## Multiple Choice Questions

### Introduction, oxidation, reduction, oxidizing and reducing agents and redox reaction, oxidation number

**[MHT-CET 2019]**

1. The oxidation state of nitrogen in nitric oxide is
   a) – 2 b) + 3 c) + 4 d) + 2
2. Identify the compound in which oxygen exists in the oxidised state.
   a) $CO_2$ b) $O_3$ c) $SO_3$ d) $OF_2$
3. The oxidation number of tin in $Sn(OH)_3^-$ is
   a) + 3 b) + 1 c) + 4 d) + 2

**[MHT-CET 2020]**

4. What is the oxidation number of carbon in glucose ?
   a) – 6 b) + 6 c) + 3 d) zero
5. The sum of oxidation numbers of all atoms in $S_2O_3^{2-}$ ion is
   a) + 7 b) – 2 c) + 5 d) + 2
6. Which among the following pairs of elements shows highest oxidation state in different compounds ?
   a) Cr, Mn b) Mn, Cl c) S, Cl d) V, Mn
7. What is the oxidation state of As in $H_3AsO_4$ ?
   a) – 1 b) + 3 c) – 3 d) + 5
8. The sum of oxidation states of all atoms in $Cr_2O_7^{2-}$ ion is
   a) – 2 b) + 2 c) – 1 d) zero
9. What is the oxidation state of Cr in $K_2Cr_2O_7$ ?
   a) – 6 b) + 12 c) + 2 d) + 6
10. What is the oxidation state of As in $H_3AsO_3$ ?
    a) – 3 b) + 4 c) + 2 d) + 3
11. Identify the reducing agent in following reaction.
    $CH_{4(g)} + 2O_{2(g)} \longrightarrow CO_{2(g)} + 2H_2O_{(l)}$
    a) $CO_{2(g)}$ b) $O_{2(g)}$ c) $H_2O_{(l)}$ d) $CH_{4(g)}$
12. Identify the oxidising agent in following reaction.
    $CH_{4(g)} + 2O_{2(g)} \longrightarrow CO_{2(g)} + 2H_2O_{(l)}$
    a) $O_{2(g)}$ b) $CH_{4(g)}$ c) $CO_{2(g)}$ d) $H_2O_{(l)}$
13. The oxidation number of 'S' in $HSO_4^-$ ion is
    a) + 1 b) + 6 c) – 1 d) – 6
14. The sum of oxidation numbers of all atoms in $SnO_3^{2-}$ ion is
    a) – 2 b) – 1 c) + 2 d) zero

15. In which of the following oxides, nitrogen exhibits +4 oxidation state ?
a) $N_2O_5$ b) $N_2O_4$ c) $N_2O$ d) $N_2O_3$

16. What is the oxidation number of Mn in $MnO_4^{2-}$ ion ?
a) + 6 b) – 8 c) – 6 d) + 8

17. Carbon is present in highest oxidation number in
a) CO b) $CaC_2$ c) $C_2O_4^{2-}$ d) $CO_3^{2-}$

18. What is the oxidation number of carbon in $K_2C_2O_4$ ?
a) – 2 b) + 3 c) + 4 d) 0

19. The oxidation state of phosphorous in $Mg_2P_2O_7$ is
a) + 3 b) + 2 c) + 5 d) – 3

20. What is the oxidation number of V in $V_2O_7^{4-}$ ion ?
a) + 6 b) + 3 c) + 5 d) + 4

21. What is the oxidation number of carbon in $K_2C_2O_4$ ?
a) + 5 b) + 6 c) + 4 d) + 3

22. What is the oxidation state of Mn in $MnO_4^{2-}$ ion ?
a) + 6 b) – 8 c) – 6 d) + 8

23. The oxidation number of phosphorous in $Ba(H_2PO_2)_2$ is
a) – 3 b) + 3 c) + 5 d) + 1

24. The oxidation number of Cr in $Cr(OH)_4^-$ ion is
a) – 4 b) – 1 c) + 3 d) + 4

25. When methane is burnt completely, oxidation state of carbon changes from
a) + 2 to – 2 b) – 4 to + 4 c) 0 to + 4 d) + 4 to 0

**[MHT-CET 2021]**

26. The average oxidation state of sulphur in $S_4O_6^{2-}$ is
a) + 0.5 b) + 6 c) + 2.5 d) + 4

27. Oxidation number of N in $NH_3$ and $HNO_3$ respectively is
a) – 3 and + 5 b) + 5 and – 3 c) – 3 and + 3 d) + 3 and – 3

28. What is the oxidation state of hydrogen in $CaH_2$ ?
a) – 1 b) + 1 c) – 2 d) + 1

29. What is the oxidation state of phosphorous in $Ca_3(PO_4)_2$ ?
a) + 5 b) + 4 c) + 1 d) + 3

30. Identify oxidising agent in following reaction.

$$H_2O_{2(ag)} + ClO^-_{4(aq)} \longrightarrow ClO^-_{2(aq)} + O_{2(g)}$$

a) $H_2O_{2(aq)}$ b) $ClO^-_{2(aq)}$ c) $ClO^-_{4(aq)}$ d) $O_{2(g)}$

31. Identify the reductant in following reaction.

$C_2O_4^{2-} + MnO_4^- + H^+ \longrightarrow Mn^{2+} + CO_2 + H_2O$

a) $H^+$ b) $H_2O$ c) $C_2O_4^{2-}$ d) $MnO_4^-$

32. Oxidation state of Cr in potassium dichromate is

a) + 7 b) + 6 c) + 1 d) + 3

33. Oxidation state of iodine in $I_3^-$ is

a) $\frac{-1}{3}$ b) + 4 c) + 5 d) − 3

34. Identify reductant in following reaction.

$H_2S + NO_2 \longrightarrow H_2O + NO + S$

a) $H_2S$ b) $NO_2$ c) NO d) S

35. Identify the reducing agent in following reaction.

$H_2O_{2(aq)} + ClO^-_{4(aq)} \longrightarrow ClO^-_{2(aq)} + O_{2(g)}$

a) $ClO_{2(aq)}$ b) $H_2O_{2(aq)}$ c) $ClO^-_{4(aq)}$ d) $O_{2(g)}$

**[MHT-CET 2022]**

36. What is the oxidation number of oxygen in $OF_2$ ?

a) − 1 b) − 2 c) + 1 d) + 2

37. What is the oxidation number of Mn in $MnO_4^-$ ?

a) + 6 b) + 4 c) + 7 d) + 5

38. What is the oxidation state of oxygen in $O_2^{2-}$ ion ?

a) − 1 b) + 2 c) − 2 d) + 1

39. What is the oxidation of nitrogen in $N_3H$ ?

a) + 3 b) $\frac{-1}{3}$ c) $\frac{+1}{3}$ d) − 1

40. What is the oxidation state of Cl in $KClO_3$ ?

a) + 5 b) − 5 c) − 1 d) + 1

41. What is the oxidation number of oxygen in super oxide ?

a) $\frac{-1}{2}$ b) $\frac{+1}{2}$ c) + 1 d) + 2

42. In which of the following compounds Mn shows highest oxidation state ?

a) $MnO_2$ b) $K_2MnO_4$ c) $KMnO_4$ d) $Mn_2O_3$

43. What is the sum of oxidation states of all atoms in $ClO_4^-$ ion ?

a) − 4 b) + 2 c) zero d) − 1

44. Which among the following compounds has oxidation number of phosphorous +1 ?

a) $H_3PO_4$ b) $H_4P_2O_7$ c) $H_3PO_2$ d) $H_3PO_3$

45. In which of the following compounds carbon shows highest oxidation state ?
a) $C_{12}H_{22}O_{11}$ b) $CHCl_3$ c) HCHO d) $CH_2Cl_2$

46. Which of the following ionic species exhibits more than one oxidation state for different atoms of same elements ?
a) dichromate ion b) permanganate ion
c) tetrathionate ion d) perchlorate ion

47. Which among the following compounds has lowest oxidation state of iron ?
a) $FeSO_4(NH_4)_2SO_4.6H_2O$ b) $Fe(CO)_5$
c) $K_4[Fe(CN)_6]$ d) $Fe_2O$

## Stock notation and balancing redox reaction

**[MHT-CET 2019]**

48. In the reaction,

$$MnO^-_{4(aq)} + Br^-_{(aq)} \longrightarrow MnO_{2(s)} + BrO^-_{3(aq)}$$

the correct change in oxidation number of the species involved is
a) $Mn^{+7}$ to $Mn^{+3}$ b) $Br^{+5}$ to $Br^{-1}$ c) $Br^{-1}$ to $Br^{+5}$ d) $Mn^{+7}$ to $Mn^{+2}$

**[MHT-CET 2020]**

49. What is the change in oxidation number of sulphur in following reaction ?

$$MnO^-_{4(aq)} + SO^{2-}_{3(aq)} \longrightarrow MnO^{2-}_{4(aq)} + SO^{2-}_{4(aq)}$$

a) + 4 to + 6 b) + 6 to + 5 c) + 8 to + 6 d) + 6 to + 8

**[MHT-CET 2021]**

50. What is the change in oxidation state of chlorine in following reaction ?

$$H_2O_{2(aq)} + ClO^-_{4(aq)} \longrightarrow ClO^-_{2(aq)} + O_{2(g)}$$

a) + 3 to + 7 b) + 7 to + 3 c) – 4 to – 2 d) – 2 to – 1

51. Identify the correct statement for following reaction.

$$H_2O_{2(aq)} + ClO^-_{4(aq)} \longrightarrow ClO^-_{2(aq)} + O_{2(g)}$$

a) Oxidation state of Cl decreases from + 7 to + 4
b) Oxidation state of oxygen on product side is – 1 and – 2 respectively.
c) Oxidation state of oxygen on reactant side is – 1 and – 2 respectively.
d) Oxidation state of Cl is + 3 on reactant side and + 1 on product side.

52. What is the value of 'X' in order to balance the following redox reaction by ion electron method ?

$$XH_2O_2 + ClO_4 \longrightarrow XO_2 + ClO_2 + 2H_2O$$

a) 3 b) 4 c) 1 d) 2

53. Which among the following formulae is correctly represented acoording to stock notation ?
a) Fe (II) $Cl_3$ b) Mn (II) $O_2$ c) Au (III) Cl d) Sn (IV) $Cl_4$