OCR
Oxford Cambridge and RSA

Monday 18 October 2021 – Morning

A Level Chemistry B (Salters)

H433/03 Practical skills in chemistry

Practical Insert

Time allowed: 1 hour 30 minutes

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INSTRUCTIONS
- Do **not** send this Insert for marking. Keep it in the centre or recycle it.

INFORMATION
- This document has **4** pages.

pH changes of solutions

A group of students record the pH of some solutions using a pH meter.
They then see what happens to the pH when they add water, acid and alkali to the solutions.

Requirements

The students are provided with the following, along with standard laboratory apparatus:

- stock solutions of the following:
  - propanoic acid 0.50 mol dm^{-3}
  - sodium propanoate 0.50 mol dm^{-3}
  - sodium hydroxide 0.050 mol dm^{-3}
  - hydrochloric acid 0.050 mol dm^{-3}.
- solid sodium propanoate
- distilled water
- pH meter
- electronic balance
- 100 cm^3 beakers.

Method

Set up three beakers, each containing 30 cm^3 of one of the solutions **A**, **B** and **C** shown below.

A 0.50 mol dm^{-3} propanoic acid solution, $C_2H_5COOH(aq)$
B 0.50 mol dm^{-3} sodium propanoate solution, $C_2H_5COONa(aq)$
C 0.50 mol dm^{-3} propanoic acid solution with 2.4 g of sodium propanoate dissolved in it.

- Gently place the pH meter into each solution in turn to measure the starting pH.
  Wash the pH meter with distilled water each time before placing it in the different solutions.
- Record the pH of each solution on addition of 20 cm^3 of water.
- Take 30 cm^3 of solution **A** and add 20 cm^3 of 0.050 mol dm^{-3} hydrochloric acid.
  Measure the pH.
- Take 30 cm^3 of solution **A** and add 20 cm^3 of 0.050 mol dm^{-3} sodium hydroxide.
  Measure the pH.
- Repeat the last two bullet points for solutions **B** and **C**.
- Record your results in the table.

The students' results are shown in the table on the next page.

Results table

	Starting pH	pH after the addition of water, acid or alkali		
Solution (volume used – 30 cm^3)		**+ 20 cm^3 water**	**+ 20 cm^3 0.050 mol dm^{-3} HCl(aq)**	**+ 20 cm^3 0.050 mol dm^{-3} NaOH(aq)**
A 0.50 mol dm^{-3} propanoic acid solution, $C_2H_5COOH(aq)$	2.5	2.7	1.7	3.7
B 0.50 mol dm^{-3} sodium propanoate solution, $C_2H_5COONa(aq)$	9.3	9.2	6.0	12.5
C 0.50 mol dm^{-3} solution of propanoic acid with 2.4 g of sodium propanoate dissolved in it.	5.1	5.1	5.1	5.2