PHYSICAL CHEMISTRY

DPP

DAILY PRACTICE PROBLEMS

DPP No. 6

Total Marks : 32

Max. Time : 32 min.

Topic : Mole Concept

Type of Questions		M.M., Min.
Single choice Objective ('–1' negative marking) Q.1,2,9,7	(3 marks, 3 min.)	[12, 12]
Multiple choice objective ('–1' negative marking) Q.6,10	(4 marks, 4 min.)	[8, 8]
Short Subjective Questions ('–1' negative marking) Q.8	(3 marks, 3 min.)	[3, 3]
Comprehension ('–1' negative marking) Q.3 to 5	(3 marks, 3 min.)	[9, 9]

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 (C) 0, + 1 and + 2 (D) – 2, + 1 and – 2

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

$X = H_2SO_4$; $Y = H_2SO_5$; $Z = H_2S_2O_8$

(A) Z only (B) Y and Z only (C) Y only (D) X, Y and Z

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 $Ca_3(PO_4)_2$ is +2, and chlorine in Cl_2 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_2, the oxidation number of F is +1.

(D) Hydrogen is always given + 1 oxidation number in its compounds.

4. When $KMnO_4$ reacts with $FeSO_4$ in acidic medium, it is converted into $MnSO_4$. Then change in oxidation number for Mn in the above process is :

(A) 7 (B) 2 (C) 5 (D) 0

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 :

(A) C (B) S & Cr (C) K, O , S & H (D) C & O

6.* Which of the following changes involve either oxidation or reduction :

(A) $VO^{2+} \rightarrow V_2O_3$ (B) $Na \rightarrow Na^+$ (C) $Zn^{+2} \rightarrow Zn$ (D) $CrO_4^{-2} \rightarrow Cr_2O_7^{-2}$

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) $CuSO_4 + KI \longrightarrow 2CuI + I_2 + K_2SO_4$ (D) $AgCl + NH_3 \longrightarrow [Ag(NH_3)_2]Cl$

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

How many moles of electrons, per mole of NO_3^- 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)

(A) 2, 4, 6 (B) 1, 6, 12 (C) 2, 8, 20 (D) None of these

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

(A) ClO_4^- (B) Cl^- (C) ClO_2^- (D) ClO_3^-

Answer Key

DPP No. # 6

1.	(A)	**2.**	(D)	**3.**	(B)	**4.**	(C)	**5.**	(C)
6.*	(A,B,C)	**7.**	(D)	**8.**	8	**9.**	(B)	**10.***	(C, D)

Hints & Solutions

DPP No. # 6

1. ON of S in S_8 = 0; ON of S in S_2F_2 = + 1; ON of S in H_2S = – 2.

2. In all these three compounds
H_2SO_4, H_2SO_5, $H_2S_2O_8$, 'S' is in +6 state which is it's maximum oxidation state.

6.* $\overset{(+6)}{Cr}\overset{(-2)}{O_4}^{-2} \longrightarrow \overset{(+6)}{Cr_2}\overset{(-2)}{O_7}^{-2}$
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.
$AgCl + NH_3 \longrightarrow [Ag(NH_3)_2]Cl$.

8. $\overset{+5}{N}O_3^- \longrightarrow \overset{-3}{N}H_4^+$

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

9. $12e^- + As_4O_6 + 12H^+ \longrightarrow As_4 + 6H_2O$
$Sn^{2+} \longrightarrow Sn^{4+} + 2e^-$

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