13 Acids Revision Helpsheet

Lesson Objectives	Tasks		
Know that a base is a proton acceptor	What is the Bronsted-Lowry definition of a base?	What is the Bronsted-Lowry definition of an acid?	Identify the acid and base in this reaction: $NH_3 + HCl \rightarrow NH_4Cl$
Know that acid–base equilibria involve the transfer of protons	Describe what happens in a neutralisation reaction in terms of proton transfer		Give one example of nitric acid acting as an acid and one where it acts as a base
Know that pH = – log10[H+], where [ ] represents the concentration in mol dm–3	Write an expression for pH	True or false: For every change in pH of one there is a factor of x10 change in [H+]	True or false: The higher the pH the higher the concentration of [H+]
Convert concentration into pH and vice versa	Calculate the pH of a solution which has [H+] = 1.5M	Calculate the concentration of a HCl solution which has a pH of 3	Calculate the concentration of H_2SO_4 solution which would have a pH of 3
Calculate the pH of a solution of a strong acid from its concentration	Calculate the pH of a 1.5M solution of HCl	Calculate the pH of a 1.5M solution of H_2SO_4	Calculate the pH of a 1.5M solution of H_3PO_4
Know that water is weakly dissociated	Write an expression to show the dissociation of water into its ions		
Know that *K*w = [H+][OH–]	Write an expression for the ionic product of water		
Calculate the pH of a strong base from its concentration.	Calculate the pH of a 1M NaOH solution	Calculate the pH of a 2M NaOH solution	Write a stepwise method for calculating the pH of a strong base
Know that weak acids and weak bases dissociate only slightly in aqueous solution	Compare the extent of dissociation of weak and strong acids	Write an expression for the dissociation of a weak acid	Write an expression for a weak base in water
Construct an expression, with units, for the dissociation constant *K*a for a weak acid	Write an expression for Ka for ethanoic acid	What assumption do we make about the extent of dissociation when dealing with weak acids?	

Know that pKa = – log10 *Ka*	Write an expression for pKa	Is a smaller pKa a sign of a strong or weak acid?	
Perform calculations relating the pH of a weak acid to the dissociation constant, *Ka*, and the concentration	Calculate the pKa of a solution of 0.1M ethanoic acid	Calculate the concentration of H+ in a solution of ethanoic acid which has a pKa of 4.77	Benzoic acid has a pKa of 4.20. Calculate its pH.
Understand the typical shape of pH curves for acid–base titrations	Draw a pH curve for each of the following combinations: a) Strong acid and strong base b) Strong acid and weak base c) Weak acid and strong base d) Weak acid and weak base		
Use pH curves to select an appropriate indicator	Describe how you would use a pH curve to choose an appropriate indictor for a titration		
Perform calculations for the titrations of monoprotic and diprotic acids with sodium hydroxide, based on experimental results	Calculate the concentration of the acid used when 25cm^3 of 0.2M NaOH is neutralise by 17cm^3 of hydrochloric acid	Calculate the concentration of the acid used when 25cm^3 of 0.5M NaOH is neutralise by 17cm^3 of sulfuric acid	Prove that at the half-neutralisation point pKa = pH
Explain qualitatively the action of acidic and basic buffers	Explain what a buffer solution is	Describe the components needed to make a buffer solution	Explain how the pH of a buffer solution is able to remain constant when small amounts of acid and base are added
State applications of buffers	Name three everyday examples of buffers		
Be able to calculate the pH of acidic buffer solutions	Calculate the pH of a buffer which consists of 0.25M ethanoic acid and 0,25M sodium ethanoate (pKa ofEtOH= 4.77)	Calculate the pH of a buffer formed when 25cm^3 of 0. 5M NaOH is added to 50cm^3 of 2M ethanoic acid	Calculate the new pH of the same buffer after 10cm^3 of 0. 5M NaOH is added