Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Lab Day & Time: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_

## Data Sheet

Concentration of unknown acid stock solution \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ *M*

Concentration of NaOH stock solution \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ *M*

### Part I Ka from the pH of an Acid Solution of Known Concentration

pH of the unknown acid stock solution \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | HA(aq) + H2O(l) | ⇌ | H3O+(aq) | + | A–(aq) |
| Initial conc. / *M*: |  |  |  |  |  |
| Change in conc. at equilibrium / *M*: |  |  |  |  |  |
| Equilibrium conc. / *M*: |  |  |  |  |  |

Value of *K*a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

### Part II, Ka from Partial Neutralization

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Run | | | | | | |
| *Unknown Acid* | 1 |  | 2 |  | 3 |  | 4 |
| Initial buret reading | mL |  | mL |  | mL |  | mL |
| Final buret reading | mL |  | mL |  | mL |  | mL |
| Volume dispensed into flask | mL |  | mL |  | mL |  | mL |
| *NaOH* |  |  |  |  |  |  |  |
| Initial buret reading | mL |  | mL |  | mL |  | mL |
| Final buret reading | mL |  | mL |  | mL |  | mL |
| Volume dispensed into flask | mL |  | mL |  | mL |  | mL |
| Volume of volumetric flask when filled to the mark | mL |  | mL |  | mL |  | mL |
| pH of the mixture |  |  |  |  |  |  |  |

#### Initial Concentrations after neutralization

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Run | | | | | | |
|  | 1 |  | 2 |  | 3 |  | 4 |
| Moles of HA added | mol |  | mol |  | mol |  | mol |
| Moles of NaOH added | mol |  | mol |  | mol |  | mol |
| Moles of A– present | mol |  | mol |  | mol |  | mol |
| Moles of HA remaining after neutralization | mol |  | mol |  | mol |  | mol |
| **A– molarity** | *M* |  | *M* |  | *M* |  | *M* |
| **HA molarity** | *M* |  | *M* |  | *M* |  | *M* |
| **H3O+ molarity** (from pH) | *M* |  | *M* |  | *M* |  | *M* |

#### ICE Tables

Run 1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | HA(aq) + H2O(l) | ⇌ | H3O+(aq) | + | A–(aq) |
| Initial conc. / *M*: |  |  |  |  |  |
| Change in conc. at equilibrium / *M*: |  |  |  |  |  |
| Equilibrium conc. / *M*: |  |  |  |  |  |

Value of *Ka* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Run 2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | HA(aq) + H2O(l) | ⇌ | H3O+(aq) | + | A–(aq) |
| Initial conc. / *M*: |  |  |  |  |  |
| Change in conc. at equilibrium / *M*: |  |  |  |  |  |
| Equilibrium conc. / *M*: |  |  |  |  |  |

Value of *Ka* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Run 3

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | HA(aq) + H2O(l) | ⇌ | H3O+(aq) | + | A–(aq) |
| Initial conc. / *M*: |  |  |  |  |  |
| Change in conc. at equilibrium / *M*: |  |  |  |  |  |
| Equilibrium conc. / *M*: |  |  |  |  |  |

Value of *Ka* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Run 4

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | HA(aq) + H2O(l) | ⇌ | H3O+(aq) | + | A–(aq) |
| Initial conc. / *M*: |  |  |  |  |  |
| Change in conc. at equilibrium / *M*: |  |  |  |  |  |
| Equilibrium conc. / *M*: |  |  |  |  |  |

Value of *Ka* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Average Value of *Ka* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

## Post Lab Question

Does your data indicate that the value of *K*a is constant over a range of concentrations?