Name:…………………………………………………………….. Date:…………………………………………….

CHEMISTRY HOMEWORK 5.1 – ACIDS, BASES, SALTS AND NEUTRALIZATION

1.	Complete the following table: nitric acid, HNO_3, acid potassium hydroxide, KOH, base potassium nitrate, KNO_3, salt calcium chloride, $CaCl_2$, salt hydrochloric acid, HCl, acid calcium oxide, CaO, base		/6
2.	Write balanced symbol equations for the following reactions and name the salt produced:		
	(a)	calcium oxide with hydrochloric acid $CaO + 2HCl \rightarrow CaCl_2 + H_2O$ Name of salt: calcium chloride	/3
	(b)	Copper carbonate with sulfuric acid $H_2SO_4 + CuCO_3 \rightarrow CuSO_4 + CO_2 + H_2O$ Name of salt: copper sulfate	/3
3.	(a)	State a useful application of the reaction in 2 (a) Farmers put CaO on land To neutralize soil acidity	/2
4.	Classify the following solutions as acidic, alkaline or neutral: pH of 5.5 – acidic pH of 9.2 – alkaline lemon juice – acidic sodium chloride solution – neutral sodium hydroxide solution – alkaline equal amounts of H^+ and OH^- - neutral		/3
		TOTAL	/20

Name	**Formula**	**Acid, Base or Salt?**
nitric acid		
	KOH	
potassium nitrate		
	$CaCl_2$	
	HCl	
calcium oxide		

Name:………………………………………………………….. Date:…………………………………………..

CHEMISTRY HOMEWORK 5.2 – WEAK ACIDS, INDICATORS AND TITRATIONS

1.	Nitric acid is a strong acid. It has the formula HNO_3. Citric acid is a weak acid. It has the formula $HC_6H_7O_7$. In an experiment to compare the properties of citric acid and nitric acid, Danius added magnesium carbonate powder slowly to 50 mL of 0.10 mol/L $HC_6H_7O_7$ until no more magnesium carbonate powder dissolved. Danius then repeated the experiment using 50 mL of 0.10 mol/L HNO_3 instead of 50 mL of 0.10 mol/L $HC_6H_7O_7$. After the reaction, Danius added a small quantity of methyl orange indicator to the mixture to check whether the acid had been completely neutralised.		
	(a)	Write an equation to show the dissociation of nitric acid (HNO_3) in water. $HNO_3 \rightarrow H^+ + NO_3^-$	/2
	(b)	Write an equation to show the dissociation of citric acid ($HC_6H_7O_7$) in water. $HC_6H_7O_7 \rightleftarrows H^+ + C_6H_7O_7^-$	/2
	(c)	State, with a reason, whether 0.10 mol/L citric acid or 0.10 mol/L nitric acid would have a lower pH. or 0.10 mol/L HNO_3 would have a lower pH. because it is a strong acid, so fully dissociated so there are more H^+ ions	/3
	(d)	Identify one similarity and one difference Danius would expect to observe between the reactions of 50 mL of 0.10 mol/L $HC_6H_7O_7$ and 50 mL of 0.10 mol/L HNO_3 with magnesium carbonate. Similarity: same amount of magnesium carbonate would dissolve in both acids Difference: reaction would be much faster with 0.10 mol/L HNO_3	/2
	(e)	State the color shown by methyl orange indicator if: The acid had been neutralized: yellow The acid had not been neutralized: pink	/2
2.	Nina wants to find the molarity of a sample of nitric acid which she has found in a cupboard. She decides to use a standard solution of 0.050 mol/L NaOH in order to do this. Nina uses a pipette to transfer 15 mL of the NaOH solution into a conical flask and adds a few drops of phenolphthalein indicator. Nina places the nitric acid solution into a burette and adds it slowly to the NaOH solution until the indicator changes color. She needs 12.4 mL of nitric acid to do this.		
	(a)	What is meant by the term "standard solution"? A solution whose concentration is accurately known	/1
	(b)	Write an equation for the reaction between nitric acid and sodium hydroxide solution. $HNO_3 + NaOH \rightarrow NaNO_3 + H_2O$	/2
	(c)	State the initial color of the indicator, and its color at the equivalence point. Initial color: purple or pink Color at equivalence point: colorless	/2
	(d)	Calculate the molarity of the nitric acid solution. $C_2 = \frac{C_1V_1}{V_2}$ = (0.05 x 15)/12.4 = 0.060 mol/L	/3
		TOTAL	/15