

Chem12 Oxidation and Reduction : Test 1a - 40

1) Define : Oxidation -

2)a) A piece of copper is placed in a silver nitrate solution. Write down the balanced net ionic equation (redox equation) for this reaction.

b) Which species is the oxidizing agent?

3) Give the oxidation number of S in the species FSO_3^- ?

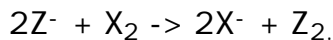
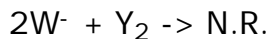
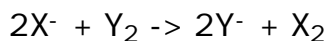
4) Is this a redox reaction : $2\text{HCl} + \text{Na}_2\text{S} \rightarrow 2\text{NaCl} + \text{H}_2\text{S}$?

5) In a redox reaction, the increase in the oxidation number of one species is accompanied by the decrease in the oxidation number of another species. Explain.

6) Balance the half reaction : $\text{HNO}_3 \rightarrow \text{NO}_2$ in acid solution.

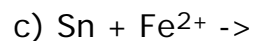
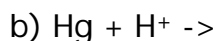
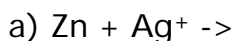
7) Balance the half reaction : $\text{NH}_3 \rightarrow \text{N}_2\text{O}$ in basic solution.

8) The four elements; W, X, Y and Z, form diatomic molecules and also form singly charged negative ions. The following observations are made in a series of experiments :



Arrange the four balanced oxidation half reactions in order with the strongest oxidizer at the top.

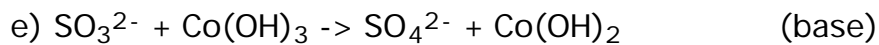
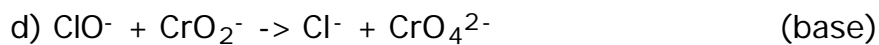
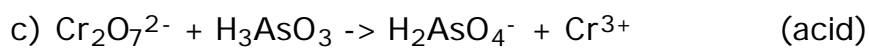
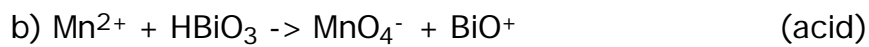
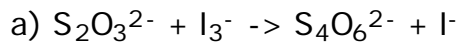
9) Predict which reactions are spontaneous. Label S or N.S.



10) Which of the following will spontaneously oxidize Fe^{2+} to Fe^{3+} ? Put Y or N.

a) Ag^+ to Ag b) Pb^{2+} to Pb c) Al^{3+} to Al d) MnO_4^- to Mn^{2+}

11) Balance the following redox reactions :



f) $\text{Cu}_2\text{SnS}_2 + \text{S}_2\text{O}_8^{2-} \rightarrow \text{Cu}(\text{OH})_2 + \text{Sn}(\text{OH})_6^{2-} + \text{SO}_4^{2-}$ (Hint : Use the two half reactions : $\text{S}_2\text{O}_8^{2-} \rightarrow \text{SO}_4^{2-}$ and $\text{Cu}_2\text{SnS}_2 \rightarrow \text{Cu}(\text{OH})_2 + \text{Sn}(\text{OH})_6^{2-} + \text{SO}_4^{2-}$) (base)

Answers : 1) It is the loss of electrons., 2)a) $\text{Cu} + 2\text{Ag}^+ \rightarrow \text{Cu}^{2+} + 2\text{Ag}$, b) Ag^+ , 3) +6, 4) No, oxidation numbers do not change., 5) Electrons are conserved., 6) $\text{HNO}_3 + \text{H}^+ + \text{e}^- \rightarrow \text{NO}_2 + \text{H}_2\text{O}$, 7) $2\text{NH}_3 + 8\text{OH}^- = \text{N}_2\text{O} + 7\text{H}_2\text{O} + 8\text{e}^-$., 8) $\text{W}_2 + 2\text{e}^- \rightarrow 2\text{W}^-$, $\text{Y}_2 + 2\text{e}^- \rightarrow 2\text{Y}^-$, $\text{X}_2 + 2\text{e}^- \rightarrow 2\text{X}^-$, $\text{Z}_2 + 2\text{e}^- \rightarrow 2\text{Z}^-$, 9)a) s, b) n.s., c) n.s., 10)a) y, b) n, c) n, d) y, 11)a) $2\text{S}_2\text{O}_3^{2-} + \text{I}_3^- \rightarrow \text{S}_4\text{O}_6^{2-} + 3\text{I}^-$, b) $2\text{Mn}^{2+} + 5\text{H}_2\text{BiO}_3 \rightarrow 2\text{H}_2\text{O} + \text{H}^+ + 2\text{MnO}_4^- + 5\text{BiO}^+$, c) $\text{Cr}_2\text{O}_7^{2-} + 3\text{H}_3\text{AsO}_3 + 5\text{H}^+ \rightarrow 3\text{H}_2\text{AsO}_4^- + 2\text{Cr}^{3+} + 4\text{H}_2\text{O}$, d) $3\text{ClO}^- + 2\text{CrO}_2^- + 2\text{OH}^- \rightarrow 3\text{Cl}^- + 2\text{CrO}_4^{2-} + \text{H}_2\text{O}$, e) $\text{SO}_3^{2-} + 2\text{Co}(\text{OH})_3 \rightarrow \text{SO}_4^{2-} + 2\text{Co}(\text{OH})_2 + \text{H}_2\text{O}$, f) $\text{Cu}_2\text{SnS}_2 + 10\text{S}_2\text{O}_8^{2-} + 26\text{OH}^- \rightarrow 2\text{Cu}(\text{OH})_2 + \text{Sn}(\text{OH})_6^{2-} + 22\text{SO}_4^{2-} + 8\text{H}_2\text{O}$.