CHEMISTRY – UNIT 5 HONORS STUDY GUIDE

When is it happening?	Friday April 17th
How long will it take?	50 minutes
What is the format?	7 multiple choice questions (10 points) 25 points worth of short answer questions You may use all of your notes and any other resources you find useful.
What is it worth?	15% of your Q4 grade
What will it cover?	See below
What resources will be useful?	Unit 5 Course Notes Lab Reports 5.1 – 5.5 Class Worksheets 5.1 – 5.5

UNIT 5 HONORS CHECKLIST

No.	Concept	Mastered?
1	Know that an acid is a proton (H^+) donor and that most acids dissolve in water and dissociate to give solutions containing H^+ ions; know the name and formula of the three most common laboratory acids (HCl, H_2SO_4 and HNO_3); know that these dissociation reactions give chloride ions (Cl^-), sulfate ions (SO_4^{2-}) and nitrate ions (NO_3^-) respectively; be able to write equations for their dissociation in water; be able to write dissociation reactions for unfamiliar acids if their formula is given	
2	Know that base is a proton (H^+) acceptor; know that some bases dissolve in water and dissociate to give solutions containing OH^- ions and that these are called alkalis; know that there are four common types of base: metal oxides (eg CaO), metal hydroxides (eg NaOH), metal carbonates (eg $CaCO_3$) and ammonia (NH_3); know the name and formula of these bases, limited to Group I and Group II metals, and write simple ionic equations to show how O^{2-}, OH^-, CO_3^{2-} and NH_3 react with H^+ ions; know which bases are also alkalis (ie soluble) and which bases are insoluble	
3	Know that a salt is a substance formed when the H^+ from an acid is replaced by a metal ion or ammonium ion; know the name and formula of any salt produced from a familiar acid and a familiar base; know that a reaction between an acid and a base to form a salt is called a neutralization reaction and write equations for neutralization reactions between familiar acids and bases; write equations for neutralization reactions between unfamiliar acids and bases if their formulas are given; know that most salts are soluble in water	
4	Describe simple observations that you would see when carrying out neutralization reactions, and relate these observations to the state symbols in the equations; know that neutralization reactions can be useful and give examples to support this; describe how to prepare a pure sample of a soluble salt from an acid and an insoluble base; explain why it is important that the base is insoluble (Lab 5.2)	

5	Know that water dissociates naturally to give small quantities of H^+ and OH^- ions and that all aqueous solutions contain both of these ions; know that the product of the concentrations of these ions in an aqueous solution is always 1×10^{-14} mol/L and hence deduce the concentration of H^+ ions if the OH^- concentration is known and vice versa; know that a solution is defined as acidic if $[H^+] > [OH^-]$, alkaline if $[OH^-] > [H^+]$ and neutral if $[H^+] = [OH^-]$; know that the pH of a solution is related to the power of the hydrogen ion concentration and predict the pH of a solution if its H^+ ion concentration is known and vice versa	
6	Know that acids and bases can be strong or weak depending on the extent of their dissociation and/or solubility in water and recognize common acids and bases as strong or weak; represent the dissociation of weak acids and bases with a reversible sign; know that strong and weak acids with the same molarity will have different H^+ concentrations and therefore different pH values, conductivities and rates of reaction with insoluble bases, appreciate that the strength of an acid does not affect the quantity of base needed to neutralize it because weak acids dissociate more as H^+ ions are removed until they are fully dissociated; know that all strong acid – strong alkali neutralizations involve the same reaction ($H^+ + OH^- \rightarrow H_2O$) so all have the same molar enthalpy change of neutralization (-57 kJ/mol) but that weak acids and bases dissociate during the neutralization process, that these dissociations are endothermic and so the neutralization of weak acids and bases is a less exothermic process than the neutralization of strong acids and bases	
7	Know that an indicator is a weak acid (HA) which dissociates to give an anion (A^-) with a different color; that the color shown by an indicator depends on the position of the dissociation equilibrium, which in turn depends on the pH; know that different indicators change color over different pH ranges and that this range is known as the end-point of the indicator; be able to predict the color shown by an indicator or mixture of indicators at a particular pH if the colors and the end-points of the indicators are given; use this information to deduce whether a particular indicator will be useful in a given situation	
8	Know that a titration is an experiment which allows the volume of one liquid needed to react with a fixed volume of another liquid to be determined; know that titrations are a common type of volumetric analysis, which is an example of quantitative analysis; know that the most common type of titration is between an acid and a base; know that titrations can be used to calculate the molarity of an acid by titration with a standard solution of a base and vice versa; be able to describe a titration procedure in detail (Lab 5.5); know that the point in a titration at which the acid and the base have exactly neutralized each other is known as the equivalence point; know that there is a significant change in pH at the equivalence point and that this pH change depends on the strength of the acid and the base; appreciate that an indicator will only work in a titration if its end point pH range lies within the pH change at the equivalence point of the titration and use this information to select a suitable indicator for a titration; be able to use the results of a titration to calculate the molarity of an acid or a base	