|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **WASHINGTON LATIN PUBLIC CHARTER SCHOOL**  **CHEMISTRY 2019-20**    **UNIT 5A PRACTICE TEST – CHEMICAL REACTIONS I: ACIDS AND BASES**  Answer all questions  Recommended time = 50 minutes  BAHATI NJEMA!     |  |  |  |  | | --- | --- | --- | --- | |  | Name: |  |  | |  | Score for Q1 - 3 (open response) | /28 |  | |  | Score for Q4 – 10  (multiple choice) | /7 |  | |  | Bonus  (Submits quiz on time and in correct format) | /5 |  | |

**SECTION A – OPEN RESPONSE**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **1.** | Neutralization reactions are reactions between acids and bases to produce salts. They have a variety of uses, including making different salts. | | | |  |
| (a) | Write balanced symbol equations for the following neutralization reactions and name the salt produced: | | |  |
| (i) | Reactants: | magnesium carbonate and nitric acid | 6 |
| Symbol equation: |  |
| Name of salt: |  |
| (ii) | Reactants: | ammonia and sulfuric acid |
| Symbol equation: |  |
| Name of salt: |  |
| (b) | State what you would observe as reaction (a) (i) was taking place | | | 2 |
|  | | |
| (c) | When preparing a pure sample of the salt from reaction (a) (i), one of the reactants should be added in excess. Which reactant is this, and why should it be added in excess? | | | 3 |
|  |  | | |
| TOTAL | | | | 11 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **2.** | The pH scale is a logarithmic scale designed to capture the acidity or alkalinity of a solution in a simple number. | | |  |
| (a) | Solution A has a hydrogen ion (H+) concentration of 1 x 10-4 mol/L. What is the pH of solution A? | |  |
|  | | 1 |
| (b) | Solution B has a hydroxide ion (OH-) concentration of 1 x 10-3 mol/L. What is the pH of solution B? | |  |
|  | | 2 |
| (c) | Solution C is pure water. What is the hydrogen ion (H+) concentration in pure water? | |  |
|  | | 1 |
| (d) | Bromothymol blue is an indicator with an end-point pH range of 6.0 - 7.7. It’s color 1 is yellow and it’s color 2 is blue  Deduce the color of bromothymol blue in | | 3 |
| Solution A |  |
| Solution B |  |
| Solution C |  |
| TOTAL | | | 7 |

|  |  |  |  |
| --- | --- | --- | --- |
| **3.** | Lactic acid, HC3H5O3, is a weak acid.  Casey 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.  She found that 21.5 mL of the lactic acid solution were required to react with 25 mL of the sodium hydroxide solution. | |  |
| (a) | Write an equation to show what happens to lactic acid when it is mixed with water. | 2 |
|  |  |
| (b) | Write an equation to show the reaction between lactic acid and sodium hydroxide. | 1 |
|  |
| (c) | Describe in detail how Casey would perform the titration. Include the names of any equipment used. | 4 |
|  |  |
| (d) | Calculate the molarity of the lactic acid solution. Show your working. | 3 |
|  |  |
| TOTAL | | 10 |

**SECTION B – MULTIPLE CHOICE**

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

|  |  |  |
| --- | --- | --- |
| **4.** | The formula of aluminium sulfate is | |
|  | A | Al3S2 |
|  | B | Al(SO4)2 |
|  | C | Al2SO4 |
|  | D | Al2(SO4)3 |
|  | E | Al3(SO4)2 |
| 1 | | |

|  |  |  |
| --- | --- | --- |
| **5.** | It is not possible to produce a pure sample of aluminium sulfate by adding | |
|  | A | aluminium hydroxide to sulfuric acid |
|  | B | aluminium oxide to sulfuric acid |
|  | C | aluminium chloride to sulfuric acid |
|  | D | aluminium carbonate to sulfuric acid |
| 1 | | |

|  |  |  |
| --- | --- | --- |
| **6.** | Lactic acid is a weak acid. In an aqueous solution of lactic acid, approximately 10% of lactic acid molecules react with water to form H+ ions.  The pH of 0.01 mol/L lactic acid is approximately | |
|  | A | 1 |
|  | B | 2 |
|  | C | 3 |
|  | D | 4 |
|  | E | 7 |
| 2 | | |

|  |  |  |
| --- | --- | --- |
| **7.** | Which of the following solutions has the highest pH? | |
|  | A | 0.001 mol/L H2SO4 |
|  | B | 0.001 mol/L HCl |
|  | C | a solution containing 1 x 10-12 mol/L OH- ions |
|  | D | a solution containing 1 x 10-2 mol/L H+ ions |
|  | E | 1 mol/L lactic acid |
| 2 | | |

|  |  |  |
| --- | --- | --- |
| **8.** | 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? | |
|  | 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. |
|  | E | The lactic acid would dissolve more MgO and more quickly. |
| 1 | | |

[Click here for answer sheet](https://docs.google.com/forms/d/e/1FAIpQLScYnKknx8tVnVHVmZ_pMi4kPdeR3tzysCG25e45coBIfx7FKQ/viewform?usp=sf_link)