REDOX REACTIONS

ONE MARK QUESTIONS

1   What do you mean by oxidation number ?

2   Name a compound each in which hydrogen exists in   i) +1   ii) -1 oxidation states

3   Define Redox couple.

4   Find the oxidation number of the element underlined (each carries I mark)

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) $\underline{Cl}O_4^-$

TWO MARKS QUESTIONS

1   Name a compound each in which oxygen exists in

 i) +1   ii) -1   iii) +2   iv) -2 oxidation states

2   Define
     i)   stock notation
     i)   Standard electrode potential

3   Explain the following by giving example
     i)   Displacement redox reaction.
     ii) Disproportionation reactions

4   Calculate the standard emf of the following cell at 298K using the standard electrode

potential.   **$Al(s)\left|Al^{3+}(aq)\right. \| Fe^{2+}(aq)\left|Fe(s)\right.$**

Given $E^0_{Al^{3+}/Al}$ = - 1.66 V and $E^0_{Fe^{2+}/Fe}$ = - 0.44V.

And what will be the cell reaction?

5   What is salt bridge? What are its functions.

6   Write the cell reaction for the following Galvanic cells:

i) $Mg(s)\left|Mg^{2+}(aq)\right. \left|\right. \left|\right. Al^{3+}(aq)\left|Al(s)\right.$
ii) $Zn(s)\left|Zn^{2+}(aq)\right. \left|\right. \left|\right. Ag^{+}(aq)\left|Ag(s)\right.$

7   Balance the following equations: (each carries 2 marks)

i) $MnO_4^- + C_2H_2O_4 \rightarrow Mn^{2+} + CO_2$ [acid]

ii) $MnO_4^- + Br^- \rightarrow Mn^{2+} + Br_2$ [acid]

iii) $HNO_2 + I^- \rightarrow NO + I_2$ [acid]

THREE MARKS QUESTIONS

1   Identify the redox reactions and classify them.

   a. $2Na + H_2 \rightarrow 2NaH$

   b. $AgNO_3 + NaCl \rightarrow AgCl + NaNO_3$

   c. $CaCO_3 \rightarrow CaO + CO_2$

   d. $2HCHO + NaOH \rightarrow HCOONa + CH_3OH$

2   i)   Predict whether the following redox reaction is feasible or not under standard conditions

   $Sn^{2+} (aq) + Cu\ (s) \rightarrow Sn\ (s) + Cu^{2+}(aq)$

   Given that $E^0_{Sn^{2+}/Sn} = -0.136$ V and $E^0_{Cu^{2+}/Cu} = 0.34$ V

   ii)   Differentiate between Activity series and Electrochemical series

3   Balance the following equations: (each carries 3 marks)

   a. $HNO_2 + I^- \rightarrow NO + I_2$ [acid]

   b. $I_2 + NO_3^- + H^+ \rightarrow NO_2 + IO_3^-$ [acid]

   c. $Al + NO_3^- \rightarrow Al(OH)_4^- + NH_3$ [basic]

   d. $CrO_3^- + H_2O_2 \rightarrow CrO_4^{2-} + H_2O$ [basic]

   e. $Fe(OH)_2 + H_2O_2 \rightarrow Fe(OH)_3 + H_2O$ [basic]

   f. $I^- + IO_3^- \rightarrow I_2 + H_2O$ [acid]

VALUE BASED QUESTION (FOUR MARKS)

1   A solution of an electrolyte can be stored in a particular vessel only in case there is no chemical reaction taking place with the material of the vessel. The teacher asked a student Sachin, is it possible to store silver nitrate in copper vessel. Sachinanswered ; it is not possible to store silver nitrate in copper vessel & gave his explanation.

   i)   What explanation did Sachin gave to his teacher.
   ii)   What is oxidation & reduction according to electronic concept?
   iii) What are the values displayed by Sachin?

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