NAME SCHOOL PHONE NO.-

PICS INSTITUTE ALL INDIA TEST SERIES

REDOX - XI

Multiple Choice Questions (Type-I)

1. Which of the following is not an example of redox reaction?
(i) $CuO + H_2 \rightarrow Cu + H_2O$ (ii) $Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$
(iii) $2K + F_2 \rightarrow 2KF$ (iv) $BaCl_2 + H_2SO_4 \rightarrow BaSO_4 + 2HCl$
2. The more positive the value of E^{Θ}, the greater is the tendency of the species to get reduced. Using the standard electrode potential of redox couples given below find out which of the following is the strongest oxidising agent.
E^{Θ} values: $Fe^{3+}/Fe^{2+} = + 0.77$; $I_2(s)/I^- = + 0.54$;
$Cu^{2+}/Cu = + 0.34$; $Ag^+/Ag = + 0.80V$
(i) Fe^{3+} (ii) $I_2(s)$ (iii) Cu^{2+} (iv) Ag^+
3. E^{Θ} values of some redox couples are given below. On the basis of these values choose the correct option.
E^{Θ} values : $Br_2/Br^- = + 1.90$; $Ag^+/Ag(s) = + 0.80$
$Cu^{2+}/Cu(s) = + 0.34$; $I_2(s)/I^- = + 0.54$
(i) Cu will reduce Br^- (ii) Cu will reduce Ag
(iii) Cu will reduce I^- (iv) Cu will reduce Br_2
4. Using the standard electrode potential, find out the pair between which redox reaction is not feasible.
E^{Θ} values : $Fe^{3+}/Fe^{2+} = + 0.77$; $I_2/I^- = + 0.54$;
$Cu^{2+}/Cu = + 0.34$; $Ag^+/Ag = + 0.80$ V
(i) Fe^{3+} and I^- (ii) Ag^+ and Cu (iii) Fe^{3+} and Cu (iv) Ag and Fe^{3+}
5. Thiosulphate reacts differently with iodine and bromine in the reactions given below: $2S_2O_3^{2-} + I_2 \rightarrow S_4O_6^{2-} + 2I^-$
$S_2O_3^{2-} + 2Br_2 + 5H_2O \rightarrow 2SO_4^{2-} + 2Br^- + 10H^+$
Which of the following statements justifies the above dual behaviour of thiosulphate?
(i) Bromine is a stronger oxidant than iodine.

(ii) Bromine is a weaker oxidant than iodine.
(iii) Thiosulphate undergoes oxidation by bromine and reduction by iodine in these reactions.
(iv) Bromine undergoes oxidation and iodine undergoes reduction in these reactions.
6. The oxidation number of an element in a compound is evaluated on the basis of certain rules. Which of the following rules is not correct in this respect?
(i) The oxidation number of hydrogen is always +1.
(ii) The algebraic sum of all the oxidation numbers in a compound is zero.
(iii) An element in the free or the uncombined state bears oxidation number zero.
(iv) In all its compounds, the oxidation number of fluorine is – 1.
7. In which of the following compounds, an element exhibits two different oxidation states.
(i) NH_2OH (ii) NH_4NO_3 (iii) N_2H_4 (iv) N_3H
8. Which of the following arrangements represent increasing oxidation number of the central atom?
(i) CrO_2^- , ClO_3^- , CrO_4^{2-}, MnO_4^- (ii) ClO_3^-, CrO_4^{2-} , MnO_4^- , CrO_2^-
(iii) CrO_2^- , ClO_3^- , MnO_4^- , CrO_4^{2-} (iv) CrO_4^{2-}, MnO_4^- , CrO_2^- , ClO_3^-
9. The largest oxidation number exhibited by an element depends on its outer electronic configuration. With which of the following outer electronic configurations the element will exhibit largest oxidation number?
(i) $3d^14s^2$ (ii) $3d^34s^2$ (iii) $3d^54s^1$ (iv) $3d^54s^2$
10. Identify disproportionation reaction
(i) $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$ (ii) $CH_4 + 4Cl_2 \rightarrow CCl_4 + 4HCl$
(iii) $2F_2 + 2OH^- \rightarrow 2F^- + OF_2 + H_2O$ (iv) $2NO_2 + 2OH^- \rightarrow NO_2^- + NO_3^- + H_2O$
11. Which of the following elements does not show disproportionation tendency?
(i) Cl (ii) Br (iii) F (iv) I

II. Multiple Choice Questions (Type-II)

In the following questions two or more options may be correct.
12. Which of the following statement(s) is/are not true about the following decomposition reaction.
$2KClO_3 \rightarrow 2KCl + 3O_2$
(i) Potassium is undergoing oxidation (ii) Chlorine is undergoing oxidation
(iii) Oxygen is reduced
(iv) None of the species are undergoing oxidation or reduction
13. Identify the correct statement (s) in relation to the following reaction:
$Zn + 2HCl \rightarrow ZnCl_2 + H_2$
(i) Zinc is acting as an oxidant (ii) Chlorine is acting as a reductant
(iii) Hydrogen ion is acting as an oxidant (iv) Zinc is acting as a reductant

14. The exhibition of various oxidation states by an element is also related to the outer orbital electronic configuration of its atom. Atom(s) having which of the following outermost electronic configurations will exhibit more than one oxidation state in its compounds.
(i) $3s^1$ (ii) $3d^14s^2$ (iii) $3d^24s^2$ (iv) $3s^23p^3$

15. Identify the correct statements with reference to the given reaction
$P_4 + 3OH^- + 3H_2O \rightarrow PH_3 + 3H_2PO_2^-$
(i) Phosphorus is undergoing reduction only.
(ii) Phosphorus is undergoing oxidation only.
(iii) Phosphorus is undergoing oxidation as well as reduction.
(iv) Hydrogen is undergoing neither oxidation nor reduction.

16. Which of the following electrodes will act as anodes, when connected to Standard Hydrogen Electrode?

(i)	Al/Al^{3+}	$E^{\Theta} = -1.66$
(ii)	Fe/Fe^{2+}	$E^{\Theta} = -0.44$
(iii)	Cu/Cu^{2+}	$E^{\Theta} = +0.34$
(iv)	$F_2(g)/2F^-(aq)$	E = + 2.87

17. In which reaction there is change in O.N. of N atom
(a) $2NO_2 = N_2O_4$ (b) $2NO_2 + H_2O \rightarrow HNO_3 + HNO_2$
(c) $NH_4OH \rightarrow NH_4^+ + OH^-$ (d) $N_2O_5 + H_2O \rightarrow 2HNO_3$

18. Select the compound in which chlorine is assigned the oxidation number + 7.
(a) $HClO_4$ (b) $HClO_2$ (c) $HClO_3$ (d) HCl

19. In ferrous ammonium sulphate oxidation number of Fe is

(a) +3 (b) +2 (c) 0 (d) -2

20. O.N. of P in KH_2PO_2 is

(a) +1 (b) +3 (c) +5 (d) -4

21. The O.N. of nitrogen is NO_3^- is

(a) -1 (b) +2 (c) +5 (d) -2

22. The oxidation state of nitrogen in N_3H is

(a) $+\frac{1}{2}$ (b) +3 (c) -1 (d) $-\frac{1}{3}$

23. Oxidation number of iron in potassium ferrocyanide $K_4[Fe(CN)_6]$ is

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

24. If three electrons are lost by a metal ion M^{+3}, its final oxidation number would

(a) Zero (b) +6 (c) +2 (d) +3

25. Chlorine is in + 1 oxidation state in

(a) HCl (b) $HClO_4$ (c) ICl (d) Cl_2O

26. Oxidation state of oxygen in hydrogen peroxide is

(a) -1 (b) +1 (c) 0 (d) -2

27. The standard reduction potential values of three metallic cations x, y, z are 0.52, - 3.03 and -1.18 V respectively. The order of reducing power of the corresponding metals is

(a) y > z > x (b) x > y > z (c) z > y > x (d) z > x > y

28. The colour of $K_2Cr_2O_7$ changes from red orange to lemon yellow on treatment with aqueous KOH because of

(a) reduction of Cr (VI) to Cr (III)

(b) formation of chromium hydroxide (c) conversion of dichromate ion to chromate

(d) oxidation of potassium hydroxide to potassium peroxide

29. Which substance is serving as a reducing agent in the following reaction

$$14H + Cr_2O_7^{2-} + 3Ni \rightarrow 2Cr^{+3} + 7H_2O + 3N^{2+}$$

(a) H_2O (b) Ni (c) H^+ (d) Cr_2O^{2-}

30. For the redox reaction

$$MnO\bar{4} + C_2O_4^{2-} + H^+ \rightarrow Mn^{2+}CO_2 + H_2O$$

Correct stoichiometric coefficients of $MnO\bar{4}, C_2O_4^{2-}, H^+$ are:

(a) 2,5,16 (b) 16,5,2 (c) 5,16,2 (d) 2,16,5

31. In which of the following reaction H_2O_2 is a reducing agent

(a) $2FeCl_2 + 2HCl + H_2O_2 \rightarrow 2FeCl_3 + 2H_2O$ (b) $Cl_2 + H_2O_2 \rightarrow 2HCl + O_2$

(c) $2HI + H_2O_2 \rightarrow 2H_2O + I_2$ (d) $H_2SO_3 + H_2O_2 \rightarrow H_2SO_4 + H_2O$

32. The oxidation number of P in $Mg_2P_2O_7$ is

(a) +3 (b) +2 (c) +5 (d) -3

33. In the reaction $2Ag + 2H_2SO_4 \rightarrow Ag_2SO_4 + 2H_2O + SO_2$ the sulphuric acid acts as:

(a) Oxidising agnet (b) Reducing agnet

(c) Catalyst (d) Acid as well as oxidant

34. A 2.5 mol of hydrazine N_2H_4 loses 25 mole of electrons in being converted to a new compound X. Assuming that all of the nitrogen appears in the new compound, what is the oxidation state of nitrogen in compound X?

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

35. Oxidation number of O is H_2O_2 will be

(a) -2 (b) -1 (c) +1 (d) +2

36. Which of the following is serving as a reducing agent in the following reaction

$14H + Cr_2O_7^{2-} + 3Ni \rightarrow 2Cr^{+3} + 7H_2O + 3N^{2+}$

(a) H_2O (b) Ni (c) H^+ (d) $Cr_2O_7^{2-}$

37. The oxidation number of S in SO_4^{-2} is

(a) +8 (b) +6 (c) +4 (d) 0

38. The oxidation number of chromium in $K_2Cr_2O_7$ is

(a) -6 (b) +6 (c) +2 (d) -2

39. The oxidation state of Cr in $K_2Cr_2O_7$ is

(a) 4 (b) 6 (c) 7 (d) -6

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