# PRACTICAL TEST

You are provided with the following:
**BA1**, which is a 2 M hydrochloric acid solution.
**BA2**, which is a 2 M solution of alkali **W**.
BA3, which is a 2 M solution of alkali **Z**.

You are required to compare the enthalpies of neutralisation of alkali **W** and alkali **Z** with hydrochloric acid.

**Procedure**:

(a) Using a measuring cylinder, transfer 20.0 $cm^3$ of solution **BA2** into a plastic beaker/cup.

(b) Measure and record its temperature in the space provided in the table below, when volume of **BA1**=0.00 $cm^3$.

(c) Using a burette, transfer 5.00 $cm^3$ of solution **BA1** into each of the six (6) test-tubes.

(d) To solution **BA2** in the beaker or cup, add solution **BA1** from one of the test-tubes, quickly stir the mixture with the thermometer, read and record the maximum temperature attained by the mixture.
Immediately continue the addition of **BA1** from the remaining test-tubes, one at a time, each time stirring with the thermometer and recording the maximum temperature attained by the mixture.

(e) Record your results in the table below.

(f) Repeat the procedure from (a) to (e) with **BA3**. (6 ½ marks)

| Volume of BA1 ($cm^3$) | Maximum temperature attained by mixture ($^oC$) | |
|---|---|---|
| | Mixture of BA1 and BA2 | Mixture of BA1 and BA3) |
| 0.00 | | |
| 5.00 | | |
| 10.00 | | |
| 15.00 | | |
| 20.00 | | |
| 25.00 | | |
| 30.00 | | |

**Questions.**

(a) Plot on the same axes, graphs of maximum temperature attained by mixture (vertical axis) against volume of **BA1** (horizontal axis) (6 ½ marks)

(b) Using the graphs you have plotted, determine the highest temperature for the reaction between hydrochloric acid and

(i) **W**. ……

(ii) **Z**. ……

(c) Determine the maximum temperature change for each of the reactions. (1 mark)

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(d) Which one of the alkali **W** and **Z** has a higher enthalpy of neutralisation with hydrochloric acid? (1/2 mark)

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(e) Give a reason for your answer in (d). (1 ½ mark)

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End