5.1.3 Acids, bases and buffers

Brønsted–Lowry acids and bases (a) (i) a Brønsted–Lowry acid as a species that donates a proton and a Brønsted–Lowry base as a species that accepts a proton (ii) use of the term conjugate acid–base pairs (iii) monobasic, dibasic and tribasic acids					
(b) the role of H+ in the reactions of acids with metals and bases (including carbonates, metal oxides and alkalis), using ionic equations					
(c) (i) the acid dissociation constant, Ka, for the extent of acid dissociation (ii) the relationship between Ka and pKa					
pH and [H+(aq)]					
(d) use of the expression for pH as: pH = –log[H+] [H+] = 10^{-pH}					
(e) use of the expression for the ionic product of water, Kw					
(f) calculations of pH, or related quantities, for: (i) strong monobasic acids (ii) strong bases, using Kw					
(g) calculations of pH, Ka or related quantities, for a weak monobasic acid using approximations					
(h) limitations of using approximations to Ka related calculations for 'stronger' weak acids					
Buffers: action, uses and calculations					
(i) a buffer solution as a system that minimises pH changes on addition of small amounts of an acid or a base					
(j) formation of a buffer solution from: (i) a weak acid and a salt of the weak acid, e.g. CH_3COOH/CH_3COONa (ii) excess of a weak acid and a strong alkali, e.g. excess $CH_3COOH/NaOH$					
(k) explanation of the role of the conjugate acid–base pair in an acid buffer solution, e.g. $CH_3COOH/CH_3COO–$, in the control of pH					
(l) calculation of the pH of a buffer solution, from the Ka value of a weak acid and the equilibrium concentrations of the conjugate acid–base pair; calculations of related quantities					
(m) explanation of the control of blood pH by the carbonic acid–hydrogencarbonate buffer system					
Neutralisation					
(n) pH titration curves for combinations of strong and weak acids with strong and weak bases, including: (i) sketch and interpretation of their shapes (ii) explanation of the choice of suitable indicators, given the pH range of the indicator (iii) explanation of indicator colour changes in terms of equilibrium shift between the HA and A– forms of the indicator					
(o) the techniques and procedures used when measuring pH with a pH meter.					