PHYSICAL CHEMISTRY



DPP No. 6

Total Marks: 32

Max. Time: 32 min.

Topic: Mole Concept

1. The oxidation number of sulphur in S_8 , S_2F_2 and H_2S respectively are :

(A)
$$0, + 1$$
 and -2

(B)
$$+ 2$$
, $+ 1$ and $- 2$

(D)
$$-2$$
, $+1$ and -2

2. Which of the following compounds have sulphur atom in its maximum oxidation state:

$$A - F$$
 (A) Z only

;
$$Y = H_2SO_5$$
 ; (B) Y and Z only (C) Y

;
$$Z = H_2 S_2 O_8$$

(C) Y only

Comprehension # (Q. 3 to Q. 5)

Oxidation state of an element in a particular species (atom, molecule or ion) is the number of electrons gained or lost by that element during its change from free state into combined state. For example, the oxidation state of Na in NaCl is +1, calcium in Ca₂(PO₄)₂ is +2, and chlorine in Cl₂ is zero.

- (1) Oxidation number is given positive sign if electrons are lost and oxidation number is given negative sign if electrons are gained.
- (2) Oxidation number represents charge in case of ionic compounds. However, in covalent compounds, it represents imaginary charge. Now answer the following questions (3-5):
- 3. Identify the correct statement:
 - (A) Halogens always have -1 oxidation state in their compounds.
 - (B) Oxidation number can be zero, negative, positive, integer or fractional.
 - (C) In OF, the oxidation number of F is +1.
 - (D) Hydrogen is always given + 1 oxidation number in its compounds.
- When KMnO₄ reacts with FeSO₄ in acidic medium, it is converted into MnSO₄. Then change in oxidation 4. number for Mn in the above process is:

5.
$$K_2Cr_2O_7 + C_2O_4^{2-} + H_2SO_4 \longrightarrow K_2SO_4 + CO_2 + Cr_2(SO_4)_3 + H_2O$$

In above reaction, identify the elements which do not undergo change in their oxidation state:

Which of the following changes involve either oxidation or reduction: 6.* (A) $VO^{2+} \rightarrow V_2O_3$ (B) $Na \rightarrow Na^+$

(A)
$$VO^2 \rightarrow V_2O_3$$

(C)
$$Zn^{+2} \rightarrow Zn$$

(D)
$$CrO_4^{-2} \to Cr_2O_7^{-2}$$

7. Which of the following is not a redox reaction:

(A) Mg +
$$N_2 \longrightarrow Mg_3N_2$$

(B)
$$MnO_4^- + C_2O_4^{2-} \longrightarrow Mn^{2+} + CO_2$$

(C) CuSO₄ + KI
$$\longrightarrow$$
 2Cu I + I₂ + K₂SO₄ (D) AgCl + NH₃ \longrightarrow [Ag(NH₃)₂] Cl

(D)
$$AgCI + NH_2 \longrightarrow [Ag(NH_2)_2] CI$$

8.
$$Zn + NO_3^- \longrightarrow Zn^{2+} + NH_4^+ + H_2O$$

How many moles of electrons, per mole of NO₃⁻ ion, are gained in the above reaction?

9. Arsenic estimation can be done by Bettendorff's process. The reaction is given below:

$$As_4O_6 + SnCl_2 + HCl \longrightarrow As_4 + SnCl_4 + H_2O$$

Find out the exact stoichiometric cofficiant of the reactants respectively: (in the order as given in question)

(B) 1, 6, 12

(C) 2, 8, 20

(D) None of these

10.* Which of the following can show disproportionation reaction:

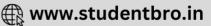
(A) CIO₄-

(B) CI-

(C) CIO₂-

(D) CIO₂-





Answer Key

DPP No. #6

8

1. (A)

2.

(D)

3. (B)

(C) 4.

5.

(C)

6.* (A,B,C)

7.

(D)

8.

9.

(B)

10.*

(C, D)

its & Solu

DPP No. #6

ON of S in S_s = 0; 1.

ON of S in S,F, = + 1;

ON of S in $H_aS = -2$.

2. In all these three compounds

H₂SO₄, H₂SO₅, H₂S₂O₈, 'S' is in +6 state which is it's maximum oxidation state.

6.*

Oxidation number of both element Cr & O does not change.

7. Those reaction in which oxidation number of any element do not change not a redox reaction.

 $AgCI + NH_3 \longrightarrow [Ag(NH_3)_2]CI.$

 $\stackrel{\scriptscriptstyle{+5}}{\text{N}}\text{O}_3^- \longrightarrow \stackrel{\scriptscriptstyle{-3}}{\text{N}}\text{H}_4^+$ 8.

$$8e^- + 10H^+ + NO_3^- \longrightarrow NH_4^+ + 3H_2O.$$

9.

 $12H^{+} + As_4O_6 + 6Sn^{2+} \longrightarrow 6Sn^{4+} + As_4 + 6H_2O$



