

AP Exam Review- Reactions

Name: _____ Period: _____

1) (i) Solid potassium chlorate is strongly heated and decomposes, resulting in a change in the oxidation numbers of both chlorine and oxygen.

(ii) What is the oxidation number of chlorine **before** and **after** the reaction?

2) (i) Solid silver chloride is added to a solution of concentrated hydrochloric acid, forming a complex ion.

(ii) Which species acts as a Lewis base in the reaction? Explain.

3) (i) A solution of ethanoic (acetic) acid is added to a solution of barium hydroxide.

(ii) Explain why a mixture of equal volumes of equimolar solutions of ethanoic acid and barium hydroxide is basic.

4) (i) Ammonia gas is bubbled into a solution of hydrofluoric acid.

(ii) Identify a conjugate acid-base pair in the reaction.

5) (i) Zinc metal is placed in a solution of copper(II) sulfate.

(ii) Describe the change in color of the solution that occurs as the reaction proceeds.

6) (i) A solution of nickel(II) bromide is added to a solution of potassium hydroxide.

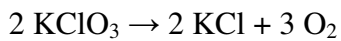
(ii) Identify the spectator ions in the reaction mixture.

7) (i) Hexane is combusted in air.

(ii) When one molecule of hexane is completely combusted, how many molecules of products are formed?

Answers

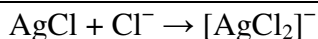
1) (i) Solid potassium chlorate is strongly heated and decomposes, resulting in a change in the oxidation numbers of both chlorine and oxygen.



(ii) What is the oxidation number of chlorine **before** and **after** the reaction?

Chlorine has an oxidation number of +5 in KClO_3 and -1 in KCl .

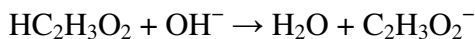
2) (i) Solid silver chloride is added to a solution of concentrated hydrochloric acid, forming a complex ion.



(ii) Which species acts as a Lewis base in the reaction? Explain.

The chloride ion acts as a Lewis base in the reaction because it donates an electron pair.

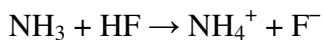
3) (i) A solution of ethanoic (acetic) acid is added to a solution of barium hydroxide.



(ii) Explain why a mixture of equal volumes of equimolar solutions of ethanoic acid and barium hydroxide is basic.

In the mixture there are initially twice as many moles of hydroxide ions as molecules of acid; since they react in a 1:1 ratio, there is an excess of hydroxide ions after the reaction is complete, leading to the basic solution.

4) (i) Ammonia gas is bubbled into a solution of hydrofluoric acid.

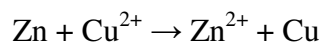


(ii) Identify a conjugate acid-base pair in the reaction.

NH_3 (base) and NH_4^+ (acid)

Or: HF (acid) and F^- (base)

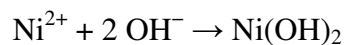
5) (i) Zinc metal is placed in a solution of copper(II) sulfate.



(ii) Describe the change in color of the solution that occurs as the reaction proceeds.

The blue color of the solution due to the presence of the hydrated copper(II) ion fades as the copper(II) ion reacts and the colorless hydrated zinc(II) ion forms.

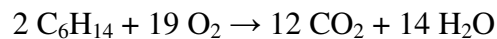
6) (i) A solution of nickel(II) bromide is added to a solution of potassium hydroxide.



(ii) Identify the spectator ions in the reaction mixture.

The spectator ions are the bromide ion (Br^{-}) and the potassium ion (K^{+}).

7) (i) Hexane is combusted in air.



(ii) When one molecule of hexane is completely combusted, how many molecules of products are formed?

1 molecule of hexane produces 13 molecules of products