

Solutions

2.1 Potassium sulfate.

2.2 $\text{H}^+ + \text{OH}^- \rightarrow \text{H}_2\text{O}$.

2.3 Strong – hydrochloric/nitric/sulfuric acid; weak – ethanoic/citric/carbonic acid.

3.1 Copper oxide + nitric acid $\rightarrow$ copper nitrate + water. Warm the dilute nitric acid; add copper oxide until no more dissolves – excess proves all the acid has reacted; filter off the excess black solid; evaporate the filtrate to the crystallisation point and allow it to cool/crystallise; dry the crystals between filter paper/in a warm oven.

3.2 Dilution lowers the concentration of H^+ ions – the same amount of acid in more water; pH measures H^+ concentration, not presence; so pH rises toward 7 as the solution is diluted.

3.3 Ethanoic acid is a weak acid – only partially ionised in water; so its H^+ concentration is lower than hydrochloric's at the same 0.1 mol/dm^3 ; hydrochloric acid ionises completely, so it has the higher $[\text{H}^+]$ and the lower pH.