

WASHINGTON LATIN PUBLIC CHARTER SCHOOL  
CHEMISTRY 2019-20

UNIT 5A – CHEMICAL REACTIONS I – ACIDS AND BASES  
TEST

SECTION A – OPEN RESPONSE

<p>1. Neutralization reactions are reactions between acids and bases to produce salts. They have a variety of uses, including making different salts.</p> <p>Complete the following table to show the names and formulas of different acids, bases and salts.</p> <p>Clue: if it contains H<sup>+</sup>, it's an acid; if it contains hydroxide, oxide or carbonate, it's a base; otherwise it's a salt</p>			
Name	Formula	acid, base or salt?	5
	KOH	base	
potassium nitrate			
	HNO <sub>3</sub>		
magnesium carbonate	MgCO <sub>3</sub>		
magnesium chloride			
	HCl		
(a)	Complete the following symbol equations for neutralization reactions:		
	(i)	KOH + HNO <sub>3</sub> → you make potassium nitrate	4
	(ii)	MgCO <sub>3</sub> + 2HCl → you make magnesium chloride	

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(b)	State what you would see as reaction (a) (ii) was taking place	2
	MgCO <sub>3</sub> is a solid – what will happen to it Look at the products – what will you see?	
TOTAL		11

2. The acidity or alkalinity of a solution can be captured in a single number, called the pH.

The acidity or alkalinity of a solution can also be determined by using acid-base indicators. Two common indicators are methyl orange and phenolphthalein. The colors and end-point pH ranges of these indicators are shown in the table below:

Indicator	Color 1	pH range	Color 2
bromothymol blue	yellow	6.0 – 7.7	blue
phenolphthalein	colorless	8.3 – 10.0	pink

A sample of lemon juice was analysed and found to have a pH of 3

A sample of blood was analysed and found to have a pH of 7

A sample of 0.1 mol/L sodium hydroxide was also analysed

Complete the following table:

Sample	pH	acidic, neutral or alkaline? Look at the pH	Color it turns bromothymol blue	Color it turns phenolphthalein
Lemon juice	3		Use the chart in the question	Use the chart in the question
Blood	7		Use the chart in the question	Use the chart in the question
Hydrochloric acid			Use the chart in the question	Use the chart in the question

TOTAL

5

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3.	<p>Lactic acid, <math>\text{HC}_3\text{H}_5\text{O}_3</math>, is a weak acid.          Xondra had a solution of lactic acid of unknown molarity.          She determined the molarity of the lactic acid solution by carrying out a titration with 0.10 mol/L sodium hydroxide solution using phenolphthalein indicator.          She found that 21.5 mL of the lactic acid solution were required to react with 25 mL of the sodium hydroxide solution.</p>	
(a)	<p>Describe in detail how Xondra would perform the titration. Include the names of any equipment used.</p>	
	<p>You need to mention pipette, burette and conical flask          Then follow the procedure on the final page of the study guide</p>	4
(b)	<p>Calculate the molarity of the lactic acid solution.</p> $C_2 = \frac{C_1 V_1}{V_2}$ <p>Use the formula</p>	
	<p><math>C_1 = 0.1</math>, <math>V_1 = 25 \text{ mL}</math>, <math>V_2 = 21.5 \text{ mL}</math></p>	3
(c)	<p>Describe the change in color Xondra would see when the lactic acid had been completely neutralized.</p>	
	<p>What is the indicator? Look at the table in question 2.</p>	2
TOTAL		9

## SECTION B – MULTIPLE CHOICE

Do not answer these questions on this document. Click on the answer sheet provided at the end of the questions.

<b>4.</b>	When copper oxide reacts with sulfuric acid, the name of the salt produced is	
	A	copper acid
	B	copper sulfate
	C	sulfuric oxide
	D	sodium chloride
2		

<b>5.</b>	A solution of wood bleach has a pH of 2. It could be described as: <b>Look at the table in the study guide linking pH to acidity</b> <b>Low pH = acidic, high pH = alkaline</b>	
	A	strongly acidic
	B	weakly acidic
	C	neutral
	D	weakly alkaline
	E	strongly alkaline
2		

<b>6.</b>	Which of the following solutions has the highest pH? <b>Low pH = acidic, high pH = alkaline – which solution is an alkali?</b>	
	A	1 mol/L ammonia
	B	Vinegar
	C	pure water
	D	1 mol/L hydrochloric acid
	E	orange juice
2		

<b>7.</b>	What would happen if MgO powder was added separately to 50 mL of 0.5 mol/L HCl and 0.5 mol/L lactic acid? <b>Look at the answer key to practice test Q3 for the differences between strong and weak acids</b>	
	A	The lactic acid would dissolve more MgO but more slowly
	B	The lactic acid would dissolve less MgO and more slowly
	C	The lactic acid would dissolve the same amount of MgO but more slowly
	D	The lactic acid would dissolve the same amount of MgO and at the same rate.

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	E	The lactic acid would dissolve more MgO and more quickly.
		2

Now proceed to the [answer sheet](#)