# ACIDS, BASES, SALTS, AND BUFFER SOLUTIONS PRELAB SMART WORKSHEET

## PART A. $pH$ CALCULATIONS

- $K_a = 1.8 \times 10^{-5}$
- $K_b = 1.8 \times 10^{-5}$

Table 1: Calculation of pH for varying concentrations of different species

| Species | Concentration ($M$) | pH Unrounded | pH Rounded |
|---------|---------------------|--------------|------------|
| $HCl$ | 0.7491 | 🔒 0.125460 ✓ | 🔒 0.1255 ✓ |
| $HCl$ | 0.09312 | 🔒 1.030957 ✓ | 🔒 1.0310 ✓ |
| $HCl$ | 0.5988 | 🔒 0.222718 ✓ | 🔒 0.2227 ✓ |
| $NaOH$ | 0.9352 | 🔒 13.970905 ✓ | 🔒 13.9709 ✓ |
| $NaOH$ | 0.8309 | 🔒 13.919549 ✓ | 🔒 13.9195 ✓ |
| $NaOH$ | 0.4270 | 🔒 13.630428 ✓ | 🔒 13.6304 ✓ |
| $CH_3COOH$ | 0.78 | 🔒 2.426316 ✓ | 🔒 2.43 ✓ |
| $NH_4OH$ | 0.59 | 🔒 11.513062 ✓ | 🔒 11.51 ✓ |

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YOUR PROGRESS ON 'PART A. $pH$ CALCULATIONS' SECTION

**CORRECT** 16 / 16    **POINTS AWARDED** 79 / 80    **AUTOSOLVED** 0 / 16    **NOT FINISHED** 0 / 16

## PART B. $pH$ OF SALTS

Indicate whether the cation, anion, and salt are acidic, basic, or $pH$ neutral:

Table 2: Determination of pH of different species in cation, anion and salt form

| | Cation | Anion | Salt |
|---|--------|-------|------|
| Sodium acetate, $NaCH_3CO_2$ | 🔒 pH neutral ✓ | 🔒 basic ✓ | 🔒 basic ✓ |
| Sodium carbonate, $Na_2CO_3$ | 🔒 pH neutral ✓ | 🔒 basic ✓ | 🔒 basic ✓ |
| Sodium hydrogen sulfate, $NaHSO_4$ | pH neutral 🔒 ✓ | acidic 🔒 ✓ | acidic 🔒 ✓ |
| Sodium hydrogen carbonate, $NaHCO_3$ | 🔒 pH neutral ✓ | 🔒 basic ✓ | 🔒 basic ✓ |
| Ammonium chloride, $NH_4Cl$ | 🔒 acidic ✓ | 🔒 pH neutral ✓ | 🔒 acidic ✓ |

| Aluminum chloride, $AlCl_3$ | 🔒 acidic ✓ | 🔒 pH neutral ✓ | 🔒 acidic ✓ |
|---|---|---|---|

YOUR PROGRESS ON 'PART B. $pH$ OF SALTS' SECTION

**CORRECT** 18 / 18  **POINTS AWARDED** 35 / 36  **AUTOSOLVED** 0 / 18  **NOT FINISHED** 0 / 18

## PART C. $pH$ OF BUFFERS

Calculate the $pH$ of a buffer prepared by mixing 20.0 $mL$ of 0.19 $M$ acetic acid and 30.0 $mL$ of 0.17 $M$ sodium acetate.

Table 3: Concentrations of acetic acid and sodium acetate

|  | Concentration ($M$) |
|---|---|
| Acetic acid | 0.19 |
| Sodium acetate | 0.17 |

Table 4: Calculation of pH of the buffer

|  | Unrounded | Rounded |
|---|---|---|
| $pH$ of buffer | 🔒 4.872787 ✓ | 🔒 4.87 ✓ |

YOUR PROGRESS ON 'PART C. $pH$ OF BUFFERS' SECTION

**CORRECT** 2 / 2  **POINTS AWARDED** 10 / 10  **AUTOSOLVED** 0 / 2  **NOT FINISHED** 0 / 2
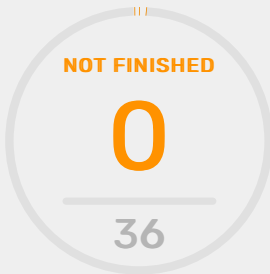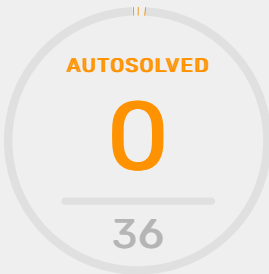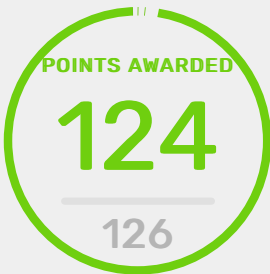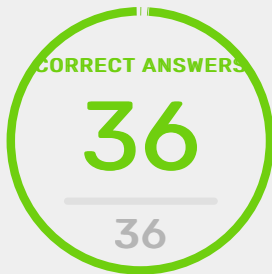
## YOUR OVERALL PROGRESS

Visual status toggles for statistics by question type

☐ Concept  ☐ Calculation  ☐ Rounding

| CORRECT ANSWERS | POINTS AWARDED | AUTOSOLVED | NOT FINISHED |
|---|---|---|---|
| 36 / 36 | 124 / 126 | 0 / 36 | 0 / 36 |

## END OF ACTIVITY

SCORE: **98%**   SAVED: ✔