

PHYSICAL CHEMISTRY

ENTHUSIAST | LEADER | ACHIEVER



EXERCISE

Redox Reaction

ENGLISH MEDIUM

EXERCISE-I (Conceptual Questions)
OXIDATION NUMBER

- In $[\text{Ni}(\text{CO})_4]$, the oxidation state of Ni is :
(1) 4 (2) 0 (3) 2 (4) 8
RR0001
- The oxidation number of nitrogen in NH_2OH is :
(1) 0 (2) +1 (3) -1 (4) -2
RR0002
- Of the following elements, which one has the same oxidation state in all of its compounds ?
(1) Hydrogen (2) Fluorine
(3) Carbon (4) Oxygen
RR0003
- Oxidation number of fluorine in OF_2 is :
(1) +1 (2) +2 (3) -1 (4) -2
RR0004
- The oxidation number of C in CH_4 , CH_3Cl , CH_2Cl_2 , CHCl_3 and CCl_4 are respectively :
(1) +4, +2, 0, -2, -4 (2) +2, +4, 0, -4, -2
(3) -4, -2, 0, +2, +4 (4) -2, -4, 0, +4, +2
RR0005
- Phosphorus has the oxidation state of +3 in :
(1) Ortho phosphoric acid
(2) Phosphorus acid
(3) Meta phosphoric acid
(4) Pyrophosphoric acid
RR0006
- Oxidation state of oxygen in hydrogen peroxide is
(1) -1 (2) +1 (3) 0 (4) -2
RR0007
- Which one of the following statements is not correct?
(1) Oxidation state of S in $(\text{NH}_4)_2\text{S}_2\text{O}_8$ is +6
(2) Oxidation number of Os in OsO_4 is +8
(3) Oxidation state of S in H_2SO_5 is +8
(4) Oxidation number of O in KO_2 is $-\frac{1}{2}$
RR0009
- Which of the following shows highest oxidation number in combined state :
(1) Os (2) Ru
(3) Both (1) and (2) (4) None
RR0010

Build Up Your Understanding

- Oxidation number of sodium in sodium amalgam (Na-Hg) is :
(1) +2 (2) +1 (3) -3 (4) Zero
RR0011
- Oxidation number of C in HNC is :
(1) +2 (2) -3 (3) +3 (4) Zero
RR0013
- Oxidation number of Fe in $\text{Fe}_{0.94}\text{O}$ is :
(1) 200 (2) 200/94
(3) 94/200 (4) None
RR0014
- Oxidation number of carbon in carbon suboxide (C_3O_2) is :
(1) $\frac{+2}{3}$ (2) $\frac{+4}{3}$ (3) +4 (4) $\frac{-4}{3}$
RR0015
- Oxidation number of sulphur in $\text{Na}_2\text{S}_2\text{O}_3$ would be :-
(1) +2 (2) +4 (3) -2 (4) 0
RR0016
- Two oxidation states for chlorine are found in the compound :
(1) CaOCl_2 (2) KCl (3) KClO_3 (4) Cl_2O_7
RR0017
- $-\frac{1}{3}$ oxidation state of nitrogen will be obtained in case of :
(1) Ammonia (NH_3)
(2) Hydrazoic acid (N_3H)
(3) Nitric oxide (NO)
(4) Nitrous oxide (N_2O)
RR0019
- Compound $\text{YBa}_2\text{Cu}_3\text{O}_7$ is a super conductor. The O.N. of the copper in the compound will be: [O.No. of Y = +3]
(1) $+\frac{7}{3}$ (2) zero (3) +2 (4) +1
RR0021
- The oxidation state of iodine in H_4IO_6^- is :-
(1) +7 (2) -1 (3) +5 (4) +1
RR0022
- Amongst the following, identify the species with an atom in +6 oxidation state:-
(1) MnO_4^- (2) $\text{Cr}(\text{CN})_6^{3-}$
(3) NiF_6^{2-} (4) CrO_2Cl_2
RR0023

- 20.** The oxidation state of + 1 for phosphorous is found in:-
 (1) Phosphorous acid (H_3PO_3)
 (2) Orthophosphoric acid (H_3PO_4)
 (3) Hypo phosphorous acid (H_3PO_2)
 (4) Hypo phosphoric acid ($\text{H}_4\text{P}_2\text{O}_6$)
RR0024
- 21.** In which of the following compounds iron has lowest oxidation state:-
 (1) $\text{FeSO}_4(\text{NH}_4)_2\text{SO}_4 \cdot 6\text{H}_2\text{O}$
 (2) $\text{K}_4[\text{Fe}(\text{CN})_6]$
 (3) $[\text{Fe}(\text{CO})_5]$
 (4) $\text{Fe}_{0.94}\text{O}$
RR0025
- 22.** Select the compound in which the oxidation number of oxygen is -1:-
 (1) H_2O (2) O_2F_2
 (3) Na_2O (4) BaO_2
RR0026
- 23.** Match List - I (compound) with list - II (Oxidation state of N) and select the correct answer using the codes given below the list:-
 List - I List-II
 (A) KNO_3 (a) - 1/3
 (B) HNO_2 (b) - 3
 (C) NH_4Cl (c) 0
 (D) NaN_3 (d) + 3
 (e) + 5
 Codes are:-

	A	B	C	D
(1)	e	d	b	a
(2)	e	b	d	a
(3)	d	e	a	c
(4)	b	c	d	e

RR0027
- 24.** In which of the following pair, oxidation number of Fe is same :-
 (1) $\text{K}_3[\text{Fe}(\text{CN})_6]$, Fe_2O_3
 (2) $\text{Fe}(\text{CO})_5$, Fe_2O_3
 (3) Fe_2O_3 , FeO
 (4) $\text{Fe}_2(\text{SO}_4)_3$, $\text{K}_4[\text{Fe}(\text{CN})_6]$
RR0028
- 25.** In the conversion of Br_2 to BrO_3^- , the oxidation state of bromine changes from :-
 (1) 0 to 5 (2) 1 to 5
 (3) 0 to -3 (4) 2 to 5
RR0029
- 26.** The sum of oxidation states of sulphur in $\text{H}_2\text{S}_2\text{O}_8$ is :-
 (1) +2 (2) +6 (3) +7 (4) +12
RR0030
- 27.** In which of the following compounds of Cr, the oxidation number of Cr is not +6 :-
 (1) CrO_3 (2) CrO_2Cl_2
 (3) Cr_2O_3 (4) $\text{K}_2\text{Cr}_2\text{O}_7$
RR0031
- 28.** Oxidation state of cobalt in $[\text{Co}(\text{NH}_3)_4(\text{H}_2\text{O})\text{Cl}]\text{SO}_4$ is
 (1) 0 (2) +4 (3) -2 (4) +3
RR0032
- 29.** Oxidation number of carbon in graphite is :-
 (1) Zero (2) +1 (3) +4 (4) +2
RR0033
- 30.** Oxidation number of 'N' in N_3H (hydrazoic acid) is :-
 (1) $-\frac{1}{3}$ (2) -3 (3) +3 (4) $+\frac{2}{3}$
RR0034
- 31.** Which of the following doesn't have +5 oxidation state of phosphorus ?
 (1) Phosphorus acid (H_3PO_3)
 (2) Orthophosphoric acid (H_3PO_4)
 (3) Meta phosphoric acid (HPO_3)
 (4) Pyro phosphoric acid ($\text{H}_4\text{P}_2\text{O}_7$)
RR0035
- 32.** The oxidation number of arsenic atom in H_3AsO_4 is :-
 (1) -1 (2) -3 (3) +3 (4) +5
RR0036
- 33.** In substance $\text{Mg}(\text{HXO}_3)$, the oxidation number of X is :-
 (1) 0 (2) +2 (3) +3 (4) +4
RR0037
- 34.** The oxidation number of phosphorus in PH_4^+ , PO_2^{3-} , PO_4^{3-} and PO_3^{3-} are respectively :-
 (1) -3, +1, +3, +5 (2) -3, +3, +5, +1
 (3) +3, -3, +5, +1 (4) -3, +1, +5, +3
RR0040
- 35.** Which of the following compounds are arranged in increasing oxidation number of S :-
 (1) H_2SO_3 , H_2S , H_2SO_4 , $\text{H}_2\text{S}_2\text{O}_3$
 (2) $\text{H}_2\text{S}_2\text{O}_3$, H_2SO_3 , H_2S , H_2SO_4
 (3) H_2S , H_2SO_3 , H_2SO_4 , $\text{H}_2\text{S}_2\text{O}_3$
 (4) H_2S , $\text{H}_2\text{S}_2\text{O}_3$, H_2SO_3 , H_2SO_4
RR0041
- 36.** Iodine shows the highest oxidation state in the compound :-
 (1) KI (2) KI_3 (3) IF_5 (4) KIO_4
RR0042
- 37.** The sum of the oxidation states of all the carbon atoms present in the compound $\text{C}_6\text{H}_5\text{CHO}$ is :-
 (1) -4 (2) 3 (3) +5 (4) - 4/7
RR0043

APPLICATIONS OF REDOX REACTIONS

38. A reducing agent is a substance which can :

- (1) Accept electrons (2) Donate electrons
(3) Accept protons (4) Donate protons

RR0045

39. The reaction $\text{H}_2\text{S} + \text{H}_2\text{O}_2 \rightarrow \text{S} + 2\text{H}_2\text{O}$ manifests :

- (1) Oxidising action of H_2O_2
(2) Reducing nature of H_2O_2
(3) Acidic nature of H_2O_2
(4) Alkaline nature of H_2O_2

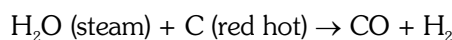
RR0046

40. If an element is in its lowest oxidation state, under proper conditions it can act as :

- (1) Reducing agent
(2) An oxidising agent
(3) Oxidising as well as reducing agent
(4) Neither oxidising nor reducing agent

RR0047

41. In a reaction of



- (1) H_2O is the reducing agent
(2) H_2O is the oxidising agent
(3) carbon is the oxidising agent
(4) oxidation-reduction does not occur

RR0048

42. The compound that can work both as an oxidising as well as reducing agent is :

- (1) KMnO_4 (2) H_2O_2
(3) $\text{Fe}_2(\text{SO}_4)_3$ (4) $\text{K}_2\text{Cr}_2\text{O}_7$

RR0049

43. HNO_2 acts as an oxidant with which one of the following reagent:-

- (1) KMnO_4 (2) H_2S (3) $\text{K}_2\text{Cr}_2\text{O}_7$ (4) Br_2

RR0051

44. In which of the following reaction H_2O_2 acts as reducing agent :-

- (1) $2\text{FeCl}_2 + 2\text{HCl} + \text{H}_2\text{O}_2 \rightarrow 2\text{FeCl}_3 + 2\text{H}_2\text{O}$
(2) $\text{Cl}_2 + \text{H}_2\text{O}_2 \rightarrow 2\text{HCl} + \text{O}_2$
(3) $2\text{HI} + \text{H}_2\text{O}_2 \rightarrow 2\text{H}_2\text{O} + \text{I}_2$
(4) $\text{H}_2\text{SO}_3 + \text{H}_2\text{O}_2 \rightarrow \text{H}_2\text{SO}_4 + \text{H}_2\text{O}$

RR0052

45. When H_2 reacts with Na, it acts as :-

- (1) Oxidising agent
(2) Reducing agent
(3) Both
(4) Cannot be predicted

RR0054

46. In the course of a chemical reaction an oxidant –

- (1) Loses electron
(2) Gains electron
(3) Both loses and gain electrons
(4) Electron change does not occur

RR0056

47. In the reaction:-



HNO_3 acts as :-

- (1) An oxidising agent (2) An acid
(3) A reducing agent (4) A base

RR0057

48. A compound contains atoms A, B and C. The oxidation number of A is +2, of B is +5 and of C is -2. The possible formula of the compound is :

- (1) ABC_2 (2) $\text{B}_2(\text{AC}_3)_2$
(3) $\text{A}_3(\text{BC}_4)_2$ (4) $\text{A}_3(\text{B}_4\text{C})_2$

RR0058

49. Equivalent weight of N_2 in the change $\text{N}_2 \rightarrow \text{NH}_3$ is

- (1) $\frac{28}{6}$ (2) 28 (3) $\frac{28}{2}$ (4) $\frac{28}{3}$

RR0059

50. Equivalent weight of NH_3 in the change $\text{N}_2 \rightarrow \text{NH}_3$ is :

- (1) $\frac{17}{6}$ (2) 17 (3) $\frac{17}{2}$ (4) $\frac{17}{3}$

RR0060

51. In the reaction, $2\text{S}_2\text{O}_3^{2-} + \text{I}_2 \rightarrow \text{S}_4\text{O}_6^{2-} + 2\text{I}^-$, the eq. wt. of $\text{Na}_2\text{S}_2\text{O}_3$ is equal to its :

- (1) Mol. wt. (2) Mol. wt./2
(3) 2 x Mol. wt. (4) Mol. wt./6

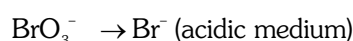
RR0061

52. In the reaction, $\text{VO} + \text{Fe}_2\text{O}_3 \rightarrow \text{FeO} + \text{V}_2\text{O}_5$, the eq. wt. of V_2O_5 is equal to its :

- (1) Mol. wt. (2) Mol. wt./8
(3) Mol. wt./6 (4) Mol. wt./2

RR0062

53. Molecular weight of KBrO_3 is M. What is its equivalent weight, if the reaction is :



- (1) M (2) M/4 (3) M/6 (4) 6M

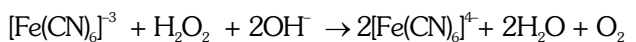
RR0064

54. In the reaction : $A^{+n_2} + xe^- \rightarrow A^{+n_1}$, here x will be

- (1) $n_1 + n_2$ (2) $n_2 - n_1$
(3) $n_1 - n_2$ (4) $-n_1 - n_2$

RR0065

55. What would be the equivalent weight of the reductant in the reaction :



[Given : Fe = 56, C = 12, N = 14, O = 16, H = 1]

- (1) 17 (2) 212 (3) 34 (4) 32

RR0066

56. Equivalent weight of FeC_2O_4 in the change :
 $FeC_2O_4 \rightarrow Fe^{3+} + CO_2$ is :

- (1) M/3 (2) M/6
(3) M/2 (4) M/1

RR0068

57. The number of mole of oxalate ions oxidised by one mole of MnO_4^- is :

- (1) 1/5 (2) 2/5
(3) 5/2 (4) 5

RR0070

58. In a reaction 4 mole of electrons are transferred to one mole of HNO_3 when it acts as an oxidant. The possible reduction product is :

- (1) (1/2) mole N_2 (2) (1/2) mole N_2O
(3) 1 mole of NO_2 (4) 1 mole NH_3

RR0072

59. The equivalent weight of $MnSO_4$ is half of its molecular weight when it is converted to :-

- (1) Mn_2O_3 (2) MnO_2
(3) MnO_4^- (4) MnO_4^{2-}

RR0073

60. In the following change, $3Fe + 4H_2O \rightarrow Fe_3O_4 + 4H_2$
If the atomic weight of iron is 56, then its equivalent weight will be :-

- (1) 42 (2) 21 (3) 63 (4) 84

RR0074

61. $Cr_2O_7^{2-} + I^- + H^+ \rightarrow Cr^{+3} + I_2 + H_2O$

The equivalent weight of the reductant in the above equation is :- (At. wt. of Cr=52, I=127)

- (1) 26 (2) 127 (3) 63.5 (4) 10.4

RR0075

62. How many moles of $KMnO_4$ are reduced by 1 mole of ferrous oxalate in acidic medium:-

- (1) $\frac{1}{5}$ (2) $\frac{5}{3}$ (3) $\frac{1}{3}$ (4) $\frac{3}{5}$

RR0076

REDOX REACTIONS

63. Which one of the following is a redox reaction ?

- (1) $H_2 + Br_2 \rightarrow 2HBr$
(2) $2NaCl + H_2SO_4 \rightarrow Na_2SO_4 + 2HCl$
(3) $HCl + AgNO_3 \rightarrow AgCl + HNO_3$
(4) $NaOH + HCl \rightarrow NaCl + H_2O$

RR0078

64. Which of the following is not a redox change ?

- (1) $2H_2S + SO_2 \rightarrow 2H_2O + 3S$
(2) $2BaO + O_2 \rightarrow 2BaO_2$
(3) $BaO_2 + H_2SO_4 \rightarrow BaSO_4 + H_2O_2$
(4) $2KClO_3 \rightarrow 2KCl + 3O_2$

RR0079

65. In the reaction, $Cl_2 + OH^- \rightarrow Cl^- + ClO_4^- + H_2O$, chlorine is :

- (1) Oxidised
(2) Reduced
(3) Oxidised as well as reduced
(4) Neither oxidised nor reduced

RR0081

66. Which is a redox reaction :

- (1) $2CuI_2 \rightarrow CuI + I_2$
(2) $NaCl + AgNO_3 \rightarrow AgCl + NaNO_3$
(3) $NH_4Cl + NaOH \rightarrow NH_3 + NaCl + H_2O$
(4) $Cr_2(SO_4)_3 + 6KOH \rightarrow 2Cr(OH)_3 + 3K_2SO_4$

RR0082

67. Which of the following example does not represent disproportionation -

- (1) $MnO_2 + 4HCl \rightarrow MnCl_2 + Cl_2 + 2H_2O$
(2) $2H_2O_2 \rightarrow 2H_2O + O_2$
(3) $4KClO_3 \rightarrow 3KClO_4 + KCl$
(4) $3Cl_2 + 6NaOH \rightarrow 5NaCl + NaClO_3 + 3H_2O$

RR0083

68. The decomposition of KClO_3 to KCl and O_2 on heating is an example of :
- (1) Intermolecular redox change
 - (2) Intramolecular redox change
 - (3) Disproportionation or auto redox change
 - (4) Comproportionation

RR0084

69. Which of the following change represents a disproportionation reaction (s) :
- (1) $\text{Cl}_2 + 2\text{OH}^- \rightarrow \text{ClO}^- + \text{Cl}^- + \text{H}_2\text{O}$
 - (2) $\text{Cu}_2\text{O} + 2\text{H}^+ \rightarrow \text{Cu} + \text{Cu}^{2+} + \text{H}_2\text{O}$
 - (3) $2\text{HCuCl}_2 \xrightarrow[\text{Water}]{\text{dilution with}} \text{Cu} + \text{Cu}^{2+} + 4\text{Cl}^- + 2\text{H}^+$
 - (4) All of the above

RR0085

70. How many electrons should X_2H_4 liberate so that in the new compound X shows oxidation number of $-\frac{1}{2}$ (E.N. $\text{X} > \text{H}$)
- (1) 10
 - (2) 4
 - (3) 3
 - (4) 2

RR0087

71. Which one of the following is not a redox reaction :-
- (1) $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$
 - (2) $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$
 - (3) $\text{Na} + \text{H}_2\text{O} \rightarrow \text{NaOH} + \frac{1}{2}\text{H}_2$
 - (4) $\text{MnCl}_3 \rightarrow \text{MnCl}_2 + \frac{1}{2}\text{Cl}_2$

RR0088

72. In the reaction -
- $$\text{MnO}_4^- + \text{SO}_3^{2-} + \text{H}^+ \rightarrow \text{SO}_4^{2-} + \text{Mn}^{+2} + \text{H}_2\text{O}$$
- (1) MnO_4^- and H^+ both are reduced
 - (2) MnO_4^- is reduced and H^+ is oxidised
 - (3) MnO_4^- is reduced and SO_3^{2-} is oxidised
 - (4) MnO_4^- is oxidised and SO_3^{2-} is reduced

RR0089

73. $\text{I}_2 + \text{KI} \rightarrow \text{KI}_3$
In the above reaction:-
- (1) Only oxidation taken place
 - (2) Only reduction takes place
 - (3) Both the above
 - (4) Neither oxidation nor reduction

RR0090

74. Which of the following reaction represents the oxidising behaviour of H_2SO_4 :-
- (1) $2\text{PCl}_5 + \text{H}_2\text{SO}_4 \rightarrow 2\text{POCl}_3 + 2\text{HCl} + \text{SO}_2\text{Cl}_2$
 - (2) $2\text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$
 - (3) $\text{NaCl} + \text{H}_2\text{SO}_4 \rightarrow \text{NaHSO}_4 + \text{HCl}$
 - (4) $2\text{HI} + \text{H}_2\text{SO}_4 \rightarrow \text{I}_2 + \text{SO}_2 + 2\text{H}_2\text{O}$

RR0091

75. Select the example of disproportionation reaction

- (1) $\text{BaCl}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + 2\text{HCl}$
- (2) $\text{NH}_4\text{NO}_3 \rightarrow \text{N}_2\text{O} + 2\text{H}_2\text{O}$
- (3) $4\text{H}_3\text{PO}_3 \rightarrow \text{PH}_3 + 3\text{H}_3\text{PO}_4$
- (4) $\text{AgCl} + 2\text{NH}_3 \rightarrow \text{Ag}(\text{NH}_3)_2\text{Cl}$

RR0092

76. Which of the following reaction involves oxidation & reduction :-

- (1) $\text{NaBr} + \text{HCl} \rightarrow \text{NaCl} + \text{HBr}$
- (2) $\text{HBr} + \text{AgNO}_3 \rightarrow \text{AgBr} + \text{HNO}_3$
- (3) $2\text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$
- (4) $\text{H}_2 + \text{Br}_2 \rightarrow 2\text{HBr}$

RR0093

77. The reaction



- (1) Redox
- (2) Reduction only
- (3) Neutralization
- (4) Disproportionation

RR0094

78. Which of the following reaction involves neither oxidation nor reduction :-

- (1) $\text{CrO}_4^{2-} \rightarrow \text{Cr}_2\text{O}_7^{2-}$
- (2) $\text{Cr} \rightarrow \text{CrCl}_3$
- (3) $\text{Na} \rightarrow \text{Na}^+$
- (4) $2\text{S}_2\text{O}_3^{2-} \rightarrow \text{S}_4\text{O}_6^{2-}$

RR0095

79. $\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2$

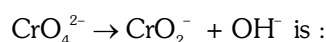
Zn undergoes -

- (1) Reduction
- (2) Oxidation
- (3) Both oxidation and reduction
- (4) Neither oxidation nor reduction

RR0096

BALANCING OF REDOX REACTIONS

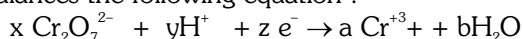
80. Balance the following given half reaction for the unbalanced whole reaction :



- (1) $\text{CrO}_4^{2-} + 2\text{H}_2\text{O} + 3\text{e}^- \rightarrow \text{CrO}_2^- + 4\text{OH}^-$
- (2) $2\text{CrO}_4^{2-} + 8\text{H}_2\text{O} \rightarrow \text{CrO}_2^- + 4\text{H}_2\text{O} + 8\text{OH}^-$
- (3) $\text{CrO}_4^{2-} + \text{H}_2\text{O} \rightarrow \text{CrO}_2^- + \text{H}_2\text{O} + \text{OH}^-$
- (4) $3\text{CrO}_4^{2-} + 4\text{H}_2\text{O} + 6\text{e}^- \rightarrow 2\text{CrO}_2^- + 8\text{OH}^-$

RR0097

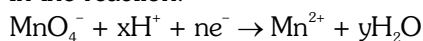
81. Choose the set of coefficients that correctly balances the following equation :



	x	y	z	a	b
(1)	2	14	6	2	7
(2)	1	14	6	2	7
(3)	2	7	6	2	7
(4)	2	7	6	1	7

RR0098

82. In the reaction:

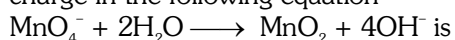


What is the value of n :

- (1) 5 (2) 8 (3) 6 (4) 3

RR0099

83. The number of electrons required to balance charge in the following equation –



- (1) 5 (2) 4 (3) 3 (4) 2

RR0100

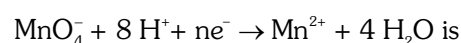
84. $2\text{KMnO}_4 + 5\text{H}_2\text{S} + 6\text{H}^+ \rightarrow 2\text{Mn}^{2+} + 2\text{K}^+ + 5\text{S} + 8\text{H}_2\text{O}$.

In the above reaction, how many electrons would be involved in the oxidation of 1 mole of reductant?

- (1) Two (2) Five (3) Ten (4) One

RR0102

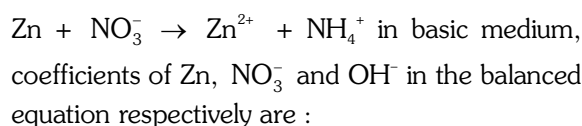
85. The value of n in :



- (1) 5 (2) 4 (3) 3 (4) 2

RR0103

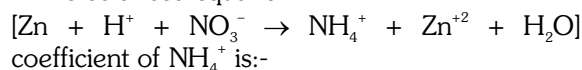
86. For the redox reaction



- (1) 4, 1, 7 (2) 7, 4, 1
(3) 4, 1, 10 (4) 1, 4, 10

RR0105

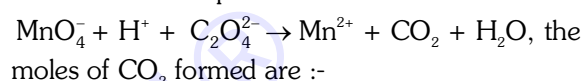
87. In the balanced equation-



- (1) 4 (2) 3 (3) 2 (4) 1

RR0106

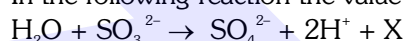
88. In the balanced equation



- (1) 2 (2) 4 (3) 5 (4) 10

RR0107

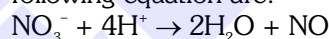
89. In the following reaction the value of 'X' is



- (1) $4e^-$ (2) $3e^-$ (3) $2e^-$ (4) $1e^-$

RR0108

90. The number of electrons required to balance the following equation are:



- (1) 2 on right side (2) 3 on left side
(3) 3 on right side (4) 5 on left side

RR0109

EXERCISE-I (Conceptual Questions)

ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	2	3	2	3	3	2	1	3	3	4	1	2	2	1	1
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	2	1	1	4	3	3	4	1	1	1	4	3	4	1	1
Que.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Ans.	1	4	3	4	4	4	1	2	1	1	2	2	2	2	1
Que.	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	2	1	3	1	4	1	3	3	3	1	1	3	2	2	2
Que.	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Ans.	2	4	1	3	3	1	1	2	4	3	1	3	3	4	3
Que.	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
Ans.	4	1	1	2	1	2	1	3	1	1	3	4	4	3	2

EXERCISE-II (Previous Year Questions)
AIPMT 2009

1. Oxidation numbers of P in PO_4^{3-} , of S in SO_4^{2-} and that of Cr in $\text{Cr}_2\text{O}_7^{2-}$ are respectively :-
- (1) -3, +6 and +6 (2) +5, +6 and +6
 (3) +3, +6 and +5 (4) +5, +3 and +6

RR0111
AIPMT Pre. 2012

2. When Cl_2 gas reacts with hot and concentrated sodium hydroxide solution, the oxidation number of chlorine changes from:
- (1) Zero to -1 and zero to +3
 (2) Zero to +1 and zero to -3
 (3) Zero to +1 and zero to -5
 (4) Zero to -1 and zero to +5

RR0114

3. In which of the following compounds, nitrogen exhibits highest oxidation state?
- (1) N_3H (2) NH_2OH
 (3) N_2H_4 (4) NH_3

RR0115
AIPMT 2014

4. The reaction of aqueous KMnO_4 with H_2O_2 in acidic conditions gives :-
- (1) Mn^{4+} and O_2 (2) Mn^{2+} and O_2
 (3) Mn^{2+} and O_3 (4) Mn^{4+} and MnO_2

RR0119
RE-AIPMT 2015

5. Assuming complete ionization, same moles of which of the following compounds will require the least amount of acidified KMnO_4 for complete oxidation?
- (1) FeC_2O_4 (2) $\text{Fe}(\text{NO}_2)_2$
 (3) FeSO_4 (4) FeSO_3

RR0121
NEET-II 2016

6. Hot concentrated sulphuric acid is a moderately strong oxidizing agent. Which of the following reactions does not show oxidizing behaviour?
- (1) $\text{C} + 2\text{H}_2\text{SO}_4 \rightarrow \text{CO}_2 + 2\text{SO}_2 + 2\text{H}_2\text{O}$
 (2) $\text{CaF}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{CaSO}_4 + 2\text{HF}$
 (3) $\text{Cu} + 2\text{H}_2\text{SO}_4 \rightarrow \text{CuSO}_4 + \text{SO}_2 + 2\text{H}_2\text{O}$
 (4) $3\text{S} + 2\text{H}_2\text{SO}_4 \rightarrow 3\text{SO}_2 + 2\text{H}_2\text{O}$

RR0124
AIPMT/NEET
NEET(UG) 2018

7. 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 coefficients of the reactants for the balanced equation are
- | | MnO_4^- | $\text{C}_2\text{O}_4^{2-}$ | H^+ |
|-----|------------------|-----------------------------|--------------|
| (1) | 16 | 5 | 2 |
| (2) | 2 | 5 | 16 |
| (3) | 2 | 16 | 5 |
| (4) | 5 | 16 | 2 |

RR0125
NEET(UG) 2019

8. Which of the following reactions are disproportionation reaction?
- (a) $2\text{Cu}^+ \rightarrow \text{Cu}^{2+} + \text{Cu}^0$
 (b) $3\text{MnO}_4^{2-} + 4\text{H}^+ \rightarrow 2\text{MnO}_4^- + \text{MnO}_2 + 2\text{H}_2\text{O}$
 (c) $2\text{KMnO}_4 \xrightarrow{\Delta} \text{K}_2\text{MnO}_4 + \text{MnO}_2 + \text{O}_2$
 (d) $2\text{MnO}_4^- + 3\text{Mn}^{2+} + 2\text{H}_2\text{O} \rightarrow 5\text{MnO}_2 + 4\text{H}^+$
 Select the **correct** option from the following :-
- (1) (a) and (b) only (2) (a), (b) and (c)
 (3) (a), (c) and (d) (4) (a) and (d) only

RR0167
NEET (UG) 2020

9. What is the change in oxidation number of carbon in the following reaction?
- $$\text{CH}_4(\text{g}) + 4\text{Cl}_2(\text{g}) \rightarrow \text{CCl}_4(\text{l}) + 4\text{HCl}(\text{g})$$
- (1) 0 to -4 (2) +4 to +4
 (3) 0 to +4 (4) -4 to +4

RR0186
NEET(UG) 2021 (Paper-2)

10. The equivalent weight of the salt $\text{KHC}_2\text{O}_4 \cdot \text{H}_2\text{C}_2\text{O}_4 \cdot 4\text{H}_2\text{O}$ used as reducing agent is
- | | |
|--------------------------------|--------------------------------|
| (1) $\frac{\text{Mol. wt}}{1}$ | (2) $\frac{\text{Mol. wt}}{2}$ |
| (3) $\frac{\text{Mol. wt}}{3}$ | (4) $\frac{\text{Mol. wt}}{4}$ |

RR0188
NEET (UG) 2022

11. In the neutral or faintly alkaline medium, KMnO_4 oxidises iodide into iodate. The change in oxidation state of manganese in this reaction is from
- (1) +6 to +4 (2) +7 to +3
 (3) +6 to +5 (4) +7 to +4

RR0189

NEET (UG) 2022 (OVERSEAS)

12. Identify the set from the following sets in which all species can exhibit disproportionation reactions.

- (1) $\text{Cl}_2, \text{ClO}_2^-, \text{ClO}_3^-, \text{S}_8$
- (2) $\text{ClO}_4^-, \text{ClO}^-, \text{ClO}_2^-, \text{F}_2$
- (3) $\text{ClO}_3^-, \text{ClO}_4^-, \text{H}_2\text{O}_2, \text{ClO}^-$
- (4) $\text{ClO}_2^-, \text{ClO}_3^-, \text{ClO}_4^-, \text{Cl}_2$

RR0190

Re-NEET (UG) 2022

13. Which of the following reactions is a decomposition redox reaction ?

- (1) $2 \text{Pb}(\text{NO}_3)_2(\text{s}) \rightarrow 2 \text{PbO}(\text{s}) + 4 \text{NO}_2(\text{g}) + \text{O}_2(\text{g})$
- (2) $\text{N}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2 \text{NO}(\text{g})$
- (3) $\text{Cl}_2(\text{g}) + 2\text{OH}^-(\text{aq}) \rightarrow \text{ClO}^-(\text{aq}) + \text{Cl}^-(\text{aq}) + \text{H}_2\text{O}(\ell)$
- (4) $\text{P}_4(\text{s}) + 3\text{OH}^-(\text{aq}) + 3\text{H}_2\text{O}(\ell) \rightarrow \text{PH}_3(\text{g}) + 3\text{H}_2\text{PO}_2^-(\text{aq})$

RR0191

EXERCISE-II (Previous Year Questions)

ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	
Ans.	2	4	1	2	3	2	2	1	4	4	4	1	1	

EXERCISE-III (Analytical Questions)

Master Your Understanding

1. In the reaction $\text{CH}_3\text{OH} \rightarrow \text{HCOOH}$, the number of electrons that must be added to the right is :-
 (1) 4 (2) 3 (3) 2 (4) 1

RR0127

2. Which statement is wrong :-
 (1) Oxidation number of oxygen is +1 in peroxides
 (2) Oxidation number of oxygen is +2 in oxygen difluoride
 (3) Oxidation number of oxygen is $-\frac{1}{2}$ in superoxides
 (4) Oxidation number of oxygen is -2 in most of its compound

RR0128

3. In the reaction $8\text{Al} + 3\text{Fe}_3\text{O}_4 \rightarrow 4\text{Al}_2\text{O}_3 + 9\text{Fe}$, the number of electrons transferred from reductant to oxidant is :-
 (1) 8 (2) 4 (3) 16 (4) 24

RR0129

4. In which of the following reaction hydrogen is acting as an oxidising agent :-
 (1) With iodine to give hydrogen iodide
 (2) With lithium to give lithium hydride
 (3) With nitrogen to give ammonia
 (4) With sulphur to give hydrogen sulphide

RR0130

5. Oxidation number of Xe in XeF_5^- is :
 (1) +1 (2) +2 (3) +3 (4) +4

RR0131

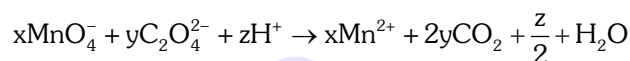
6. Which is the best description of the behaviour of bromine in the reaction given below :-
 $\text{H}_2\text{O} + \text{Br}_2 \rightarrow \text{HOBr} + \text{HBr}$
 (1) Both oxidized and reduced
 (2) Oxidized only
 (3) Reduced only
 (4) Proton acceptor only

RR0132

7. The correct order of acidic strength is -
 (1) $\text{HClO}_4 < \text{HClO}_3 < \text{HClO}_2 < \text{HClO}$
 (2) $\text{HClO}_2 < \text{HClO}_3 < \text{HClO}_4 < \text{HClO}$
 (3) $\text{HClO}_4 < \text{HClO} < \text{HClO}_2 < \text{HClO}_3$
 (4) $\text{HClO} < \text{HClO}_2 < \text{HClO}_3 < \text{HClO}_4$

RR0133

8. Consider the following reaction:



The values of x, y and z in the reaction are respectively:-

- (1) 5, 2 and 16 (2) 2, 5 and 8
 (3) 2, 5 and 16 (4) 5, 2 and 8

RR0134

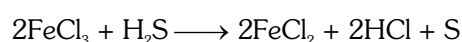
9. In which of the following reaction H_2O_2 acts as a reducing agent ?

- (a) $\text{H}_2\text{O}_2 + 2\text{H}^+ + 2\text{e}^- \rightarrow 2\text{H}_2\text{O}$
 (b) $\text{H}_2\text{O}_2 - 2\text{e}^- \rightarrow \text{O}_2 + 2\text{H}^+$
 (c) $\text{H}_2\text{O}_2 + 2\text{e}^- \rightarrow 2\text{OH}^-$
 (d) $\text{H}_2\text{O}_2 + 2\text{OH}^- - 2\text{e}^- \rightarrow \text{O}_2 + 2\text{H}_2\text{O}$

- (1) (a), (c) (2) (b), (d) (3) (a), (b) (4) (c), (d)

RR0135

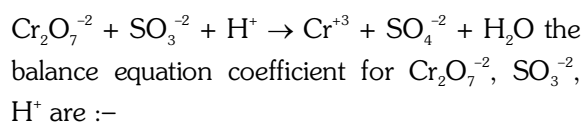
10. In the following reaction



- (1) FeCl_3 is oxidant
 (2) FeCl_3 & H_2S are oxidised
 (3) FeCl_3 is oxidised & H_2S is reduced
 (4) H_2S is oxidant

RR0137

11. In oxidation reduction reaction



- (1) 1, 3, 8 (2) 16, 5, 2
 (3) 2, 16, 5 (4) 5, 2, 16

RR0138

12. Which of the following act both as oxidant & reductant:—

- (1) H_2S (2) SO_3
(3) H_2O_2 (4) F_2

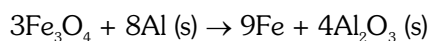
RR0139

13. Oxidation number of chlorine in perchloric acid is:—

- (1) +1 (2) +3
(3) +5 (4) +7

RR0141

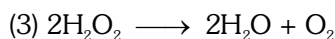
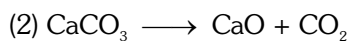
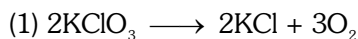
14. Identify the reducing agent in the reaction.



- (1) Fe_3O_4 (2) Al
(3) Fe (4) Al_2O_3

RR0168

15. Which of the following is a disproportionation reaction:



RR0169

EXERCISE-III (Analytical Questions)

ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	1	1	4	2	4	1	4	3	2	1	1	3	4	2	3