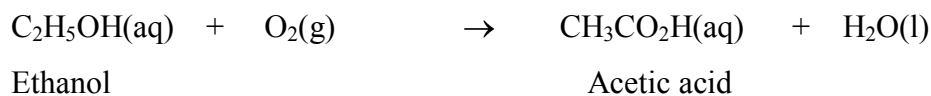


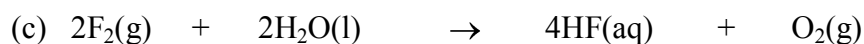
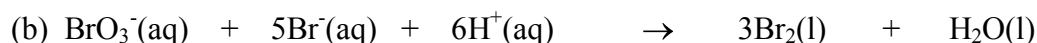
JF General Chemistry Tutorial Sheet 2

1. Wine is soured in a process by which ethanol $\text{C}_2\text{H}_5\text{OH}$ is oxidised to acetic acid.

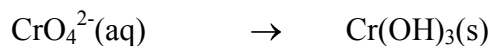


If 12.0 g of ethanol and 10.0 g oxygen were sealed in a wine bottle, which would be the limiting reactant for the oxidation and what would be the theoretical yield of acetic acid?

2. For the following redox reactions, use oxidation numbers to identify the oxidising and reducing agents:



3. Balance the following skeletal equation, for a half-reaction occurring in basic solution



4. When an aqueous solution of ammonium nitrate and calcium chloride are mixed does a precipitate form? If so, write the formula of the precipitate. Give two examples of insoluble compounds.

5. (a) The hydrogen sulfite ion, HSO_3^- , is a moderately strong reducing agent in acidic solution and depending upon the conditions, is oxidised to either the hydrogen sulfate ion HSO_4^- , or the dithionate ion $\text{S}_2\text{O}_6^{2-}$. Write the balanced equations for each half-reaction.

(b) Write half-reactions and the overall equation for the reaction of $\text{HSO}_3^-(\text{aq})$ with $\text{I}_2(\text{g})$ to form $\text{I}^-(\text{aq})$ and $\text{HSO}_4^-(\text{aq})$.

6. Camels store the fat tristearin $\text{C}_{57}\text{H}_{110}\text{O}_6$ as a source of water, according to the reaction:



(a) What mass of water is available from 2.5 kg of tristearin?

(b) How many moles of oxygen are required to oxidise 5 g of tristearin?

7. Complete and write the overall equation, the full ionic form of the equation and the net ionic equation for the following acid-base reaction.



8. Write three balanced equations to show the three stages in the preparation of nitric acid listed below:

(a) the reaction of ammonia with oxygen to give nitric oxide (NO) and water.

(b) The reaction of nitric oxide with oxygen to produce nitrogen dioxide.

(c) The reaction of nitrogen dioxide with water to produce nitric acid and nitric oxide.