INDIAN SCHOOL MUSCAT

CLASS XI

CHEMISTRY WORKSHEET

REDOX REACTIONS

Multiple Choice Questions:

1. Reaction in which there is loss of electron by a species is
   a) Reduction b) Oxidation c) Displacement d) Disproportionation reaction

2. The standard hydrogen electrode has zero electrode potential because
   a) Hydrogen is easiest to oxidize
   b) It is assumed to be zero
   c) Hydrogen atom has only one electron
   d) Hydrogen is the lightest element

3. Which is the correct representation
   a)$HAu(I)Cl_4$ b) $HAu(IV)Cl_4$ c) $HAu(III)Cl_4$ d) $HAu(V)Cl_4$

4. In the following disproportionation reaction, which species undergoes simultaneous oxidation and reduction
   $2H_2O_2 \rightarrow 2H_2O + O_2$
   a) H b) H_2O c) O d) O_2

5 For feasibility of redox reaction in a cell, the emf should be
   a) Zero b) positive c) negative d) fixed

Assertion[A] & Reasoning[R]
(A) Both assertion and reason are correct statements, and the reason is the correct explanation of the assertion
(B) Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion
(C) Assertion is correct, but reason is wrong statement
(D) Assertion is wrong, but reason is correct statement
(E) Both assertion and reason are wrong statements

1 [A]: In a redox reaction there is simultaneous oxidation and reduction.
   [R]: In oxidation there is gain of electrons and in reduction there is loss of electrons

2 [A]: In the reaction $2Na + Cl_2 \rightarrow 2NaCl$, Na is oxidized.
   [R]: Na acts as a reducing agent.

3 [A]: $E^0_{Mg2+/Mg} = -2.37V$ and $E^0_{Ag+/Ag} = 0.80V$
   [R]: Mg^{2+}/Mg couple is stronger reducing agent than H^+/H_2 couple

4 [A]: A solution of $FeSO_4$ can be stored in copper vessel
   [R]: E^0_{red} of Cu < E^0_{red} of Fe

Answer the following questions:

1. Find the oxidation number of the element underlined.
   a) $Na_3\,\underline{V}O_4$ b) $K_2\underline{Cr}O_4$ c) $\underline{C}H_4$ d) $\underline{S}O_2Cl_2$ f) $\underline{N}O_2$ g) $\underline{Br}F_3$ h) $Na_2\,\underline{S}_4\,O_6$
   i) $\underline{C}H_2Cl_2$ j) $\underline{Cl}O_4^-$
2. Differentiate between
   a) Valency and Oxidation number
   b) Activity series and Electrochemical series
   c) Oxidizing agent and Reducing agent
3. Define
   a) Oxidation number
   b) Redox couple.
   c) Standard electrode potential
   d) Stock notation
   e) Disproportionation reactions

4. Identify the redox reactions and classify them.
   a) $CuO + H_2 \rightarrow Cu + H_2O$
   b) $2Na + H_2 \rightarrow 2NaH$
   c) $AgNO_3 + NaCl \rightarrow AgCl + NaNO_3$
   d) $CaCO_3 \rightarrow CaO + CO_2$
   e) $2HCHO + NaOH \rightarrow HCOONa + CH_3OH$
5. Name a compound each in which
   a) hydrogen exists in i) +1 ii) -1 oxidation states.
   b) oxygen exists in i) +1 ii) -1 iii) +2 iv) -2 oxidation states.
   c) Chlorine exists in i)+1 ii)-1 oxidation states.
6. Balance the following equations:
   a) $MnO_4^- + Br^- \rightarrow Mn^{2+} + Br_2$ [acid]
   b) $NO_3^- + Bi \rightarrow Bi^{3+} + NO_2$ [acid]
   c) $MnO_4^- + C_2H_2O_4 \rightarrow Mn^{2+} + CO_2$ [acid]
   d) $HNO_2 + I^- \rightarrow NO + I_2$ [acid]
   e) $I_2 + NO_3^- + H^+ \rightarrow NO_2 + IO_3^-$ [acid]
   f) $Al + NO_3^- \rightarrow Al(OH)_4^- + NH_3$ [basic]
   g) $CrO_3^- + H_2O_2 \rightarrow CrO_4^{2-} + H_2O$ [basic]
   h) $Fe(OH)_2 + H_2O_2 \rightarrow Fe(OH)_3 + H_2O$ [basic]
   i) $I^- + IO_3^- \rightarrow I_2 + H_2O$ [acid]
7. Calculate the standard emf of the following cell at 298K using the standard electrode potential.

   $$\mathbf{Al(s) \mid Al^{3+}(aq) \parallel Fe^{2+}(aq) \mid Fe(s)}$$

   Given $\mathbf{E^0}_{\mathbf{Al^{3+}/Al}} = -1.66$ V and $\mathbf{E^0}_{\mathbf{Fe^{2+}/Fe}} = -0.44$V.
   And what will be the cell reaction?
8. What is salt bridge? What are its functions?

9. Write the cell reaction for the following Galvanic cells:
   $Mg(s) \mid Mg^{2+}(aq) \mid\mid Al^{3+}(aq) \mid Al(s)$
   $Zn(s) \mid Zn^{2+}(aq) \mid\mid Ag^{+}(aq) \mid Ag(s)$

10. Predict whether the following redox reaction is feasible or not under standard conditions
. $\mathbf{Sn^{2+}(aq) + Cu(s) \rightarrow Sn(s) + Cu^{2+}(aq)}$
   Given that $\mathbf{E^0}_{\mathbf{Sn^{2+}/Sn}} = -0.136$ V and $\mathbf{E^0}_{\mathbf{Cu^{2+}/Cu}} = 0.34$ V.