KD EDUCATION ACADEMY (9582701166

Time : 3 Hour 20 Minute

STD 11 Science Chemistry
kd 90+ ch-7 redox reaction

Total Marks : 200

* **Choose The Right Answer From The Given Options.[1 Marks Each]** **[81]**

1. The oxidation number of carbon in CH_2Cl_2 is
   (A) 0 (B) 2 (C) 3 (D) 5

2. he ratio of oxygen atom having −2 and −1 oxidation numbers in $S_2O_8^{2-}$ is _____.
   (A) 1 (B) 2 (C) 3 (D) 4

3. Which are of the following can act as oxidising as well reducing agent?
   (A) H_2 (B) I_2
   (C) H_2O_2 (D) All of these

4. Oxidation number of Cl in $CaOCl_2$ is _____.
   (A) −1 and +1 (B) +2
   (C) −2 (D) None of these

5. The oxidation state of C in diamond is:
   (A) 0 (B) +1 (C) −1 (D) +2

6. 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

7. Identify the correct statements with reference to the given reaction:
   $$P_4 + 3OH^- + 3H_2O \longrightarrow PH_3 + 3H_2PO_2^-$$
   (A) Phosphorus is undergoing reduction only.
   (B) Phosphorus is undergoing oxidation only.
   (C) Phosphorus is undergoing oxidation as well as reduction.
   (D) Hydrogen is undergoing neither oxidation nor reduction.

8. In the balanced chemical equation:
   $IO_3 + aI^- + bH^+ \longrightarrow cH_2O + dI_2$
   a, b, c, d respectively are:
   (A) 5, 6, 3, 3 (B) 5, 3, 6, 3 (C) 3, 5, 3, 6 (D) 5, 6, 5, 5

9. $H_2SO_5 + H_2O \rightarrow H_2SO_4 + H_2O_2$
   Oxidation number of sulphur in H_2SO_5 in the above reaction is:
   (A) 6 (B) 4 (C) 5 (D) 2

10. Which of the following arrangements represent increasing oxidation number of the central atom?
    (A) $CrO_2^-, ClO_3^-, CrO_4^{2-}, MnO_4^-$ (B) $ClO_3^-, CrO_4^{2-}, MnO_4^-, CrO_2^-$
    (C) $CrO_2^-, ClO_3^-, MnO_4^-, CrO_4^{2-}$ (D) $CrO_4^{2-}, MnO_4^-, CrO_2^-, ClO_3^-$

11. The lowest possible oxidation state of nitrogen is −3 as in N^{3-}.
    (A) True (B) False

(C) Ambiguous (D) None of these

12. It is found that V forms a double salt isomorphous with Mohr's salt. The oxidation number of V in this compound is_____.

(A) 3 (B) +2 (C) +4 (D) −4

13. From the given species such as Li, K, Ca and Na, which of the following is the strongest reducing agent?

(A) Na (B) Li (C) Ca (D) K

14. In $FeCr_2O_4$ the oxidation numbers of Fe and Cr are:

(A) +2 and +3 (B) 0 and +2

(C) +2 and +6 (D) +3 and +6

15. In the reaction, $2Na_2S_2O_3 + I_2 \rightarrow Na_2S_4O_6 + 2NaI$, I_2 acts as:

(A) Oxidising agent. (B) Reducing agent.

(C) Oxidising as well as reducing agent. (D) None of the above.

16. Choose the correct explanation regarding half-reaction such as $Cr_2O_7^{2-} \longrightarrow Cr^{3+}$ from the following.

(A) It is oxidation half-reaction.

(B) Chromium being oxidized.

(C) $Cr_2O_7^{2-}$ is a good reducing agent.

(D) Chromium being reduced.

17. Number of moles of MnO_4^- required to oxidise one mole of ferrous oxalate completely in acidic medium will be:

(A) 0.6 moles. (B) 0.4 moles.

(C) 7.5 moles. (D) 0.2 moles.

18. Which one of the following substances is a good oxidising agent?

(A) Coke. (B) Water.

(C) Hydrogen peroxide. (D) Sulphur dioxide.

19. Find the oxidation number of V in $Rb_4Na[HV_{10}O_{28}]$.

(A) +5 (B) +2

(C) -5 (D) None of these

20. If a reaction is carried out in acidic medium then which is used to balance the equation?

(A) H^+ ions. (B) OH^- ions. (C) H^- ions. (D) O^{2-} ions.

21. Oxidation number of S in $S_2O_3^{2-}$ is:

(A) -2 (B) +2 (C) +6 (D) 0

22. Oxidation state of Fe in Sodium Nitroprusside is:

(A) +3 (B) +4 (C) +2 (D) +1

23. $xKMnO_4 + NH_3 \longrightarrow yKNO_3 + MnO_3 + KOH + H_2O$

(A) x = 4, y = 6 (B) x = 8, y = 6

(C) x = 3, y = 8 (D) x = 8, y = 3

24. Consider the following chemical reaction

$MnO_4^-(aq) + I^-(aq) \longrightarrow MnO_2(s) + I_2(s)$

Which of the following reactions is an oxidation half-reaction?

(A) $MnO_4^-(aq) \longrightarrow MnO_2(s)$

(B) $I^-(aq) \rightarrow I_2(s)$.

(C) Both (a) and (b).

(D) None of the above.

25. The oxidation number of Phosphorus in $Mg_2P_2O_7$ is:

(A) +3 (B) 2 (C) +5 (D) -3

26. A mole of N_2H_4 loses 10 mol of electrons to form a new compound Y. Assuming that all the nitrogen appears in the new compound, what is the oxidation state of nitrogen in Y ? (There is no change in the oxidation number of hydrogen).

(A) -1 (B) -3 (C) +3 (D) +5

27. Oxidation state of nitrogen is not an integer in:

(A) Hydroxyl amine (NH_2OH)

(B) Ammonia (NH_3)

(C) Hydrazine (N_2H_4)

(D) Hydrazoic acid (N_3H)

28. $? + O_2 \rightarrow 2K_2O$

(A) K (B) K_2 (C) 2K (D) 4K

29. The brown ring complex compound is formulated as $[Fe(H_2O)_5(NO)]SO_4$. The oxidation state of iron in this complex is:

(A) 0 (B) +1 (C) +2 (D) +3

30. The oxidation state of oxygen is maximum in _____.

(A) Bleaching powder ($CaOCl_2$)

(B) Oxygen difluoride (OF_2)

(C) Dioxygen difluoride (O_2F_2)

(D) Hydrogen peroxide (H_2O_2)

31. The oxidation number of cobalt in $K[Co(CO)_4]$ is:

(A) -1 (B) -3 (C) +1 (D) +3

32. Which of the following processes does not involve oxidation of iron?

(A) Rusting of iron sheets.

(B) Decolourisation of blue $CuSO_4$ solution by Fe.

(C) Formation of $Fe(CO)_5$ from Fe.

(D) Liberation of H_2 from steam by iron at high temperature.

33. The value of n in the molecular formula $Be_nAl_2Si_6O_{18}$ is:

(A) 1 (B) 2 (C) 3 (D) 4

34. In the reaction between copper nitrate solution and zinc, copper ions are reduced by gaining electrons from:

(A) Copper. (B) Nitrogen. (C) Zinc. (D) Oxygen.

35. When ammonium nitrate is gently heated, an oxide of nitrogen is formed. What is the oxidation state of nitrogen in this oxide?

(A) +4 (B) +2 (C) +3 (D) +1

36. An element if present in the free or the uncombined state, its each atom bears an oxidation number:

(A) More than 1

(B) Less than 1

(C) More than 2

(D) Zero.

37. The oxidation number of P in $Na_4P_2O_7$ is:

(A) +3 (B) +2 (C) +5 (D) -3

38. The average oxidation number of iodine in I_3^- ion is:

(A) -1 (B) $\frac{-1}{3}$ (C) $+1$ (D) $\frac{+1}{3}$

39. Oxidation number of sulphur in marshall's acid ($H_2S_2O_8$) is:

(A) +5 (B) +8 (C) +6 (D) +7

40. $E^{\ominus}$ values of some redox couples are given below. On the basis of these values choose the correct option:

$$E^{\ominus}\text{values}: Br_2/\,Br^- = +1.90;\ Ag^+/\,Ag(S) = +0.80$$
$$Cu^{2+}/\,Cu(s) = +0.34; I_2(s)/\,I^- = 0.54$$

(A) Cu will reduce Br^- (B) Cu will reduce Ag

(C) Cu will reduce I^-

(D) Cu will reduce Br_2

41. Oxidation number of C in HCCOH is_____.

(A) +2 (B) +4 (C) +3 (D) 0

42. One mole of N_2H_4 loses 10 moles of electrons to form a new compound A. Assuming that all the nitrogen appears in the new compound, what is the oxidation state of nitrogen in A?

[There is no change in the oxidation state of hydrogen]

(A) +1 (B) −3 (C) +3 (D) +5

43. The oxidation number of Mn in potassium permanganate is:

(A) +6 (B) +7 (C) +5 (D) +8

44. On reduction of $KMnO_4$ by oxalic acid in acidic medium, the oxidation number of Mn chnages. What is the magnitude of this change?

(A) 7 to 2 (B) 6 to 2 (C) 5 to 2 (D) 7 to 4

45. The more positive the value of $E^{\ominus}$, 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:

$$E^{\ominus}\text{values: } Fe^{3+}/\,Fe^{2+} = +0.77; I_2(S)/\,I^- = +0.54;$$
$$Cu^{2+}/\,Cu = +0.34; Ag^+/\,Ag = +0.80V$$

(A) Fe^{3+} (B) $I_2(S)$ (C) Cu^{2+} (D) Ag^+

46. What is the oxidation number of chlorine in ClO_3^-?

(A) +5 (B) +3 (C) +4 (D) +2

47. Solution of potassium chloride or ammonium nitrate in salt-bridge usually solidified by boiling with:

(A) Agar-agar. (B) Starch. (C) Cellulose. (D) Glycogen.

48. In the reaction, $2KClO_3 \rightarrow 2KCl + 3O_2$, the elements which have been oxidised and reduced respectively are:

(A) Chlorine and oxygen. (B) Oxygen and chlorine.

(C) Potassium and oxygen. (D) Oxygen and potassium.

49. What is the oxidation number of Br in the compound $RbBrO_4$?

(A) −1 (B) +7 (C) +1 (D) +4

50.

When tin(IV) chloride is treated with excess of conc. hydrochloric acid, the complex ion$(SnCl_6)^{2-}$ is formed. The oxidation state of tin in this complex ion is?

(A) +4 (B) zero (C) −2 (D) −4

51. Which of the following compounds we use in our laboratory as a standard solution (titrant) ?

(A) $KMnO_4$ (B) $K_2Cr_2O_7$

(C) $Na_2S_2O_3$ (D) All of these

52. In the chemical reaction,
$K_2Cr_2O_7 + xH_2SO_4 + ySO_2 \rightarrow K_2SO_4 + Cr_2(SO_4)_3 + zH_2O$
the value of x + y + z

(A) 6 (B) 5 (C) 7 (D) 3

53. The difference in the oxidation numbers of the two types of sulphur atoms in $Na_2S_4O_6$ is:

(A) 5 (B) 4 (C) 3 (D) 6

54. What is the oxidation number of Si in the compound $CaSiO_3$?

(A) −4 (B) +2 (C) −2 (D) +4

55. Standard reduction frotential of X, Y, Z are -1.2v, +0.5v, -3.0v respectively, the reducing power of the metals will be:

(A) Y > Z > X (B) Y > X > Z

(C) Z > X > Y (D) X > Y > Z

56. When P reacts with caustic soda, the products are PH_3 and NaH_2PO_2. The reaction is an example of.

(A) Oxidation. (B) Reduction.

(C) Both oxidation and reduction. (D) Neutralisation.

57. The oxidation state of the most electronegative element in the products of the reaction between BaO_2 and H_2SO_4 are:

(A) 0 and −1 (B) −1 and −2

(C) −2 and 0 (D) −2 and +1

58. Tailing of mercury is _____ redox change.

(A) Intramolecular. (B) Intermolecular.

(C) Disproportion. (D) None.

59. In the given reaction,
$CH_2 = CH_2(g) + H_2(g) \rightarrow CH_3—CH_3(g)$
ethene undergoes:

(A) Reduction process. (B) Oxidation process.

(C) Addition process. (D) All of these.

60. The oxidation state of Cr in $K_2Cr_2O_7$ is:

(A) +4 (B) +3 (C) +6 (D) +5

61. In $MgCl_2$, the oxidation number of chlorine is:

(A) +1 (B) +2 (C) −1 (D) 0

62. The sum of oxidation number of all the atoms in a neutral molecule must be zero.

(A) True. (B) False.

(C) Ambiguous. (D) None of these.

63. The oxidation number of chromium in CrO_5 is:

(A) +6 (B) +5 (C) +10 (D) 0

64. Oxidation state of nitrogen in NH_2OH is:

(A) −3 (B) −1 (C) +2 (D) 3

65. Oxygen has an oxidation state of +2 in.

(A) H_2O_2 (B) OF_2 (C) SO_2 (D) H_2O

66. The oxidation numbers of sulphur in S_8, S_2F_2 and F_2S respectively, are:

(A) 0, +1 and −2 (B) +2, +1 and −2

(C) 0, +1 and +2 (D) −2, +1 and −2

67. In which of the following compounds, is the oxidation number of sulphur is the least?

(A) SO_2 (B) SO_3 (C) $Na_2S_4O_8$ (D) H_2SO_4

68. The oxidation numbers of the sulphur atoms in peroxy monosulphuric acid (H_2SO_5) and peroxydisulphuric and ($H_2S_2O_8$) are respectively.

(A) +8 and +7 (B) +3 and +3

(C) +6 and +6 (D) +4 and +6

69. The oxidation state of the underlined element in the given compound is:

BaCl2

(A) +2 (B) -2

(C) 0 (D) None of these

70. What is the oxidation state of central atom in $Ca[PtCl_4]$?

(A) 1 (B) 2 (C) 3 (D) 4

71. Which among the following shows maximum oxidation state?

(A) V (B) Fe (C) Mn (D) Cr

72. What is the oxidation number of O in a diatomic molecule (O_2)?

(A) +2 (B) ±2 (C) +8 (D) 0

73. In which of the following, the highest oxidation state is not possible?

(A) $[XeO_6]^{4-}$ (B) XeF_8 (C) OsO_4 (D) RuO_4

74. What is the oxidation state of Mn in the compound K_2MnO_4?

(A) 3 (B) 4 (C) 5 (D) 6

75. Plumbous ion is represented as:

(A) Pb^{+2} (B) Pb^{+4} (C) Pb^{+3} (D) Pb^{+1}

76. Oxidation number of C in HNC is_____.

(A) +2 (B) −3 (C) +3 (D) Zero

77. In which of the following groups of iodine compounds shows increasing order of oxidation states:

(A) HIO_4, ICl, I_2, HI (B) HI, I_2, IC, HIO_4

(C) I_2, HI, HIO_4 HI (D) ICl HIO_4,HI, I_2

78. Which of the following is not an example of redox reaction?

(A) $\mathrm{CuO + H_2 \longrightarrow Cu + H_2O}$

(B) $\mathrm{Fe_2O_3 + 3CO \longrightarrow 2Fe + 3CO_2}$

(C) $\mathrm{2K + F_2 \longrightarrow 2KF}$

(D) $BaCl_2 + H_2SO_4 \longrightarrow BaSO_4 + 2HCl$

79. Identify the correct statement (s) in relation to the following reaction:

$$Zn + 2HCl \longrightarrow ZnCl_2 + H_2$$

(A) Zinc is acting as an oxidant. (B) Chlorine is acting as a reductant.

(C) Hydrogen ion is acting as an oxidant. (D) Zinc is acting as a reductant.

80. In $Ni(CO)_4$, the oxidation state of Ni is?

(A) 4 (B) Zero (C) 2 (D) 8

81. What is the oxidation number of lithium in LiCl?

(A) +3 (B) −1 (C) +1 (D) 0

*** Answer The Following Questions In One Sentence.[1 Marks Each]** **[11]**

82. Justify that the following reactions are redox reactions:
$CuO(s) + H_2(g) \rightarrow Cu(s) + H_2O(g)$

83. What happens when Cu^{2+} is added KI solution? Indicator used in this titration?

84. What is the relationship between direction of current and flow of electrons by convention?

85. What is oxidation state of Cr in $[Cr(H_2O)_6]Cl_3$

86. What are spectator ions? Give one example.

87. What is the relationship between standard oxidation potential and standard reduction potential?

88. Out of Zn and Cu vessel which one will be more suitable to store 1M HCl?
$E^{\circ}_{\frac{Zn^{2+}}{Zn}} = -0.76V$
$E^{\circ}_{\frac{Cu^{2+}}{Cu}} = +0.34V$

89. How to find strength of $KMnO_4$ by titrating it with Mohr's salt in acidic medium?

90. Justify that the following reactions are redox reactions:
$Fe_2O_3(s) + 3CO(g) \rightarrow 2Fe(s) + 3CO_2(g)$

91. $Br_2 + 2Cl^- \rightarrow Cl_2 + 2Br^-$, will this reaction take place or not?
$E^{0}_{\frac{Br_2}{Br^-}} = +1.09V$
$E^{0}_{\frac{Cl_2}{Cl^-}} = +1.36V$

92. Refer to the periodic table given in your book and now answer the following questions:
Select the possible non metals that can show disproportionation reaction.

*** Given Section consists of questions of 2 marks each.** **[22]**

93. Assign oxidation number to the underlined elements in the following species:
$H_4\underline{P}_2O_7$

94. The compound Y $Ba_2Cu_3O_7$, which shows superconductivity, has copper in x oxidation state. Assume that the rare earth element yttrium is in its usual +3 oxidation state. Predict the value of x.

95.

Permanganate ion reacts with bromide ion in basic medium to give manganese dioxide and bromate ion. Write the balanced chemical equation for the reaction.

96. PbO and PbO_2 react with HCl according to following chemical equations:

$$2PbO + 4HCl \longrightarrow 2PbCl_2 + 2H_2O$$

$$PbO_2 + 4HCl \longrightarrow PbCl_2 + Cl_2 + 2H_2O$$

Why do these compounds differ in their reactivity?

97. In neutral or faintly alkaline solution '8' moles of peramanganate anions quantitatively oxidise this sulphate anions to produce x' moles of sulphur containing product. What is magnitude of 'X'.

98. i. Identify the oxidant and reductant in the following reactions:

a. $10H^+ + 4Zn(S) + NO_3^-(aq) \longrightarrow 4Zn^{2+}(aq) + NH_4^+(aq) + 3H_2O$

b. $I_2(g) + H_2(g) \longrightarrow 2Hl(g) + S(s)$

ii. Write the anode, cathode and net cell reaction for the following cell:

$$Zn(s)|Zn(aq)||Br^-(aq)|Br_2(g), pt$$

iii. Give two main functions of salt bridge.

99. Balance $P + HNO_3 \longrightarrow H_3PO_4 + NO_2 + H_2O$ by oxidation number method.

100. What happens when Cl_2 gas is passed through aqueous solution of KBr? What type of redox reaction is it?

101. Balance the following equation:

$Br_2 + H_2O_2 \longrightarrow BrO_3^- + H_2O$ (in acidic medium)

102. Calculate the oxidation number of phosphorus in the following species.

a. HPO_3^{2-}

b. PO_4^{3-}

103. How many millimoles of potassium dichromate is required to oxidise 24mL of 0.5M Mohr's salt solution in acidic medium?

*** Given Section consists of questions of 3 marks each.** **[21]**

104. Using the standard electrode potentials given in the Table, predict if the reaction between the following is feasible:

Reaction (Oxidised form + ne⁻ → Reduced form)	$E^\ominus$ / V
$F_2(g) + 2e^- \rightarrow 2F^-$	2.87
$Co^{3+} + e^- \rightarrow Co^{2+}$	1.81
$H_2O_2 + 2H^+ + 2e^- \rightarrow 2H_2O$	1.78
$MnO_4^- + 8H^+ + 5e^- \rightarrow Mn^{2+} + 4H_2O$	1.51
$Au^{3+} + 3e^- \rightarrow Au(s)$	1.40
$Cl_2(g) + 2e^- \rightarrow 2Cl^-$	1.36
$Cr_2O_7^{2-} + 14H^+ + 6e^- \rightarrow 2Cr^{3+} + 7H_2O$	1.33
$O_2(g) + 4H^+ + 4e^- \rightarrow 2H_2O$	1.23
$MnO_2(s) + 4H^+ + 2e^- \rightarrow Mn^{2+} + 2H_2O$	1.23
$Br_2 + 2e^- \rightarrow 2Br^-$	1.09
$NO_3^- + 4H^+ + 3e^- \rightarrow NO(g) + 2H_2O$	0.97
$2Hg^{2+} + 2e^- \rightarrow Hg_2^{2+}$	0.92
$Ag^+ + e^- \rightarrow Ag(s)$	0.80
$Fe^{3+} + e^- \rightarrow Fe^{2+}$	0.77
$O_2(g) + 2H^+ + 2e^- \rightarrow H_2O_2$	0.68
$I_2(s) + 2e^- \rightarrow 2I^-$	0.54
$Cu^+ + e^- \rightarrow Cu(s)$	0.52
$Cu^{2+} + 2e^- \rightarrow Cu(s)$	0.34
$AgCl(s) + e^- \rightarrow Ag(s) + Cl^-$	0.22
$AgBr(s) + e^- \rightarrow Ag(s) + Br^-$	0.10
$2H^+ + 2e^- \rightarrow H_2(g)$	0.00
$Pb^{2+} + 2e^- \rightarrow Pb(s)$	−0.13
$Sn^{2+} + 2e^- \rightarrow Sn(s)$	−0.14
$Ni^{2+} + 2e^- \rightarrow Ni(s)$	−0.25
$Fe^{2+} + 2e^- \rightarrow Fe(s)$	−0.44
$Cr^{3+} + 3e^- \rightarrow Cr(s)$	−0.74
$Zn^{2+} + 2e^- \rightarrow Zn(s)$	−0.76
$2H_2O + 2e^- \rightarrow H_2(g) + 2OH^-$	−0.83
$Al^{3+} + 3e^- \rightarrow Al(s)$	−1.66
$Mg^{2+} + 2e^- \rightarrow Mg(s)$	−2.36
$Na^+ + e^- \rightarrow Na(s)$	−2.71
$Ca^{2+} + 2e^- \rightarrow Ca(s)$	−2.87
$K^+ + e^- \rightarrow K(s)$	−2.93
$Li^+ + e^- \rightarrow Li(s)$	−3.05

Increasing strength of oxidising agent → / Increasing strength of reducing agent →

$Br_2(aq)$ and $Fe^{2+}(aq)$.

105. One mole of N_2H_4 loses 10 moles electrons to form a new compound Y. Assuming that all the nitrogen appears in the new compound, what is the oxidation number of N in Y?

There is no change in oxidation state of H.

106. Identify the type of redox reaction taking place in the following.

i. $3\overset{0}{Mg}(s) + \overset{0}{N_2}(g) \longrightarrow \overset{+2\ -3}{Mg_3N_2}(s)$

ii. $\overset{+5\ -2}{V_2O_5}(s)\ \ 5\overset{0}{Ca}(s) \longrightarrow 2\overset{0}{V}(s) + 5\overset{+2\ -2}{CaO}(s)$

iii. $2\ \overset{+1\ +5\ -2}{KClO_3}(s) \longrightarrow 2\ \overset{+1\ -1}{KCl}(s) + 3\overset{0}{O_2}(g)$

iv. $\overset{0}{Ca}(s) + 2\overset{+1-2}{H_2Ol} \longrightarrow \overset{+2\ -2+1}{Ca(OH)_2}(aq) + \overset{0}{H_2}(g)$

v. $\overset{0}{Br_2}(l) + 2\overset{-1}{I^-}(aq) \longrightarrow 2\overset{1-}{Br^-}(aq) + \overset{0}{I_2}(s)$

107. How does Cu_2O act as both oxidant and reductant? Explain with proper reactions showing the change of oxidation numbers in each example.

108. Why does fluorine not show disporportionation reaction?

109. a. In the following redox reactions, identify the oxidation and reducing agents:

i. $H_3PO(aq) + 2HgCl_2 + 2H_2O(aq) \longrightarrow H_3PO_4(aq) + 2Hg(l) + 4HCl(aq)$

ii. $O_2(g) + PtF_6g \longrightarrow O_2^+[PtF_6]^{\ominus}(s)$

b. Why does H_2S acts as reducing agent only whereas SO_2 acts as bot oxidant as wells as rductant?

110. Copper dissolves in dilute nitric acid but not in dilute HCl. Explain.

*** Given Section consists of questions of 5 marks each.** **[65]**

111. Balance the following redox reactions by ion-electron method:

$MnO_4^-(aq) + I^-(aq) \rightarrow MnO_2(s) + I_2(s)$ (in basic medium).

112. While sulphur dioxide and hydrogen peroxide can act as oxidising as well as reducing agents in their reactions, ozone and nitric acid act only as oxidants. Why?

113. Calculate the oxidation number of sulphur, chromium and nitrogen in H_2SO_5, $Cr_2O_7^{2-}$ and NO_3^-. Suggest structure of these compounds. Count for the fallacy.

114. Whenever a reaction between an oxidising agent and a reducing agent is carried out, a compound of lower oxidation state is formed if the reducing agent is in excess and a compound of higher oxidation state is formed if the oxidising agent is in excess. Justify this statement giving three illustrations.

115. Write correctly the balanced equations for the following redox reactions using half reactions.

i. $H_2S + Fe^{3+} \rightarrow Fe^{2+} + S + H^+$

ii. $I + IO_3^- + H^+ \rightarrow I_2 + H_2O$

iii. $Bi(s) + NO_3^- + H^+ \rightarrow NO_2 + Bi^{3+} + H_2O$

iv. $I^- + O_2(g) + H_2O \rightarrow I^2 + OH^-$

State what is oxidised to what and what is reduced to what in the reactions expressed by the equations?

116. i. Use the following reactions to arrange the elements A, B, C and D in order of their redox reactivity:

a. $A + B^+ \rightarrow At + B$

b. $B + D^+ \rightarrow B^+ + D$

c. $C^+ + D \rightarrow$ No reaction

d. $B^+C^+ \rightarrow B^+ + C$

ii. On the basis of above redox activity series, predict which of the following reactions would you expect to occur?

a. $A^+ + C \rightarrow A^+ C^+$

b. $A^+ + D \rightarrow A^+ D^+$

117. a. Consider the following redox reaction that produce electricity in a galvanic cell:

i. $2Fe^{3+} + 2Cl^- \longrightarrow 2Fe^2 + Cl_2(g)$

ii. $Cd(s) + I_2 \longrightarrow Cd^{2+} + 2I^-$

iii. $2Crs + 3Cu^{2+} \longrightarrow +3Cu(s) + 2Cr^{3+}$

Write the anode and cathode reaction for galvanic cell.

b. Split the following redox reaction into the oxidation and reduction hay reactions:

i. $Zn + Cu^{2+} \longrightarrow 2n^{2+} + Cu$

ii. $Sn^2 + 2Hg^+ \longrightarrow Sn^{4+} + Hg_2^{2+}$

118. Consider the cell reaction of an electrochemical cell:

$Ni(s) + 2Ag^+(aq) \longrightarrow Ni^{2+}(aq) + 2Ag(s)$

Answer the following questions:

i. Write anode and cathode half reactions.

ii. Mention the direction of flow of electrons.

iii. How is the electroneutrality maintained in solution of two half cells?

iv. Write the formula for calculating standard e.m.f of this cell.

v. How does e.m.f. change when concentration of Ag^+ is decreased?

119. a. Identify the oxidising agent and reducing agent in the following reactions:

i. $MnO_2 + 4HCl \longrightarrow MnCl_2 + Cl_2 + 2H_2O$

ii. $2MnO_4^- 10Cl^- + 16H^+$

$\longrightarrow 2Mn^{2+} + 5Cl_2 + 8H_2O$

b. Calculate the oxidation number of underlined elements in the following speries.

$Pb_3O_4, H_2Cl, PO_4^{3-}$

120. Using electron transfer concept, identify the oxidant and reductant in the following redox reactions.

i. $Zn(s) + 2H^+(aq) \longrightarrow Zn^{2+}(aq) + H_2(g)$

ii. $2[Fe(CN)_6]^{4-}(aq) + H_2O_2(aq) + 2H^+(aq)$

$\longrightarrow 2[Fe(CN)_6]^{3-}(aq) + 2H_2O(l)$

iii. $2[Fe(CN)_6]^{3-}(aq) + 2OH^-(aq) + H_2O_2(aq)$

$\longrightarrow 2[Fe(CN)_6]^{4-}(aq) + O_2(g) + 2H_2(l)$

iv. $BrO_3^-(aq) + F_2(g) + 2OH^-(aq) \longrightarrow$

$BrO_4^-(aq) + F^-(aq) + H_2O(l)$

v. $2NaClO_3(aq) + I_2(aq) \longrightarrow 2NaIO_3(aq) + Cl_2(g)$

121. Balance the following ionic equations.

$$Cr_2O_7^{2-} + Fe^{2+} + H^+ \longrightarrow Cr^{3+} + Fe^{3+} + H_2O$$

122. Write balanced chemical equation for the following reactions:

Permanganate ion (MnO_4^-) reacts with sulphur dioxide gas in acidic medium to produce Mn2+ and hydrogensulphate ion.

(Balance by ion electron method)

123. Balance the following ionic equations.

$$MnO_4^- + SO_3^{2-} + H^+ \longrightarrow Mn^{2+} + SO_4^{2-} + H_2O$$

----- Stay away from those people who try to disparage your ambitions. ... -----