EXAMINATIONS COUNCIL OF SWAZILAND
Swaziland General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

PHYSICAL SCIENCE **6888/04**

Paper 4 Alternative to Practical **October/November 2018**

1 hour

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams, graphs or rough working.
Do **not** use staples, paper clips, highlighters, glue or correction fluid.
Do **not** write in any barcodes.

Answer **all** questions.

You may use an electronic calculator.

You may lose marks if you do not show your working or if you do not use appropriate units.
The number of marks is given in brackets [ ] at the end of each question or part question.

For Examiner's Use	
1	
2	
Total	

This document consists of **8** printed pages.

[Turn over

1 A student is provided with a white mixture of two solids.

One solid is soluble in water while the other one is insoluble.

She adds about 10 cm^3 of water to the mixture and stirs for a few minutes.

She then separates the insoluble solid from the solution.

(a) Describe the method she uses to separate the insoluble solid from the solution.

.....

.....

..... [2]

(b) She now pours 5 cm^3 of this solution into a test-tube.

She acidifies the solution with dilute nitric acid.

She then adds about 4 drops of aqueous silver nitrate.

A positive result for a chloride ion is observed.

(i) State the observation she makes.

.....

..... [1]

(ii) Explain why she uses dilute nitric acid to acidify the solution.

.....

..... [2]

(c) The student then pours about 2 cm^3 of the acidified solution into a clean test-tube.

She adds about 1 cm^3 of aqueous sodium hydroxide.

She then puts a small strip of aluminium foil into the test-tube and gently heats the solution while holding a damp strip of Universal indicator paper at the mouth of the test-tube.

An alkaline gas is produced.

(i) State the observation she makes on the indicator paper and suggest the pH of the gas formed.

observation.....

pH..... [2]

(ii) Describe how she determines the value of the pH using the Universal indicator paper.

.....

.....

..... [1]

(iii) Identify the gas produced.

..... [1]

(iv) Explain why the student uses the Universal indicator instead of litmus paper to find the pH of the gas.

.....

..... [2]

(v) Explain why the student uses a clean test-tube in the experiment.

.....

..... [1]

[Turn over

(d) The student then takes some of the original insoluble solid and puts it in a test-tube.

She then adds about 5 cm^3 of hydrochloric acid to the insoluble solid.

She observes bubbles being produced.

(i) State the conclusion she makes from this observation.

.....

..... [1]

(ii) Suggest **two** ways of making this reaction faster.

1 .....

2 ..... [2]

(iii) Describe a test she can carry out to show the presence of calcium ions in the solution formed.

test .....

result .....

..... [3]

(iv) State **one** precaution she should take when handling acids.

..... [1]

(e) Suggest the name of the insoluble solid in **(d)**.

..... [1]

2 A student compares the rate of cooling of water in two conical flasks.

Conical flask **A** is not insulated and conical flask **B** is insulated, with paper wipes.

The student pours 200 cm^3 of hot water into both conical flasks.

She closes each conical flask with a stopper fitted with a thermometer.

Fig. 2.1 shows the set up for the experiment.

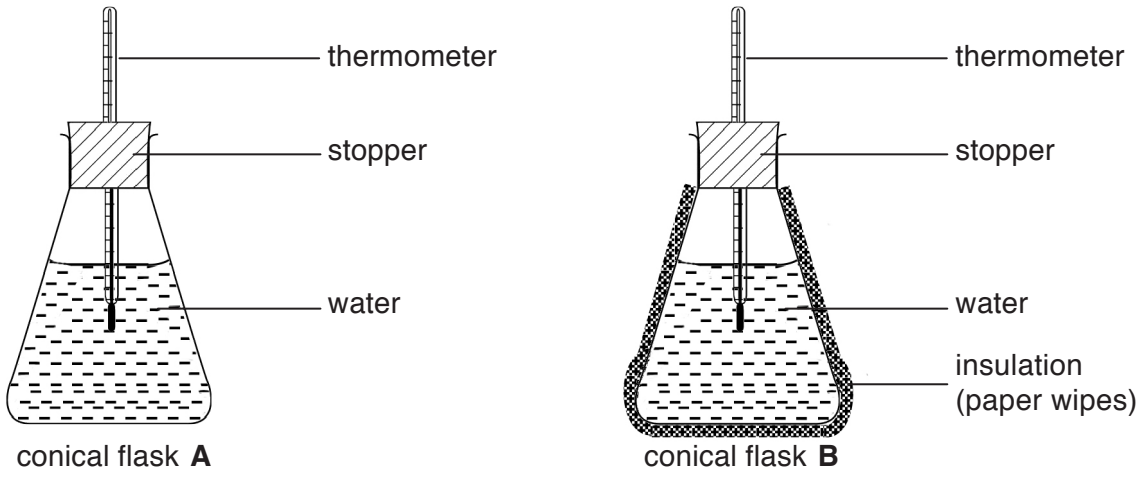

Fig. 2.1

The student measures the initial temperature of the hot water in both conical flasks for time, t = 0 seconds.

Fig. 2.2 shows the reading of the initial temperature of the water in both conical flasks.

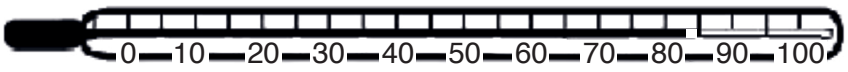

Fig. 2.2

The student starts a stopwatch immediately after recording the initial temperature and records the temperatures as shown in Table 2.1.

Table 2.1

time/seconds	conical flask **A**	conical flask **B**
	temperature/.....	temperature/.....
0		
60	74	78
120	60	67
180	48	58
240	36	50
300	25	40

(a) Complete Table 2.1 by stating the unit of temperature and the temperature in both flasks at t = 0 seconds. [2]

(b) Plot the data from Table 2.1 on the grid in Fig. 2.3.

Draw and label the lines of best fit for both conical flasks.

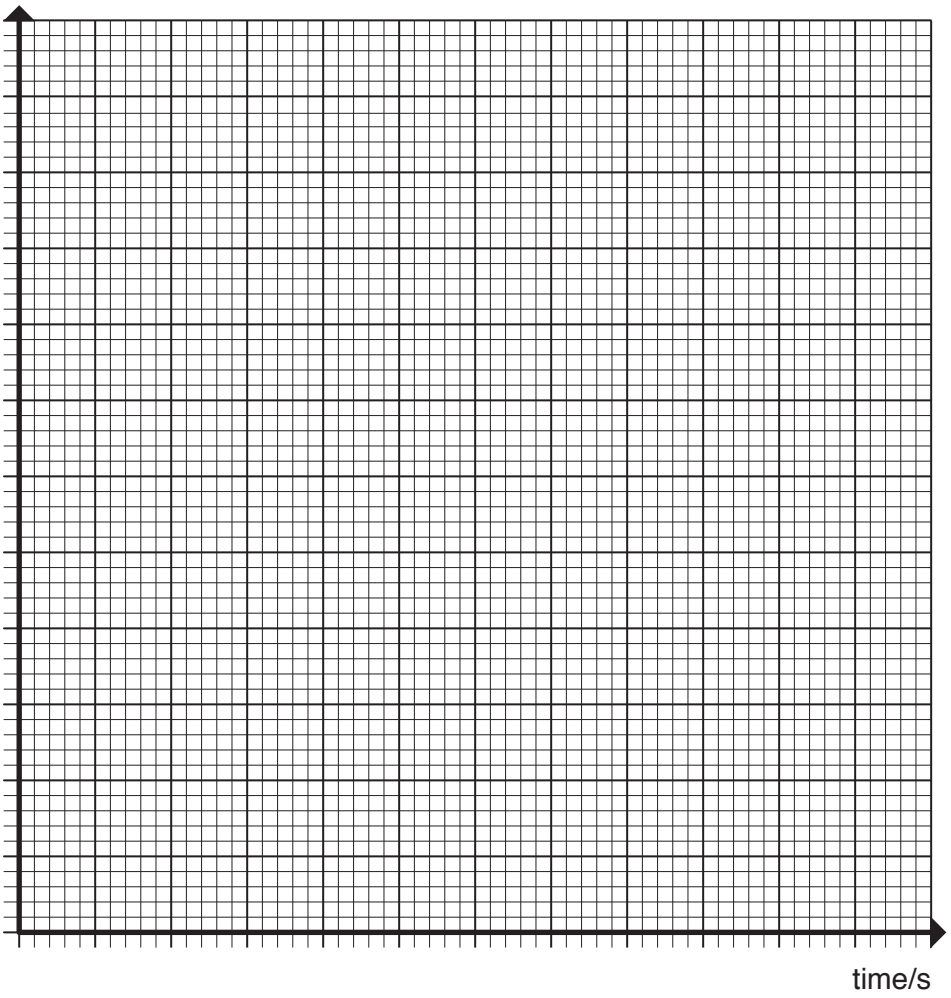

Fig. 2.3

(c) Calculate the gradient of

(i) graph **A**,

..... [2]

(ii) graph **B**.

..... [1]

(d) State and explain, using your values in **(c)**, which conical flask has a lower cooling rate.

.....

.....

..... [1]

(e) **(i)** State the effect of insulating flask **B**.

..... [1]

(ii) Describe how the insulation works in **(e)(i)**.

.....

.....

..... [2]

(f) **(i)** Explain, using your graph in **(b)**, why the cooling rate of water can be said to be linear in the given time interval.

.....

.....

..... [2]

(ii) State **two** conditions that are kept constant in order to get reliable results in this experiment.

1 .....

2 ..... [2]

(g) Calculate the time difference between the two flasks cooling to 70 °C.

..... [2]