Set-2]

## SECTION-A

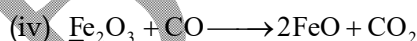
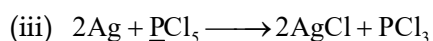
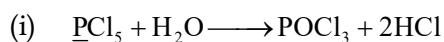
1. In which of the following pairs, the underlined atom in the first species has a lower oxidation state than the second?



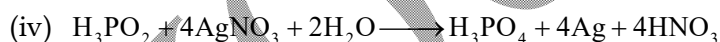
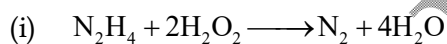
2. Which of the following is an example of disproportionation reaction?



3. Which of the following reaction does not involve the change in oxidation of the underlined atom?



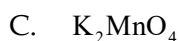
4. In which of the following reactions, the underlined species act as a reducing agent?



5. Match the following:

## Column-I

(Molecule/ion)



## Column-II

(Oxidation state of central atom)

1. +6

2. -1

3. +4

4. +2

	A	B	C	D
(i)	4	4	1	3
(ii)	2	1	4	3
(iii)	3	4	1	2
(iv)	2	4	1	3

**Assertion-Reason type Questions:**

- (a) Both A and R are true and R is the correct explanation of A  
 (b) Both A and R are true and R is not the correct explanation of A  
 (c) A is true but R is false  
 (d) A is false but R is true
6. A: Oxidation state of carbon in glucose,  $C_6H_{12}O_6$  is zero.  
 R: Glucose is a covalent compound.
7. A: In  $S_2O_8^{2-}$  ion, sulphur oxidation state is +6  
 R:  $S_2O_8^{2-}$  ion contains peroxide linkage.

**Passage based questions:**

Oxidation number denotes the oxidation state of an element in a compound ascertained according to a set of rules formulated on the basis that electron pair in a covalent bond belongs entirely to more electronegative element. Oxidation number and oxidation states are interchangeably used.

The oxidation number/state of a metal in a compound is sometimes, presented according to the stock notation, written in Roman number, for example stannous chloride is written as Tin(II) chloride or  $Sn(II) Cl_2$ .

The change in oxidation number implies change in oxidation state, which in turn helps to identify whether the species is present in oxidized form or reduced form.

**Oxidation:** An increase in the oxidation state of the element in the given substance.

**Reduction:** A decrease in the oxidation state of the element in the given substance.

**Oxidizing agent:** A reagent which can increase the oxidation state of an element in a given substance. These reagents are also called **oxidants**.

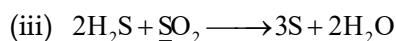
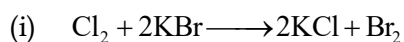
**Reducing agent:** A reagent which can lower the oxidation state of an element in a given substance. These reagents are also called **reductants**.

8. A: In the reaction,  $2\text{H}_2\text{O}_2 \rightarrow 2\text{H}_2\text{O} + \text{O}_2$

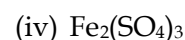
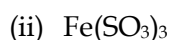
There is no change in the oxidation state of oxygen.

R: Hydrogen peroxide contain  $\text{O}_2^{2-}$ , peroxide ion with oxygen in -I oxidation state.

- (a) Both A and R are true and R is the correct explanation of A  
 (b) Both A and R are true and R is not the correct explanation of A  
 (c) A is true but R is false  
 (d) A is false but R is true
9. Which of the following reaction involves the increase in oxidation state of an underlined atom?

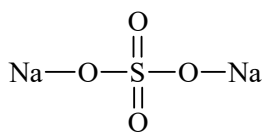


10. The chemical formula of the iron (III) sulphate is

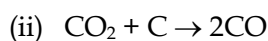
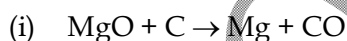


### SECTION-B

11. Calculate the oxidation state of each atom in  $\text{Na}_2\text{S}_2\text{O}_3$



12. Which of the following reactions are redox reactions? Gives reason.



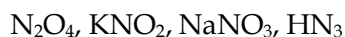
OR

Calculate the oxidation state of the underlined atoms in the following molecules/ions

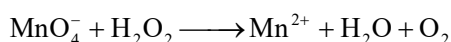


13. Potassium manganate  $\text{K}_2\text{MnO}_4$  in dil.  $\text{H}_2\text{SO}_4$  disproportionate to give potassium permanganate  $\text{KMnO}_4$ , manganese dioxide,  $\text{MnO}_2$  and  $\text{H}_2\text{O}$ . Write the balanced chemical equation using half-reaction method.

14. (i) Arrange the following species in order of increasing oxidation state of nitrogen



- (ii) Balance the following redox reaction in acidic medium



OR

- (i) Which of the following species can only act as an oxidizing agent?

$\text{H}_2\text{S}$ ,  $\text{HClO}_4$ ,  $\text{H}_2\text{S}_2\text{O}_8$ ,  $\text{HNO}_3$ ,  $\text{HOClO}$

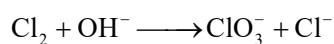
- (ii) When concentrated sulphuric acid is added to an inorganic mixture containing chloride, we get colorless pungent smelling gas  $\text{HCl}$ , but if the mixture contains bromide then we get red vapour of bromine. Explain with the help of chemical equations.

15. (i) Write the formulas for the following compounds:

(a) Nickel (II) carbonate

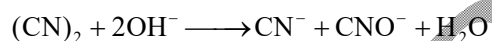
(b) Chromium (III) oxide

- (ii) Balance the following redox reaction



OR

- (i) What information can be obtained from the following reaction



- (ii) Balance the following redox reaction and identify the oxidizing agent and reducing agent

