Candidate Name	Centre Number	Candidate Number

ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Ordinary Level

COMBINED SCIENCE 4003/3

PAPER 3 (Practical Test)

JUNE 2020 SESSION 1 hour 30 minutes

Candidates answer on the question paper

Additional materials:
As listed in instructions to Supervisors
Calculator (optional)

INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **both** questions.

Write your answers in the spaces provided on the question paper.

Use a sharp pencil for your drawings. Coloured pencils or crayons should not be used.

You should record all experimental results and show the essential steps in any calculation in the spaces provided in the question paper.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.

FOR EXAMINER USE	
1	
2	
TOTAL	

This question paper consists of 5 printed pages and 3 blank pages.

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1. You are required to determine the temperature change when an acid reacts with an alkali.
You are provided with dilute hydrochloric acid (HC*l*), sodium hydroxide solution (NaOH), a thermometer, a measuring cylinder and a plastic cup.

(a) Measure 25.0 cm^3 of dilute hydrochloric acid and place it in the plastic cup.

Measure the initial temperature of the hydrochloric acid and record it in **Table 1.1**.

Rinse the thermometer and the measuring cylinder thoroughly with water.
Measure 25.0 cm^3 of the sodium hydroxide solution.

Measure the initial temperature of the sodium hydroxide solution and record it in **Table 1.1**.

Calculate the average temperature of the dilute hydrochloric acid and the sodium hydroxide solution and record it in **Table 1.1**.

NB: The average temperature of reactants

$$= \frac{\text{initial temperature of HC}l + \text{initial temperature of NaOH}}{2}$$

Pour the 25.0 cm^3 of the sodium hydroxide solution from the measuring cylinder into the dilute hydrochloric acid in the plastic cup.

Gently stir the mixture with the thermometer.
Measure the temperature of the mixture and record it in **Table 1.1**.

Table 1.1

	temperature/ $^{\circ}C$
initial temperature of the hydrochloric acid, HC*l*	
initial temperature of the sodium hydroxide solution, NaOH	
average temperature of the reactants	
temperature of mixture	
temperature change	

[12]

(b) **(i)** State, giving a reason which is supported by the experimental results, the type of reaction that occurred.

type of reaction .....

reason .....

.....

[2]

(ii) State the products of the reaction that occurred in the plastic cup.

.....

.....

[2]

(c) **(i)** State, giving a reason, **one** precaution which is to be taken during the experiment.

.....

.....

[2]

(ii) State **one** possible source of error in the experiment.

.....

.....

[1]

(iii) Give **one** way of correcting the error stated in **(ii)**.

.....

.....

[1]

2. You are required to determine the pressure exerted on a table by a brick.

You are provided with a brick labelled **A** and **B** on two faces as shown in **Fig.2.1**.

[Take the mass of the brick as 3.10 kg and gravity (g) as 10.00 N/kg]

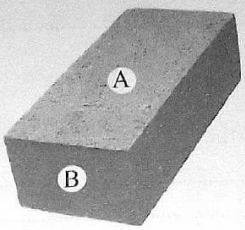


Fig.2.1

(a) **(i)** Measure, and record in **Table 2.1**, the length and width of face **A**.

Measure, and record in **Table 2.1**, the length and width of face **B**.

Convert the measurements of length and width to metres, recording them in **Table 2.1**.

Calculate the area of each face and record it in **Table 2.1**.

Table 2.1

brick face	length /cm	length/m	width/cm	width/m	area/m^2
A					
B					

[10]

(ii) Calculate the weight of the brick.

[2]

(iii) Calculate the pressure exerted on the table by

1. face **A**,

2. face **B**.

[4]

(iv) Deduce a relationship between surface area and pressure from the calculations in a(iii).

.....

.....

[1]

(v) State and explain the effect, on pressure, of using a brick of mass 6.20 kg but which has the same length, width and height as the brick used in this experiment.

effect .....

.....

explanation .....

.....

[2]

(b) State **one** source of error which may be encountered in the experiment.

.....

.....

[1]