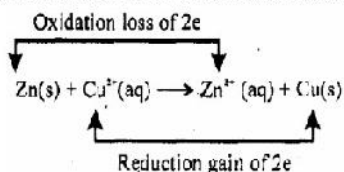


Class: 11
Subject: Chemistry
Topic: Redox reaction
No. of Questions: 20
Duration: 60 Min
Maximum Marks: 60

1. These are Assertion - Reason type question contains two statements:
Statement -1 (Assertion) and Statement -2 (Reason). Answer these questions from the following four options
Statement-1: In a reaction $\text{Zn(s)} + \text{CuSO}_4(\text{aq}) \rightarrow \text{ZnSO}_4(\text{aq}) + \text{Cu(s)}$ Zn is a reductant but itself get oxidized.
Statement-2: In a redox reaction, oxidant is reduced by accepting electrons and reductant is oxidized by losing electrons.
- A. Statement -1 is True, Statement -2 is True; Statement-2 is a correct explanation for Statement - 1
B. Statement -1 is True, Statement -2 is True; Statement-2 is NOT a correct explanation For Statement -1
C. Statement-1 is True, Statement -2 is False
D. Statement-1 is False, Statement -2 is True

Sol: A

Both statement-1 and statement-2 are true and statement-2 is the correct explanation of statement-1.



2. When $\text{K}_2\text{Cr}_2\text{O}_7$ is converted into K_2CrO_4 , the change in oxidation number of chromium is
- A. 0
B. 5
C. 7
D. 9

Sol: A

$$\text{ON of Cr in } \text{K}_2\text{Cr}_2\text{O}_7 : 2 + 2x - 14 = 0$$

$$2x = 12, x = 6$$

$$\text{ON of Cr in } \text{K}_2\text{CrO}_4 : 2 + x - 8 = 0$$

$$x = 6$$

$$\text{Change in ON of Cr} = 6 - 6 = 0$$

3. Which of the following transition metal has zero oxidation state?

- A. $[\text{Fe}(\text{CO})_5]$
- B. $\text{NH}_2.\text{NH}_2$
- C. NOClO_4
- D. CrO_5

Sol: A

$\text{Fe}(\text{CO})_5$ is metal carbonyl; hence O.N. of Fe is zero,

4. The oxidation state of Fe in $\text{K}_4[\text{Fe}(\text{CN})_6]$ is

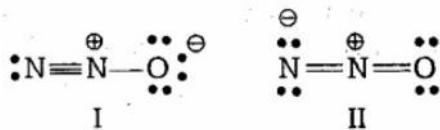
- A. +2
- B. +6
- C. +3
- D. +4

Sol: A

$\text{K}_4[\text{Fe}(\text{CN})_6]$

Let O.N. of Fe be x then $4 \times (+1) + 1 \times (x) + 6 \times (-1) = 0 \Rightarrow x = +2$

5. **Assertion (A)** Structure I is more accurate than II



Reason (R) More electronegative oxygen atom carries negative charge in I.

- A. Both (A) and (R) are true and (R) is the correct explanation of (A).
- B. Both (A) and (R) are true but (R) is not the correct explanation of (A).
- C. (A) is true but (R) is false.
- D. (A) is false but (R) is true.

Sol: A

6. The oxidation number of sulphur in $\text{Na}_2\text{S}_4\text{O}_6$ is

- A. 1.5
- B. 2.5
- C. 3
- D. 2

Sol: B

$\text{Na}_2\text{S}_4\text{O}_6$ Let O.N. of S be x then $2 \times (+1) + 4 \times (x) + 6 \times (-2)$

$= 0 \Rightarrow x = 2.5$. By chemical bonding method the two S. atoms have O.N. +5 and two S. atoms have O.N. zero

7. A metal ion M^{3+} loses 3 electrons, its oxidation number will be

- A. +3
- B. +6
- C. 0
- D. -3

Sol: B

M^{3+} on losing 3 electrons will become M^{+6} and O.N = + 6.

8. Which of the following involves transfer of five electrons?

- A. $MnO_4^- \rightarrow Mn^{2+}$
- B. $CrO_4^{2-} \rightarrow Cr^{3+}$
- C. $MnO_4^{2-} \rightarrow MnO_2$
- D. $Cr_2O_4^{2-} \rightarrow 2Cr^{3+}$

Sol: A

ON. Of Mn in MnO_4^- is +7 and in Mn^{2+} it is 2. The difference is of 5 electrons.

9. In which of the compounds does 'manganese' exhibit highest oxidation number?

- A. MnO_2
- B. Mn_3O_4
- C. K_2MnO_4
- D. $MnSO_4$

Sol: C

ON. of Mn in K_2MnO_4 is +6 (find ON. Of Mn in others)

10. In hemoglobin the iron is in the following oxidation state

- A. +4
- B. +2
- C. +3
- D. +1

Sol: B

In hemoglobin, Fe is in +2 oxidation state

11. Standard electrode potentials of redox couples $A^{2+} / A, B^{2+} / B, C / C^{2+}$ and D^{2+} / D and D^{2+} / D are 0.3V, - 0.5V, -0.75V and 0.9V respectively. Which of these is best oxidizing agent and reducing agent respectively

- A. D^{2+} / D and B^{2+} / B
- B. B^{2+} / B and D^{2+} / D
- C. D^{2+} / D and C^{2+} / C
- D. C^{2+} / C and D^{2+} / D

Sol: A

The redox couple with maximum reduction potential will be best oxidising agent and with minimum reduction potential will be best reducing agent

12. The oxidation state of chromium in the final product formed by the reaction between KI and acidified potassium dichromate solution is

- A. +3
- B. +2
- C. +6
- D. +4

Sol: A



3 oxidation state of Cr.

13. $14\text{H}^+ + \text{Cr}_2\text{O}_7^{2-} + 3\text{Ni} \longrightarrow 2\text{Cr}^{3+} + 7\text{H}_2\text{O} + 3\text{Ni}^{2+}$
- A. H_2O
B. Ni
C. H^+
D. $\text{Cr}_2\text{O}_7^{2-}$

Sol: B

The compound undergo oxidation itself and reduces others is known as reducing agent. In this reaction O, N. of Ni changes from 0 to + 2 and hence Ni acts as a reducing agent

14. Which of the following does not represent redox reaction?

- A. $2\text{Ca}(\text{OH})_2 + \text{Cl}_2 \rightarrow \text{Ca}(\text{ClO})_2 + \text{CaCl}_2 + 2\text{H}_2\text{O}$
B. $\text{Cr}_2\text{O}_7^{2-} + 2\text{OH}^- \rightarrow 2\text{CrO}_4^{2-} + \text{H}_2\text{O}$
C. $\text{NaIO}_3 + \text{NaHSO}_3 \rightarrow \text{NaHSO}_4 + \text{Na}_2\text{SO}_4 + \text{I}_2 + \text{H}_2\text{O}$
D. $2\text{Na}_2\text{S}_2\text{O}_3 + \text{I}_2 \rightarrow \text{Na}_2\text{S}_4\text{O}_6 + 2\text{NaI}$

Sol: B

No element in this reaction has undergone a change in oxidation state

15. Assertion (A) Formal charge on nitrogen in NH_4^+ is + 1.

Reason (R) Charge on NH_4^+ is + 1.

- A. Both (A) and (R) are true and (R) is the correct explanation of (A).
B. Both (A) and (R) are true but (R) is not the correct explanation of (A).
C. (A) is true but (R) is false.
D. (A) is false but (R) is true.

Sol: B

16. The oxidation states of the most electronegative element in the products of the reaction, BaO_2 with dil. H_2SO_4 is

- A. 0 and -1
B. -1 and -2
C. -2 and 0
D. -2 and -1

Sol: B

$\text{BaO}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + \text{H}_2\text{O}_2$ Oxygen is the most electronegative element in the reaction and has the oxidation states of -1 (in H_2O_2) and -2 (in BaSO_4). In H_2O_2 , peroxy ion is present

17. The oxidation state of osmium (Os) in OsO_4 is

- A. +7
B. +6
C. +4
D. +8

Sol: D

OsO₄

Let O.N. of Os be x then $1 \times (x) + 4(2)$
 $= 0$ $x = 8$

18. In oxygen di fluoride the oxidation number of oxygen is

- A. -2
- B. -1
- C. +2
- D. +1,-2

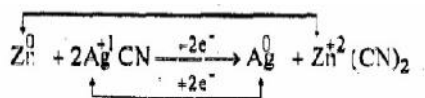
Sol: C

Let oxidation state of oxygen in OF₂ = $xx + (1 \times 2) = 0$ $x = +2$

19. Which of the following is a redox reaction?

- A. $\text{NaCl} + \text{KNO}_3 \rightarrow \text{NaNO}_3 + \text{KCl}$
- B. $\text{CaC}_2\text{O}_4 + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{H}_2\text{C}_2\text{O}_4$
- C. $\text{Mg}(\text{OH})_2 + 2\text{NH}_4\text{Cl} \rightarrow \text{MgCl}_2 + 2\text{NH}_4\text{OH}$
- D. $\text{Zn} + 2\text{AgCN} \rightarrow 2\text{Ag} + \text{Zn}(\text{CN})_2$

Sol: D

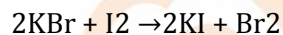


The oxidation state shows a change only in (d).

20. Which reaction is not feasible?

- A. $2\text{KI} + \text{Br}_2 \rightarrow 2\text{KBr} + \text{I}_2$
- B. $2\text{KBr} + \text{I}_2 \rightarrow 2\text{KI} + \text{Br}_2$
- C. $2\text{KBr} + \text{Cl}_2 \rightarrow 2\text{KCl} + \text{Br}_2$
- D. $2\text{H}_2\text{O} + 2\text{F}_2 \rightarrow 4\text{HF} + \text{O}_2$

Sol: B



Reaction is not possible because Br⁻ ion is not oxidised in Br₂, with I₂, due to higher Electrode (oxidation) potential of I₂ than bromine