



NSEC 11th 2026

PHYSICAL CHEMISTRY

DPP-03

Chemical Reactions

- In the reaction,

$$x\text{HI} + y\text{HNO}_3 \longrightarrow \text{NO} + \text{I}_2 + \text{H}_2\text{O},$$
 upon balancing with whole number coefficients:

(A) $x = 3, y = 2$ (B) $x = 2, y = 3$
 (C) $x = 6, y = 2$ (D) $x = 6, y = 1$
- For the redox reaction,

$$\text{MnO}_4^- + \text{C}_2\text{O}_4^{2-} + \text{H}^+ \rightarrow \text{Mn}^{2+} + \text{CO}_2 + \text{H}_2\text{O},$$
 the correct whole number stoichiometric coefficients of MnO_4^- , $\text{C}_2\text{O}_4^{2-}$ and H^+ are respectively:

(A) 2, 5, 16 (B) 16, 5, 2
 (C) 5, 16, 2 (D) 2, 16, 5
- For the redox reaction,

$$x\text{P}_4 + y\text{HNO}_3 \longrightarrow \text{H}_3\text{PO}_4 + \text{NO}_2 + \text{H}_2\text{O},$$
 upon balancing with whole number coefficients:

(A) $x = 1, y = 5$ (B) $x = 2, y = 10$
 (C) $x = 1, y = 20$ (D) $x = 1, y = 15$
- In the reaction, $\text{X}^- + \text{XO}_3^- + \text{H}^+ \longrightarrow \text{X}_2 + \text{H}_2\text{O}$, the molar ratio in which X^- and XO_3^- react is:

(A) 1 : 5 (B) 5 : 1
 (C) 2 : 3 (D) 3 : 2
- CN^- is oxidised by NO_3^- in presence of acid:

$$a\text{CN}^- + b\text{NO}_3^- + c\text{H}^+ \longrightarrow$$

$$(a + b)\text{NO} + a\text{CO}_2 + \frac{c}{2}\text{H}_2\text{O}$$
 What are the whole number values of a, b, c in that order:

(A) 3, 7, 7 (B) 3, 10, 7
 (C) 3, 10, 10 (D) 3, 7, 10
- When arsenic sulphide is boiled with NaOH, sodium arsenite and sodium thioarsenite are formed according to reaction:

$$x\text{As}_2\text{S}_3 + y\text{NaOH} \longrightarrow$$

$$x\text{Na}_3\text{AsO}_3 + x\text{Na}_3\text{AsS}_3 + \frac{y}{2}\text{H}_2\text{O}$$
 What are the values of x and y?

(A) 1, 6 (B) 2, 8
 (C) 2, 6 (D) 1, 4
- $x\text{NO}_3^- + y\text{I}^- + z\text{H}^+ \rightarrow 2\text{NO} + 3\text{I}_2 + 4\text{H}_2\text{O}$
 x, y, z respectively in the above equation are:

(A) 2, 6, 8 (B) 1, 6, 4
 (C) 0, 6, 8 (D) 2, 3, 4
- Balance the following equation and choose the quantity which is the sum of the coefficients of reactants and products:

$$\dots\text{KMnO}_4 + \dots\text{H}_2\text{O}_2 + \dots\text{H}_2\text{SO}_4 \longrightarrow$$

$$\text{MnSO}_4 + \dots\text{O}_2 + \dots\text{H}_2\text{O} + \dots\text{K}_2\text{SO}_4$$

(A) 26 (B) 23
 (C) 28 (D) 22
- In the reaction,

$$x\text{FeCl}_3 + y\text{H}_2\text{S} \longrightarrow \text{FeCl}_2 + \text{S} + \text{HCl}$$

(A) $x = 2, y = 1$ (B) $x = 3, y = 2$
 (C) $x = 4, y = 3$ (D) $x = 2, y = 2$
- The sum of the coefficients of reactants and of products for the reaction,

$$2\text{MnO} + \text{PbO}_2 + \text{HNO}_3 \rightarrow \text{HMnO}_4 + \text{Pb}(\text{NO}_3)_2 + \text{H}_2\text{O}$$
 is:

(A) 4, 3 (B) 10, 18
 (C) 19, 3 (D) 17, 11



Answer Key

1. (C)
2. (A)
3. (C)
4. (B)
5. (D)

6. (A)
7. (A)
8. (A)
9. (A)
10. (D)

