Kattar NEET 2026

Physical Chemistry By Amit Mahajan Sir

Redox Reaction

Q1 In which of the following reactions, the underlined substance has been oxidized?
(A) $\underline{Br_2} + H_2S \rightarrow 2HBr + S$
(B) $\underline{2HgCl_2} + SnCl_2 \rightarrow Hg_2Cl_2 + SnCl_4$
(C) $Cl_2 + \underline{2KI} \rightarrow 2KCl + I_2$
(D) $\underline{2Cu}^{2+} + 4I^- \rightarrow Cu_2I_2 + I_2$

Q2 In the reaction, $IO_3^- + SO_2 + 4H_2O \rightarrow I_2 + SO_4^{2-} + 8H^+$, the coefficient of SO_2 is.
(A) 3 (B) 4
(C) 5 (D) 6

Q3 Which of the following statements is **true** about oxidation state of S in $Na_2S_4O_6$?
(A) All S-atoms are in + 2.5 state.
(B) All S-atoms are in + 2 state.
(C) Two S-atoms are in 0 state and other two is in +5 state.
(D) Two S-atom are in –1 state and other two is in +6 state.

Q4 Zn gives H_2 gas with H_2SO_4 and HCl but not with HNO_3 because
(A) Zn acts as an oxidising agent when it reacts with HNO_3
(B) HNO_3 is weaker acid than H_2SO_4 and HCl
(C) In electrochemical series, Zn is above hydrogen
(D) NO_3^- is reduced in preference to hydronium ion

Q5 Which of the following involves a redox reaction?
(A) Reaction of H_2SO_4 with NaOH
(B) Production of ozone from oxygen in the atmosphere by lightning
(C) Production of nitrogen oxides from nitrogen and oxygen in the atmosphere by lightning
(D) Evaporation of water

Q6 Oxidation number of P in PO_4^{3-}, of S in SO_4^{2-} and that of Cr in $Cr_2O_7^{2-}$ are respectively
(A) +3, +6 and +5
(B) +5, + 3 and +6
(C) –3, +6 and +6
(D) +5, +6 and +6

Q7 The oxidation states of sulphur in the anions SO_3^{2-}, $S_2O_4^{2-}$ and $S_2O_6^{2-}$ follow the order
(A) $S_2O_6^{2-} < S_2O_4^{2-} < SO_3^{2-}$
(B) $S_2O_4^{2-} < SO_3^{2-} < S_2O_6^{2-}$
(C) $SO_3^{2-} < S_2O_4^{2-} < S_2O_6^{2-}$
(D) $S_2O_4^{2-} < S_2O_6^{2-} < SO_3^{2-}$

Q8 If an element is in its lowest oxidation state, under proper conditions, it can act as:
(A) A reducing agent
(B) An oxidizing agent
(C) Oxidizing as well as reducing agent
(D) Neither oxidizing nor reducing agent

Q9 Standard reduction potentials of the half reaction are given below :

$$F_2(g) + 2e^- \rightarrow 2F^-(aq);\ E^\circ = +2.85\ V$$
$$Cl_2(g) + 2e^- \rightarrow 2Cl^-(aq);\ E^\circ = +1.36\ V$$
$$Br_2(l) + 2e^- \rightarrow 2Br^-(aq);\ E^\circ = +1.06\ V$$
$$I_2(s) + 2e^- \rightarrow 2I^-(aq);\ E^\circ = +0.53\ V$$

The strongest oxidising and reducing agents respectively are
(A) F_2 and I^-
(B) Br_2 and Cl^-
(C) Cl_2 and Br^-
(D) Cl_2 and I_2

Q10 $Cl_2 \xrightarrow{NaOH} NaCl + NaClO + H_2O$
The equivalent mass of Cl_2 in the above reaction is
(A) $\frac{M}{5}$ (B) $\frac{M}{3}$
(C) $\frac{M}{2}$ (D) M

Q11 In which of the following processes nitrogen is oxidised?

(A) $NH_4^+ \rightarrow N_2$
(B) $NO_3^- \rightarrow NO$
(C) $NO_2 \rightarrow NO_2^-$
(D) $NO_3^- \rightarrow NH_4^+$

Q12 Match the following:

Column – I (Acid)		Column – II (Equivalent wt.)	
(A)	$H_4P_2O_6$	(I)	M/3
(B)	H_3PO_4	(II)	M
(C)	H_3BO_3	(III)	M/2
(D)	H_2SO_4	(IV)	M/4

(A) A-I, B-III, C-II, D-IV
(B) A-IV, B-I, C-II, D-III
(C) A-III, B-I, C-IV, D-II
(D) A-IV, B-II, C-I, D-III

Q13 Which of the following species **cannot** show disproportionation reaction?
(A) BrO^- (B) BrO_2^-
(C) BrO_3^- (D) BrO_4^-

Q14 In which one of the following changes, there is transfer of five electrons?
(A) $MnO_4^- \rightarrow Mn^{2+}$
(B) $CrO_4^{2-} \rightarrow Cr^{3+}$
(C) $MnO_4^- \rightarrow MnO_2$
(D) $Cr_2\,O_7^{2-} \rightarrow 2\,Cr^{3+}$

Q15 Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R:
Assertion A: MnO_2 can acts as an oxidizing agent as well as reducing agent.
Reason R: Oxidation state of Mn in MnO_2 lies between its possible highest and lowest oxidation state.
In the light of the above statements, choose the **correct** answer from the options given below:
(A) A is true but R is false.
(B) A is false but R is true.
(C) Both A and R are true and R is the correct explanation of A.
(D) Both A and R are true but R is NOT the correct explanation of A.

Q16 An element, which never has a positive oxidation state in any of its compounds, is:
(A) Boron (B) Oxygen
(C) Chlorine (D) Fluorine

Q17 Match the following:

Column – I (Compound)		Column – II (Oxidation state of nitrogen)	
(A)	N_2O_5	(I)	–2
(B)	NaN_3	(II)	+5
(C)	NO	(III)	–1/3
(D)	N_2H_4	(IV)	+2

(A) A-II, B-III, C-IV, D-I
(B) A-III, B-I, C-IV, D-II
(C) A-IV, B-III, C-I, D-II
(D) A-III, B-IV, C-II, D-I

Q18 When Sn^{2+} changes to Sn^{4+} in a reaction
(A) It loses two electrons
(B) It gains two electrons
(C) It loses two protons
(D) It gains two protons

Q19 When iron or zinc is added to $CuSO_4$ solution, copper is precipitated. It is due to
(A) Oxidation of Cu^{2+}
(B) Reduction of Cu^{2+}
(C) Hydrolysis of $CuSO_4$
(D) Ionization of $CuSO_4$

Q20 Which substance is serving as a reducing agent in the following reaction?
$14H^+ + Cr_2\,O_7^{2-} + 3Ni \rightarrow 2\,Cr^{3+} + 7H_2O + 3\,Ni^{2+}$
(A) H_2O (B) Ni
(C) H^+ (D) $Cr_2\,O_7^{2-}$

Q21 The oxidation number of chlorine in HOCl
(A) – 1 (B) 0
(C) +1 (D) +2

Q22 Oxidation number of oxygen in O_2 molecule is
(A) +1 (B) 0

(C) +2 (D) – 2

Q23 The oxidation states of phosphorus vary from
(A) – 3 to +5
(B) – 1 to +1
(C) – 3 to +3
(D) – 5 to +1

Q24 The oxidation state of nitrogen in N_3H is
(A) $+\frac{1}{3}$ (B) + 3
(C) -1 (D) $-\frac{1}{3}$

Q25 If HNO_3 changes into N_2O, the oxidation number of N is changed by
(A) + 2 (B) – 1
(C) 0 (D) + 4

Q26 The oxidation states of the most electronegative element in the products of the reaction of BaO_2 with dilute H_2SO_4 are
(A) 0 and – 1
(B) – 1 and – 2
(C) – 2 and 0
(D) – 2 and + 1

Q27 The potential of H-electrode in standard state is;
(A) 1.0 V (B) 0.0 V
(C) 10 V (D) 0.1 V

Q28 Oxidation number of oxygen in potassium super oxide (KO_2) is
(A) – 2 (B) – 1
(C) – 1/2 (D) – 1/4

Q29 Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R:
Assertion A: Equivalent weight of NH_3 in the reaction $N_2 \rightarrow NH_3$ is 17/3 while that of N_2 is 28/6.
Reason R: Equivalent weight $= \frac{\text{Molecular weight}}{\text{Mole of e}^-\text{lost or gained by 1 mole species}}$
In the light of the above statements, choose the **correct** answer from the options given below:
(A) A is true but R is false.
(B) A is false but R is true.
(C) Both A and R are true and R is the correct explanation of A.
(D) Both A and R are true but R is NOT the correct explanation of A.

Q30 Given below are two statements:
Statement I: I^- can never act as an oxidizing agent.
Statement II: Oxidizing agent undergoes reduction.
In the light of the above statements, choose the most appropriate answer from the options given below:
(A) Statement I is correct but Statement II is incorrect.
(B) Statement I is incorrect but Statement II is correct.
(C) Both Statement I and Statement II are correct.
(D) Both Statement I and Statement II are incorrect.

Q31 Oxidation state of S in Caro's acid (H_2SO_5) and Marshall's acid ($H_2S_2O_8$) respectively are;
(A) +8 and +7 (B) +7 and +7
(C) +6 and +6 (D) +5 and +6

Q32 The given reaction is known as;
$(NH_4)_2\,Cr_2\,O_7 \xrightarrow{\Delta} N_2 + Cr_2\,O_3 + 4H_2O$
(A) Comproportionation reaction
(B) Disproportionation reaction
(C) Non-Redox reaction
(D) Intramolecular Redox Reaction.

Q33 Number of moles of ferrous oxalate oxidised by 2 mole of $KMnO_4$ in acidic medium is:
(A) $\frac{10}{3}$ (B) $\frac{5}{3}$
(C) $\frac{8}{3}$ (D) 5

Q34 Number of mixed oxides among the given oxides is;
Fe_3O_4, Pb_3O_4,P_4O_{10},Mn_2O_7,Mn_3O_4
(A) 5 (B) 3
(C) 4 (D) 2

Q35 One mole of N_2H_4 losses 10 moles of electrons to form a new compound Y. Assuming that all nitrogen appear in the new compound, the oxidation state of nitrogen in Y is; (Assume no change in oxidation state of Hydrogen)
(A) +5 (B) +4

(C) +3 (D) +1

Q36 Given below are two statements:
Statement-I: MnO_4^- can act as a self indicator.
Statement-II: Layer test is used for the identification of Cl^-.
In the light of the above statements, choose the most appropriate answer from the options given below:
(A) Statement I is correct but Statement II is incorrect.
(B) Statement I is incorrect but Statement II is correct.
(C) Both Statement I and Statement II are correct.
(D) Both Statement I and Statement II are incorrect.

Q37 How many species among the following undergo disproportionation in the alkaline medium?
$P_4(s), S_8(s), F_2(g), Cl_2(g), NO_2(g)$
(A) 4 (B) 3
(C) 5 (D) 2

Q38 Non-redox reaction among the following is;
(A) $2H_2O \rightarrow 2H_2+O_2$
(B) $2NaH \rightarrow 2Na+H_2$
(C) $2H_2O_2 \rightarrow 2H_2O+O_2$
(D) $CaCO_3 \rightarrow CaO+CO_2$

Q39 Match List-I with List-II:

List-I (Compound)		List-II (Oxidation State of Oxygen)	
A.	NaO_2	I.	-2
B.	Al_2O_3	II.	-1/3
C.	BaO_2	III.	-1/2
D.	KO_3	IV.	-1

Choose the **correct** answer from the options given below:
(A) A-III, B-II, C-I, D-IV
(B) A-IV, B-III, C-II, D-I
(C) A-II, B-III, C-IV, D-I
(D) A-III, B-I, C-IV, D-II

Q40 Equivalent mass of HCl in the given reaction is;
$K_2Cr_2O_7 + 14HCl \rightarrow 2KCl + 2CrCl_3 + 3Cl_2 + 7H_2O$
(A) 15.64 (B) 36.5
(C) 85.16 (D) 2.6

Q41 The difference in the oxidation numbers of the two types of Bromine atoms in Br_3O_8 is;
(A) 3 (B) 2
(C) 4 (D) 5

Q42 Which among the following compounds can act as oxidising as well as reducing agent?
(A) HNO_3 (B) Cl_2O_7
(C) KI (D) SO_2

Q43 Oxidation state of two Chlorine atoms in bleaching powder $CaOCl_2$ are;
(A) +1 and -1 (B) 0 and -1
(C) 0 and +1 (D) -1 and +3

Q44 The formula of compound containing atoms A, B and C having oxidation states +2, +5 and -2 respectively is;
(A) $B_3(AC_2)_2$ (B) $A_2(B_2C)_3$
(C) $A_3(BC_4)_2$ (D) $C_2(AB)_3$

Q45 In which of the following compounds oxidation state of Hydrogen is -1?
(A) $NaHSO_4$ (B) $C_6H_{12}O_6$
(C) KH_2PO_4 (D) $NaBH_4$

Q46 Given below are two statements:
Statement-I: O_3 reduces H_2O_2 into H_2O.
Statement-II: A negative E° means that the redox couple is a weaker reducing agent than the H^+/H_2 couple.
In the light of the above statements, choose the most appropriate answer from the options given below:
(A) Statement I is correct but Statement II is incorrect.
(B) Statement I is incorrect but Statement II is correct.
(C) Both Statement I and Statement II are correct.
(D) Both Statement I and Statement II are incorrect.

Q47 $KMnO_4$ is a strong oxidising agent in acidic medium. To provide acidic medium, H_2SO_4 is used instead of HCl. This is because;
(A) H_2SO_4 is weaker acid than HCl
(B) HCl is oxidised to Cl_2 by $KMnO_4$

(C) HCl is monobasic acid
(D) HCl is oxidised to $HClO_4$ by $KMnO_4$

Q48 Identify the **incorrect** order among the following.
(A) Zn > Cu > Ag: Reducing activity.
(B) $F_2 > Cl_2 > Br_2$: Oxidising power.
(C) Na > K > Ca: Reducing power.
(D) $MnO_4^- > Cr_2O_7^{2-} > MnO_2$: Oxidising activity in acidic medium.

Q49 Identify non-metal displacement reaction among the following;
(A) $TiCl_4 + 2Mg \longrightarrow 2MgCl_2 + Ti$
(B) $2F_2 + 2NaOH \longrightarrow 2NaF + OF_2 + H_2O$
(C) $2Fe + 3H_2O \longrightarrow Fe_2O_3 + 3H_2$
(D) $CH_4 + 2O_2 \longrightarrow CO_2 + 2H_2O$

Q50 Oxidation state of each of the two extreme sulphur in $S_4O_6^{2-}$ is
(A) 0 (B) +5
(C) +2.5 (D) +1

Q51 **Incorrect** statement(s) among the following is/are;
(I) All displacement reactions are redox reactions.
(II) Oxygen cannot have positive oxidation state in its compounds.
(III) Metal cannot have zero oxidation state in its compounds.
(A) II only (B) I only
(C) I and II only (D) I, II and III

Q52 Oxidant and reductant in the given reaction respectively are;
$2Cu_2O + Cu_2S \longrightarrow 6Cu + SO_2$
(A) Cu(I) and Sulphur of Cu_2S
(B) Cu(I) and Copper of Cu_2S
(C) Cu(II) and Copper of Cu_2S
(D) Cu(II) and Sulphur of Cu_2S

Q53 Consider the reaction:
$$x Fe^{2+} + y Cr_2O_7^{2-} + z H^+ \longrightarrow x Fe^{3+} + 2y Cr^{3+} + \frac{z}{2} H_2O$$
The value of x, y and z for the balanced reaction are
(A) x = 3, y = 1, z = 10
(B) x = 3, y = 2, z = 8
(C) x = 6, y = 2, z = 15
(D) x = 6, y = 1, z = 14

Q54 In $M_{0.85}O$, metal exists in +2 and +3 oxidation state. The percentage of metal ions existing as +2 in the metal is,
(A) 55% (B) 64.7%
(C) 58.2% (D) 71.3%

Q55 In CrO_5, oxidation state of Cr and Number of peroxide bonds respectively are;
(A) +10 and 0 (B) +6 and 2
(C) +8 and 1 (D) +4 and 3

Q56 A compound of Xe and F contains 63.28% Xe. The oxidation state of Xe in the compound is; [Given: Xe = 131 u, F = 19 u]
(A) +6 (B) +4
(C) +2 (D) +5

Q57 Equivalent mass of Cl_2 in the following reaction is;
$$Cl_2 + OH^- \longrightarrow Cl^- + ClO_3^- + H_2O$$
(A) $\frac{71\times3}{5}$ (B) $\frac{71\times5}{3}$
(C) $\frac{71}{3}$ (D) $\frac{71}{5}$

Q58 Oxidation number of Pt in $[Pt(C_2H_4)Cl_3]^-$ is;
(A) +1 (B) 0
(C) +2 (D) +3

Q59 When Iron is rusted;
(A) It is oxidised only
(B) It is reduced only
(C) It is oxidised as well as reduced
(D) It neither oxidised nor reduced

Q60 Highest oxidation state of Iodine in its compounds is:
(A) +1 (B) +3
(C) +5 (D) +7

Answer Key

Q1	(C)
Q2	(C)
Q3	(C)
Q4	(D)
Q5	(C)
Q6	(D)
Q7	(B)
Q8	(A)
Q9	(A)
Q10	(D)
Q11	(A)
Q12	(B)
Q13	(D)
Q14	(A)
Q15	(C)
Q16	(D)
Q17	(A)
Q18	(A)
Q19	(B)
Q20	(B)
Q21	(C)
Q22	(B)
Q23	(A)
Q24	(D)
Q25	(D)
Q26	(B)
Q27	(B)
Q28	(C)
Q29	(C)
Q30	(C)
Q31	(C)
Q32	(D)
Q33	(A)
Q34	(B)
Q35	(C)
Q36	(A)
Q37	(A)
Q38	(D)
Q39	(D)
Q40	(C)
Q41	(B)
Q42	(D)
Q43	(A)
Q44	(C)
Q45	(D)
Q46	(A)
Q47	(B)
Q48	(C)
Q49	(C)
Q50	(B)
Q51	(D)
Q52	(A)
Q53	(D)
Q54	(B)
Q55	(B)
Q56	(B)
Q57	(A)
Q58	(C)
Q59	(A)
Q60	(D)

Hints & Solutions

Q1 Text Solution:

$Br_2 \rightarrow HBr$ (Reduction)
0.S = 0 $\quad +1 + x = 0 \quad \therefore x = -1$

$HgCl_2 \rightarrow Hg_2Cl_2$
$x + (-2) = 0 \quad 2x + 2(-1) = 0$ (Reduction)
$x = +2 \quad 2x = 2 \quad \therefore x = +1$

$KI \rightarrow I_2$ (Oxidation)
$+1 + x = 0 \quad 0$
$\therefore x = -1$

$Cu^{2+} \rightarrow Cu_2I_2$
$0.S = +2 \quad 2x + 2(-1) = 0$ (Reduction)
$2x = 2 \quad \therefore x = +1$

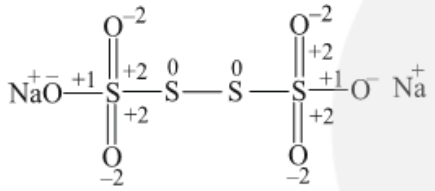
Q2 Text Solution:

$[SO_2 + 2H_2O \rightarrow SO_4^{2-} + 4H^+ + 2e^-] \times 5$
$5SO_2 + 10\ H_2O \rightarrow 5\ SO_4^{2-} + 20H^+ + 10e^-$
$2IO_3^- + 10e^- + 12H^+ \rightarrow I_2 + 6H_2O$

$5\ SO_2 + 2\ IO_3^- + 4\ H_2O \rightarrow 5\ SO_4^{2-} + I_2 + 8H^+$

$\therefore$ Coefficient of $SO_2 = 5$.

Q3 Text Solution:



$Na_2S_4O_6$

O. S of S = 0, + 5

Q4 Text Solution:

Zinc gives H_2 gas with dil H_2SO_4/HCl but not with HNO_3 because in HNO_3, NO_3^- ion is reduced

and give N_2O, NO and NO_2

Q5 Text Solution:

(a) $2NaOH + H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$ (neutralization)

(b) $\overset{0}{3O_2} \xrightarrow{\text{Light}} \overset{0}{2O_3}$ (not redox reaction)

(c) $\overset{0}{N_2} + \overset{0}{O_2} \xrightarrow{\text{Light}} \overset{+2-2}{2NO}$ (redox reaction)

here oxidation of N_2 and reduction of O_2 is taking place

(d) $H_2O\,(l) \xrightarrow{\Delta} H_2O\,(g)$ (not redox reaction)

Q6 Text Solution:

$PO_4^{3-} = x + 4(-2) = -3;\ x - 8 = -3;\ x = +5$
$SO_4^{2-} = x + 4(-2) = -2;\ x - 8 = -2;\ x = +6$
$Cr_2O_7^{2-} = 2x + 7(-2) = -2;\ 2x - 14 = -2;$
$2x = 12;\ x = +6$

Q7 Text Solution:

$SO_3^{2-} \rightarrow$S is in + 4 oxidation state
$S_2O_4^{2-} \rightarrow$S is in + 3 oxidation state
$S_2O_6^{2-} \rightarrow$S is in + 5 oxidation state

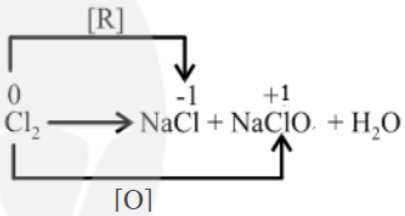
Q8 Text Solution:

In its lowest oxidation state, an element can't be reduced (no lower state possible), but it can be oxidized by losing electrons, so it acts as a reducing agent.

Q9 Text Solution:

F_2 is the strongest oxidizing agent as it has highest reduction potential while I^- is the strongest reducing agent since it has lowest reduction potential.

Q10 Text Solution:



For oxidation, $n_O = 1 \times 2 = 2$
For reduction, $n_R = 1 \times 2 = 2$
For disproportionation reaction

$$n = \frac{n_O \times n_R}{n_O + n_R}$$
$$n = \frac{2 \times 2}{2+2} = 1$$
$$E_{Cl_2} = \frac{M_{Cl_2}}{n} = \frac{M}{1}$$

Q11 Text Solution:

$$\overset{-3}{NH_4^+} \rightarrow \overset{0}{N_2} + 3e^-$$

Oxidation process, in terms of electron transfer, is the loss of electron.

Q12 Text Solution:

$$E = \frac{\text{molecular weight}}{\text{number of ionizable } H^+}$$

n-factor:- $H_2SO_4 = 2$
$H_3BO_3 = 1$
$H_3PO_4 = 3$
$H_4P_2O_6 = 4$

Q13 Text Solution:

Disproportionation reactions are a special type of redox reactions. In a disproportionation reaction an element in one oxidation state is simultaneously oxidised and reduced. In BrO_4^-, the Br-atom is in maximum oxidation state (+7)

Q14 Text Solution:

$MnO_4^- + 8H^+ + 5e^- \rightarrow Mn^{2+} + 4H_2O$

Q15 Text Solution:

The electronic configuration of Mn is $1s^2\ 2s^2\ p^6\ 3s^2p^6d^54s^2$.

Therefore, it can lose 7 electrons and oxidation state can very in between 0 to 7.

In MnO_2, oxidation state of Mn is +4, which lies between highest and lowest oxidation state, so it can act as an oxidation agent as well reducing agent.

Q16 Text Solution:

An element that never has a positive oxidation state in any of its compound is fluorine. Fluorine only shows negative oxidation states whereas other halogens shows negative as well as positive oxidation state.

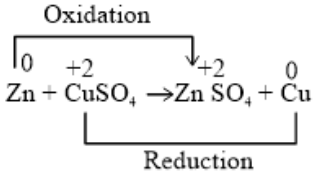
Q17 Text Solution:

1. N_2O_5 : $2x + 5(-2) = 0 \Rightarrow x = +5$
2. NaN_3 : $+1 + 3x = 0 \Rightarrow x = \frac{-1}{3}$
3. NO : $x + (-2) = 0 \Rightarrow x = +2$
4. N_2H_4 : $2x + 4(+1) = 0 \Rightarrow x = -2$

Q18 Text Solution:

$Sn^{2+} \rightarrow Sn^{4+} + 2e^-$. In this reaction Sn^{2+} change in Sn^{4+} it is called an oxidation reaction.

Q19 Text Solution:



In this reaction Cu^{2+} change in Cu, hence it is called as reduction reaction.

Q20 Text Solution:

The oxidation number of Ni changes from 0 to +2.

Q21 Text Solution:

HOCl : $+1 + (-2) + x = 0$

$x = +1$

Q22 Text Solution:

In free state oxidation state of an element is always zero.

Q23 Text Solution:

Phosphorus shows – 3 to + 5 oxidation state.

Q24 Text Solution:

In hydrazoic acid (N_3H) nitrogen shows $-\frac{1}{3}$ oxidation state.

$\overset{*}{N}_3H$

$3x + 1 = 0, 3x = -1,\ x = -\frac{1}{3}$

Q25 Text Solution:

HNO_3 : $+1 + x + 3(-2) = 0$

$x - 5 = 0 \Rightarrow x = +5$

N_2O : $2x - 2 = O$

$$2x = +2 \Rightarrow x = +1$$

$\therefore$ Change in oxidation number = 4.

Q26 Text Solution:

In H_2O_2 oxygen shows = – 1 (peroxide) oxidation state

and in $BaSO_4$ oxygen shows = – 2 oxidation state.

Q27 Text Solution:

$E^o_{H^+/H_2} = 0.0V$

Q28 Text Solution:

$\overset{*}{K}O_2,\ +1 + 2x = 0,\ x = -\frac{1}{2}$

Q29 Text Solution:

Both A and R are true and R is the correct explanation of A.

$\overset{0}{N}_2 + 6e^- \rightarrow 2N^{3-}$

$\therefore$ equivalent weight of

$NH_3 = \frac{14+3}{3} = \frac{17}{3}$

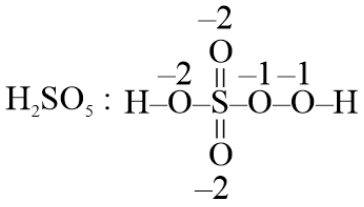
while for $N_2 = \frac{14\times2}{6} = \frac{28}{6}$

Q30 Text Solution:

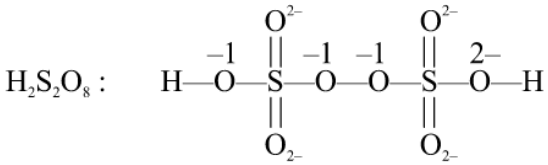
I^- can never act as an oxidizing agent.

Oxidizing agent undergoes reduction.

Q31 Text Solution:



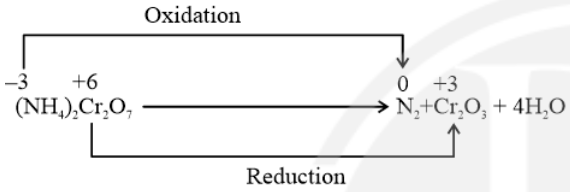
x + 2(+1) + 3(–2) + 2(–1) = 0 $\Rightarrow$ x = +6



2x + 2 (+1) + 6 (–2) + 2(–1) = 0 x = +6

Q32 Text Solution:

In intramolecular Redox reaction, different elements in same compound are oxidised and reduced.



Q33 Text Solution:

$\mathrm{KMnO_4} \xrightarrow{\mathrm{H^+}} \mathrm{Mn^{2+}} + 5\mathrm{e^-}$

$\mathrm{Fe^{2+}} \longrightarrow \mathrm{Fe^{3+}} + 1\mathrm{e^-}$

$\mathrm{C_2O_4^{2-}} \longrightarrow 2\,\mathrm{CO_2} + 2\mathrm{e^-}$

Equivalent of $KMnO_4$ = equivalent of FeC_2O_4

2×5 = mole × 3

$n_{FeC_2O_4} = \frac{10}{3}$

Q34 Text Solution:

- Fe_3O_4: $FeO+Fe_2O_3$
- Pb_3O_4: $2PbO+PbO_2$
- Mn_3O_4: $2MnO+MnO_2$
- Mn_2O_7: Single oxide
- P_4O_{10}: Dimer of P_2O_5

Q35 Text Solution:

$\mathrm{N_2^{4-}} \longrightarrow 10\mathrm{e^-} + 2\mathrm{N^{+x}}$

-4 = -10 + 2x

2x = 6

x = +3

Q36 Text Solution:

- Intensely coloured $\mathrm{MnO_4^-}$ act as a self indicator.
- Layer test is used for the identification of Br^- and I^-.

Q37 Text Solution:

- $\mathrm{P_4\left(s\right) \xrightarrow{OH^-} PH_3 + H_2\,PO_2^-}$
- $\mathrm{S_8\left(s\right) \xrightarrow{OH^-} S^{2-} + S_2O_3^{2-}}$
- $\mathrm{Cl_2(g) \xrightarrow{OH^-} ClO^- + Cl^-}$
- $\mathrm{NO_2\left(g\right) \xrightarrow{OH^-} NO_2^- + NO_3^-}$

Q38 Text Solution:

$\mathrm{\overset{+2}{Ca}\,\overset{+4}{C}\,\overset{-2}{O_3} \longrightarrow \overset{+2}{Ca}\,\overset{-2}{O} + \overset{+4}{C}\,\overset{-2}{O_2}}$

Since the oxidation state of each atom remains the same, so it is a non-redox reaction.

Q39 Text Solution:

NaO_2 (Sodium Superoxide): +1 + 2x = 0

$\Rightarrow \mathrm{x} = -\frac{1}{2}$

Al_2O_3 (Aluminium Oxide): $2Al^{3+} + 3O^{2-}$

BaO_2 (Barium Peroxide):

$+2 + 2x = 0 \Rightarrow 2x = -2 \Rightarrow x = -1$

KO_3 (Potassium Ozonide):

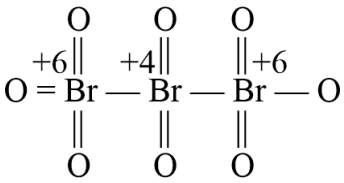
$+1 + 3x = 0 \Rightarrow 3x = -1 \Rightarrow x = -\frac{1}{3}$

Q40 Text Solution:

$\left(\mathrm{n_{factor}}\right)_{\mathrm{HCl}} = \frac{6}{14} = \frac{3}{7}$

$\mathrm{E_{HCl}} = \frac{36.5}{(3/7)} = 36.5 \times \frac{7}{3} = \frac{255.5}{3} = 85.16$

Q41 Text Solution:



required difference = 6 – 4 = 2

Q42 Text Solution:

In SO_2, S is present in +4 oxidation state so it can be oxidised and reduced both as its minimum and maximum oxidation states are -2 and +6 respectively.

Q43 Text Solution:

$CaOCl_2: Ca^{2+} + Cl^- + OCl^-$

$-2 + x = -1$

$x = +1$

Q44 Text Solution:

Net charge on a compound is zero.

Net charge on $A_3(BC_4)_2$:

=3(+2)+2(+5)+8(–2)

=+6+10–16

=0

Q45 Text Solution:

Electronegativity of H is more than B so in $NaBH_4$ oxidation state of H is -1.

Q46 Text Solution:

- O_3 oxidises H_2O_2 into O_2.

$O_3 \longrightarrow O_2 + [O]$

$H_2O_2 + [O] \longrightarrow H_2O + O_2$

$O_3 + H_2O_2 \longrightarrow O_2 + H_2O + O_2$

(OA) (RA)

- A negative E° means that the redox couple is a stronger reducing agent than the H^+/H_2 couple.

Q47 Text Solution:

$KMnO_4$ oxidises HCl into Cl_2.

Q48 Text Solution:

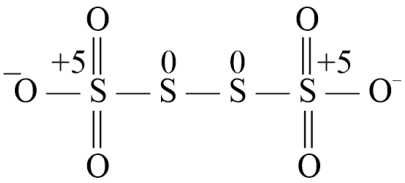
Reducing power: K > Ca > Na

Q49 Text Solution:

H_2 displacement reactions are non-metal displacement reactions.

In reaction (C), hydrogen (a non-metal) is displaced by iron (a metal). Therefore, it is a non-metal displacement reaction.

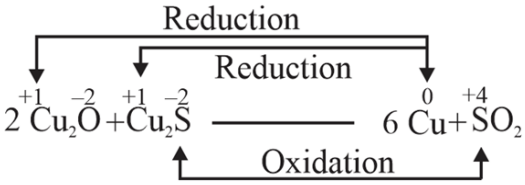
Q50 Text Solution:



Q51 Text Solution:

- $NaCl + AgNO_3 \longrightarrow AgCl + NaNO_3$. It is a non-redox reaction.
- In OF_2, oxidation state of O is +2.
- In $Fe(CO)_5$ oxidation state of Fe is 0.

Q52 Text Solution:



Q53 Text Solution:

$6\,Fe^{2+} + Cr_2O_7^{2-} + 14H^+ \longrightarrow 6\,Fe^{3+} + 2\,Cr^{3+} + 7H_2O$

Q54 Text Solution:

$M_{0.85}O = (M^{2+})_x (M^{3+})_{0.85-x} (O^{2-})_1$

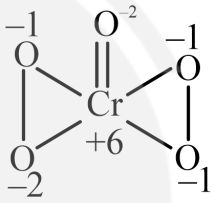
Total charge on compound = 0

+2x + 3(0.85-x) - 2(1) = 0

x = 0.55

$\%\ \text{of}\ M^{2+}\ \text{in}\ M = \frac{0.55}{0.85} \times 100 = 64.70\%$

Q55 Text Solution:



Q56 Text Solution:

XeF_n

$\%\ \text{of Xe} = \frac{\text{mass of Xe}}{\text{Mass of Compound}} \times 100$

$63.28 = \frac{131 \times 100}{131 + 19n}$

x = 4

$\therefore XeF_4 : x + 4(-1) = 0$

x = +4

Q57 Text Solution:

$Cl_2 \xrightarrow{n_1=2} 2\,Cl^- + 2e^-$

$10e^- + Cl_2 \xrightarrow{n_2=10} 2\,Cl^{+5}$

$n = \frac{n_1 n_2}{n_1 + n_2} = \frac{2 \times 10}{2 + 10} = \frac{20}{12} = \frac{5}{3}$

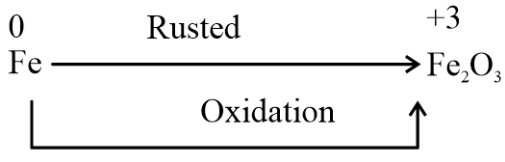
$E_{Cl_2} = \frac{71}{(5/3)} = \frac{71 \times 3}{5}$

Q58 Text Solution:

x+0+3(–1)=–1

x=+2

Q59 Text Solution:



Q60 Text Solution:

For Halogen except F, maximum oxidation state is +7.