

NAME:	SCIENCE TEACHER: (circle code)	9C
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SCIENCE

Year 9 Examination 2013

9C – 40 marks

Make sure that you have answered all the questions in paper 9B before you start this paper.

Time allowed for both examinations: 2 hours

Answer all questions in the spaces provided on the paper.

Show all your working in calculations.

Give units for all answers (eg kg or m) unless they are already provided.

Check you have pages 1-15.

For Teacher Use

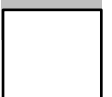
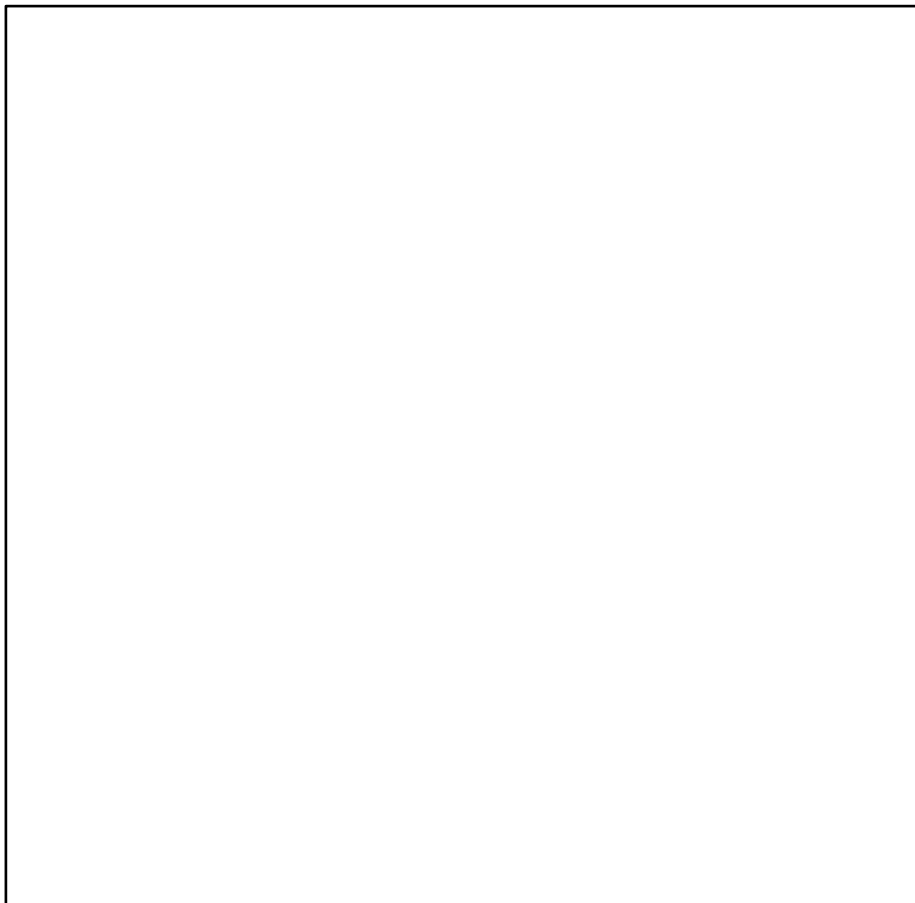
<i>Question</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>Total</i>
<i>Marks gained</i>								
<i>Marks available</i>	<i>5</i>	<i>5</i>	<i>6</i>	<i>6</i>	<i>6</i>	<i>6</i>	<i>6</i>	<i>40</i>

Question One: [5 marks]



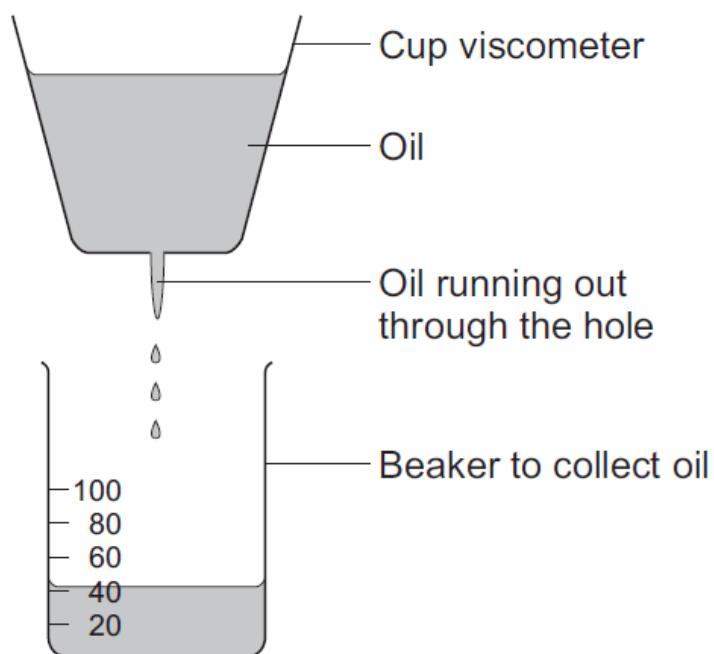
Make a scientific diagram (2D) of the apparatus needed to boil a beaker of water.

Label your diagram.



Question Two: [5 marks]

A student did an experiment to study the “thickness” (viscosity) of car engine oil. The student used the apparatus shown in the diagram below.



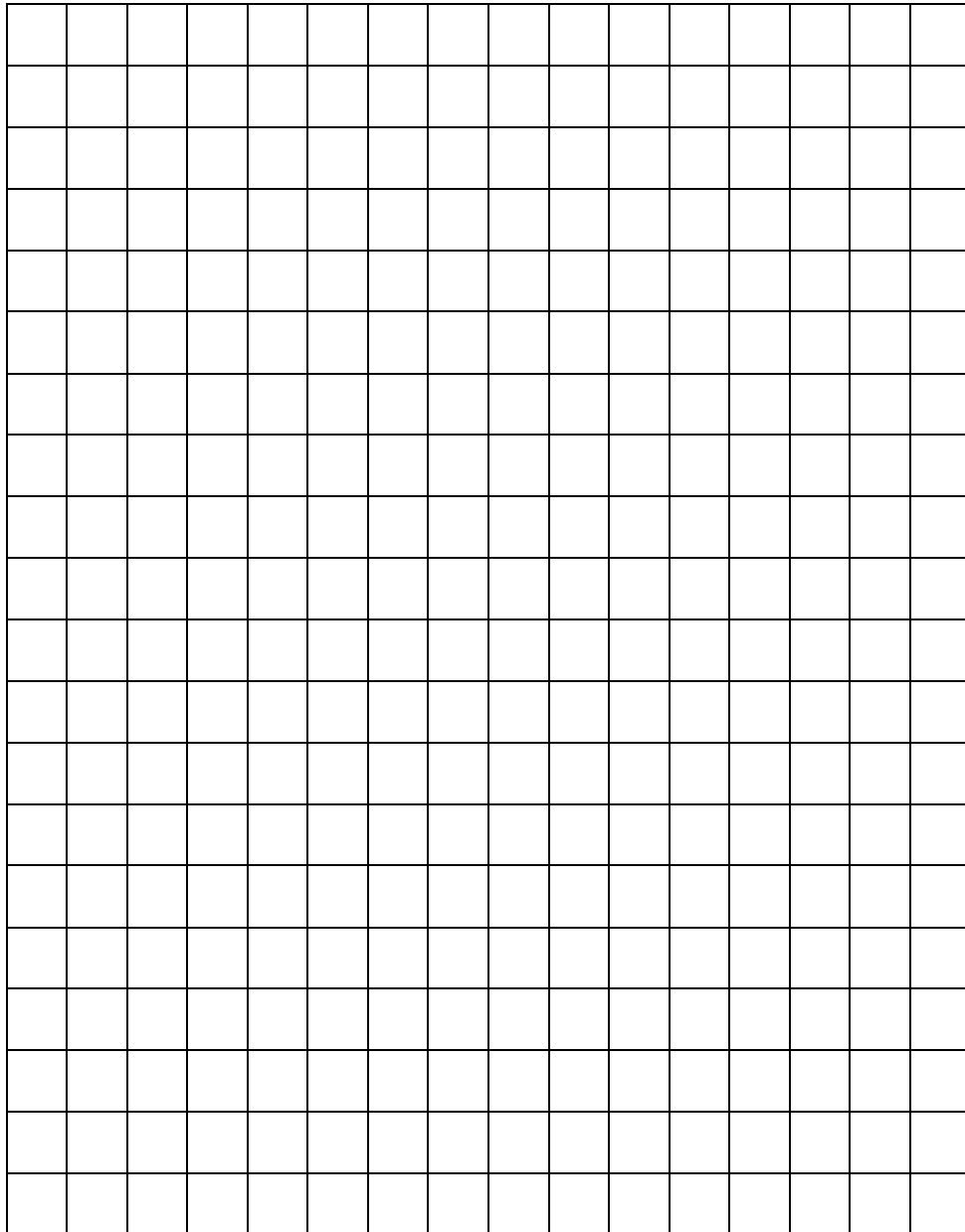
The student used the following method:

1. Pour the oil into the cup viscometer.
2. Measure the time taken for 100 mL of the oil to go through the cup viscometer.
3. Repeat the experiment with the same volume of oil at different temperatures.

The student's results are shown in the table.

Temperature of oil ($^{\circ}\text{C}$)	Time for oil to go through the viscometer (s)
20	91
30	62
40	41
50	25
60	16
70	11

- (a) Use the data in the table to draw a line graph. Draw a line of best fit through the points.



(b) Estimate how long would it take for the oil to go through the viscometer at 35°C?

(c) Describe the pattern shown on the graph.

(d) The student did the experiment again, using a more viscous (thicker) oil. **On your graph,** sketch the results you would expect the student to get using the more viscous oil.



Question Three [6 marks]

A food chain shows the energy flow in an ecosystem.

grass → wildebeest → cheetah



- (a) There are fewer cheetahs than wildebeest.
Use ideas of energy flow in food chains to explain why.

- (b) What type of organisms, important in the ecosystem, are not shown in this food chain, and why are they important?

The table shows some **marine** (sea) organisms and their diet.

Organism	Diet
Dolphin	Herring
Seal	Herring and Crab
Starfish	Mussel and Limpet
Herring	Plankton
Crab	Mussel and Limpet
Limpet	Seaweed
Seagull	Herring and Starfish
Mussel	Plankton



Question Four: [6 marks]

Bats use echo location to detect objects around them. To do this, they emit ultrasound, sound that has a frequency too high for a human to hear.

Most bats drink by flying close to the surface of a pond and taking mouthfuls of water from it.

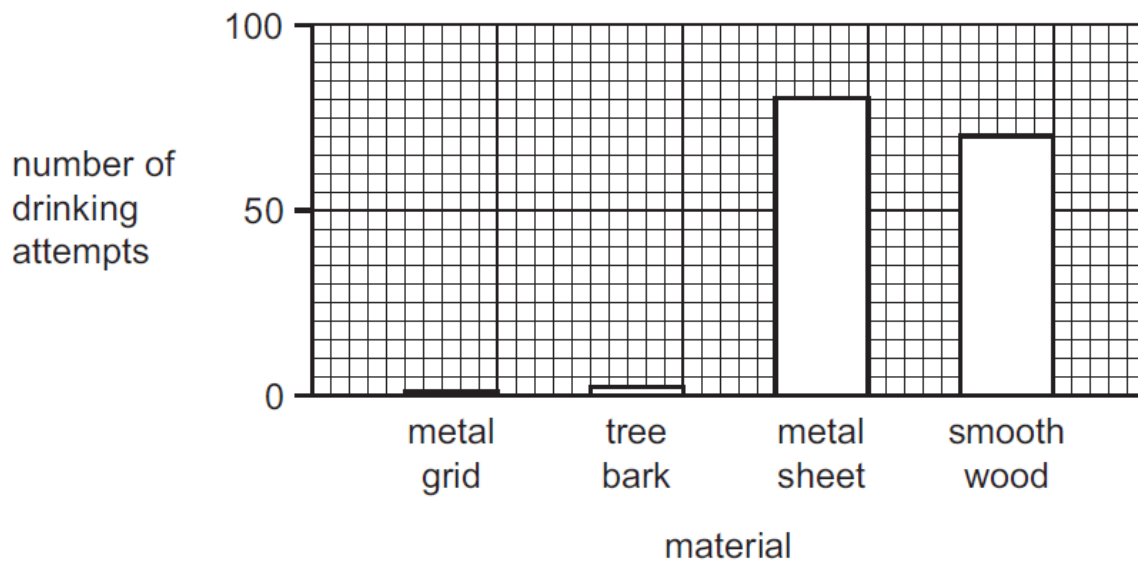


Researchers thought that bats may be able to tell where water is present because the water has a much smoother surface than the surrounding ground. They put several thirsty bats into a closed room. They placed sheets of two rough materials and two smooth materials on the floor.

rough materials	smooth materials
metal grid	metal sheet
tree bark	smooth wood

The researchers counted the number of times the bats tried to drink from the surface of each material.

Their results are shown below.



- (a) Compare the results for the rough materials and the smooth materials. What do they show?



The ultrasound waves reflect from surfaces and are detected by receptors in the bat's head. The diagram shows how ultrasound waves are reflected from a rough surface and from a smooth surface. The arrows show the direction in which the sound waves travel.



(b) Use the information in the **graph** and the **diagram** to suggest how bats detect a water surface.

Many bats feed on moths.

Tiger moths have two simple "ears". When these "ears" detect ultrasound these send nerve impulses which cause the moth to fly in rapid zig-zags.

(c) Explain how this adaptation helps the moth.



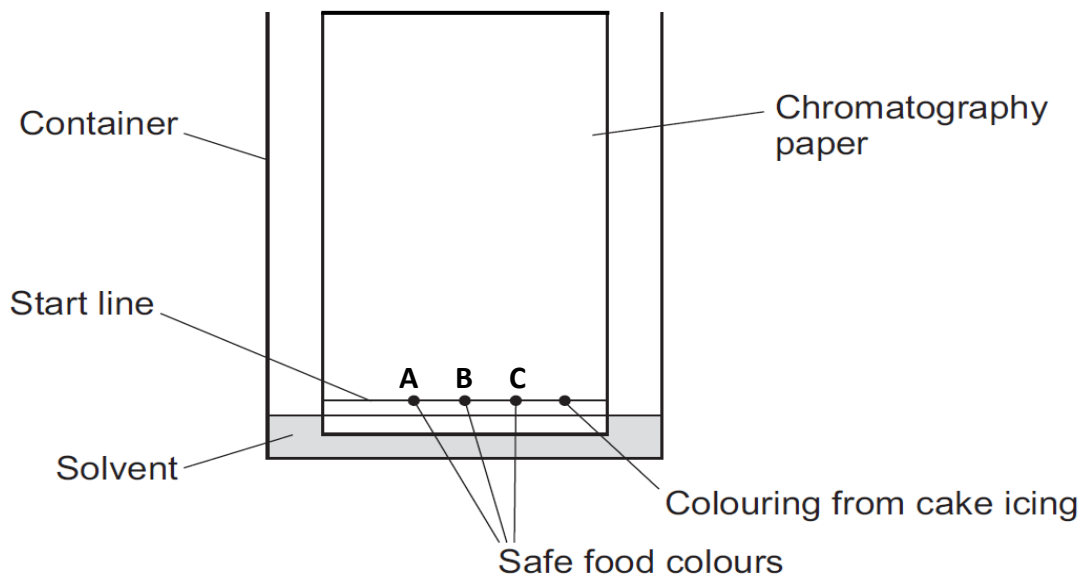
Question Five: [6 marks]

Icing on cakes is tested to check that safe colours were used when they were made.

Paper chromatography is one method of testing which colours are in cake icing.

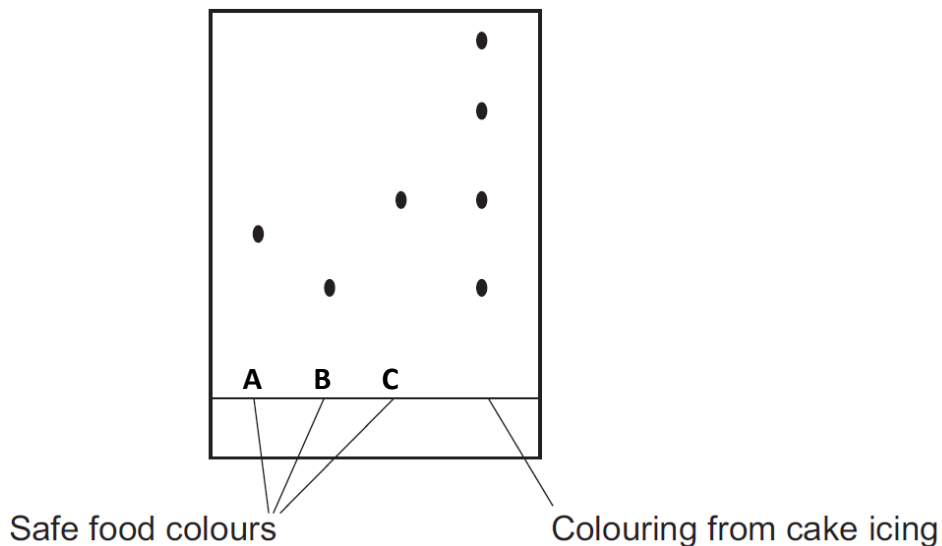


The diagram shows an experiment a student did.



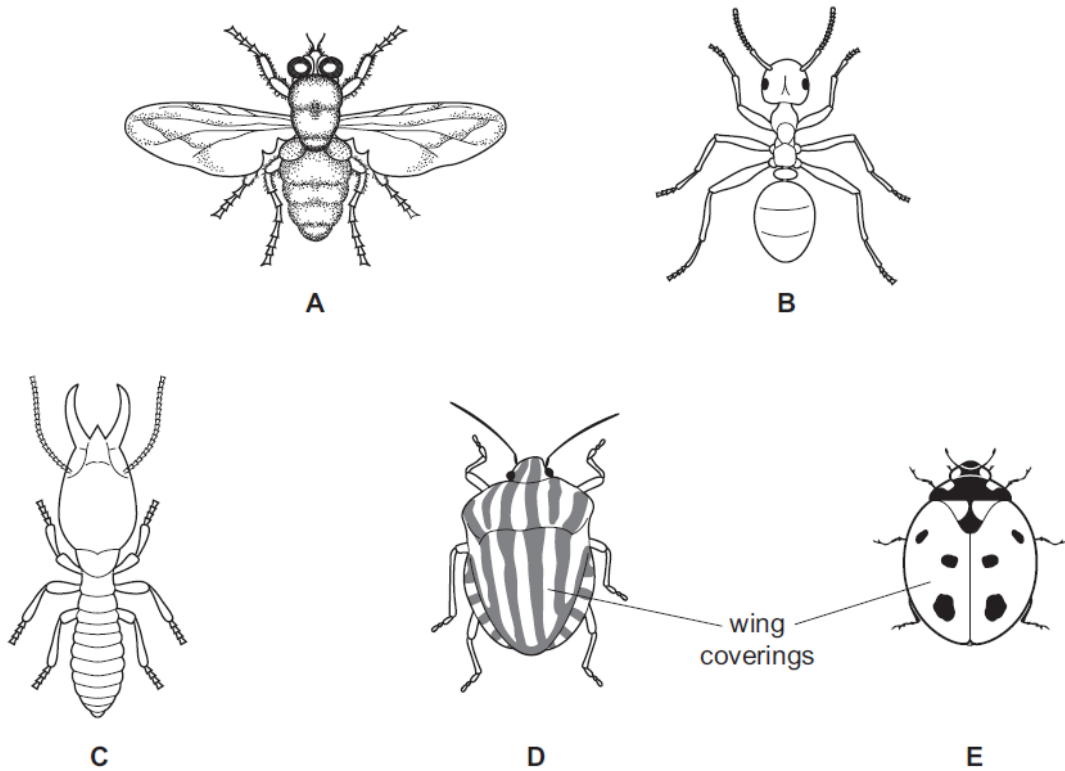
(a) Why must the start line drawn in pencil, and not using a pen?

The diagram shows the results of the paper chromatography experiment.



Question Six: [6 marks]

The diagram shows five insects.



- | | | | |
|---|---|-----------------------------------|-------------------|
| 1 | a | has wings go to 2 | |
| | b | does not have wings go to 3 | |
| 2 | a | wings are covered go to 4 | |
| | b | wings are not covered | <i>Musca</i> |
| 3 | a | head longer than front leg | <i>Termes</i> |
| | b | head shorter than front leg | <i>Formica</i> |
| 4 | a | spots on wing coverings | <i>Coccinella</i> |
| | b | striped pattern on wing coverings | <i>Graphosoma</i> |

(a) Use the key to identify each insect. Fill in the table to show how you arrived at your identifications. The first one has been done for you.

insect	1		2		3		4		name
	a	b	a	b	a	b	a	b	
A	✓			✓					<i>Musca</i>
B									
C									
D									
E									

The common name for insect A is housefly. The complete binomial (name of two parts) of the housefly is *Musca domestica*.

(b) Complete the table below that describes the classification of the fruit fly. Use the words provided.

domestica ● Family ● Insect ● Muscidae ● Phylum ● Species

Kingdom	Animalia
	Arthropoda
Class	
Order	Diptera
Genus	<i>Musca</i>

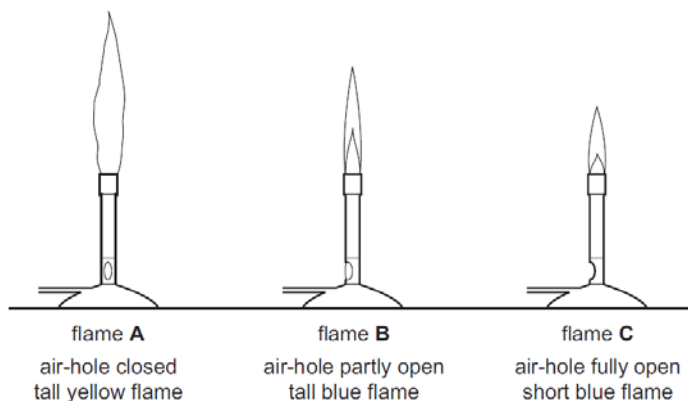
(c) Suggest why scientists may prefer to use the binomial of an insect, rather than its common name.



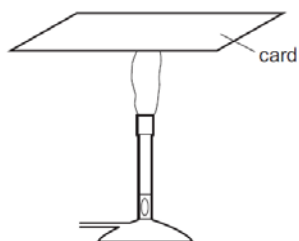
Question Seven: [6 marks]

The science class is doing experiments with Bunsen burners.

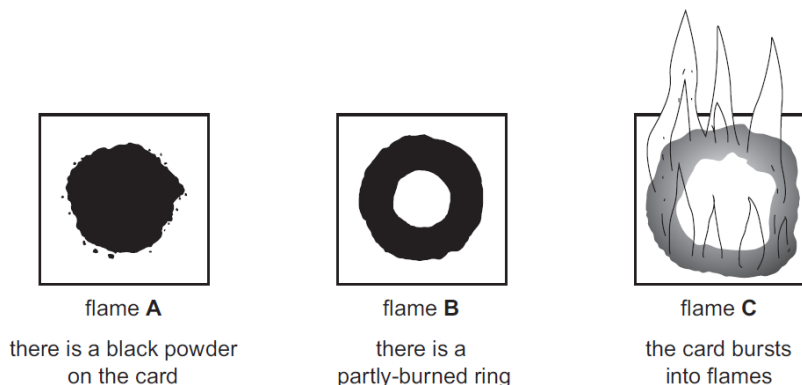
David finds out that he can get three different types of flame using his Bunsen burner.



He holds a thin white card horizontally in each flame for about 5 seconds, as shown.



The results are shown below.

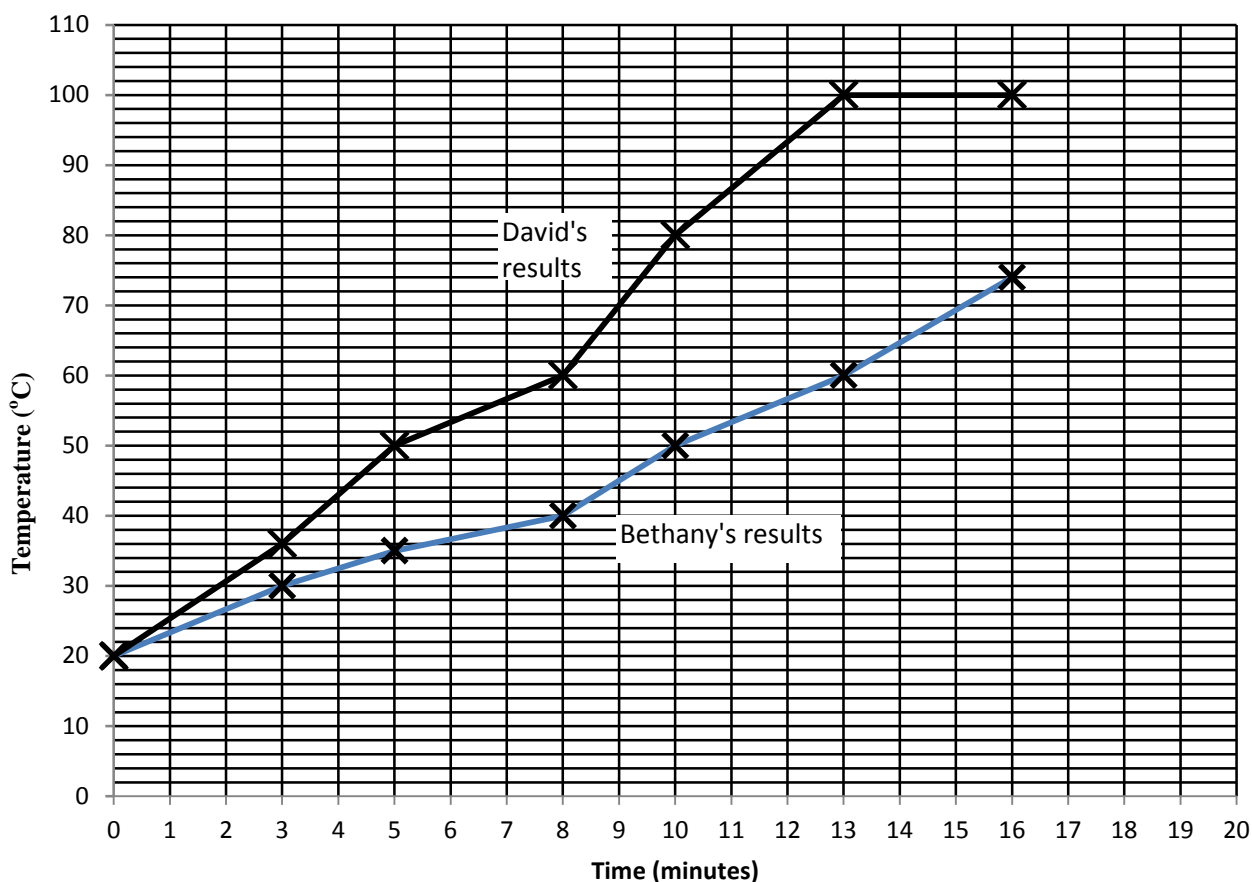


- (a) Suggest why there is a partly-burned ring with an unburned centre, on the card that was held in flame B.

- (b) The teacher asks David to explain why flame C is hotter than the other flames. Suggest why flame C is the hottest.

David and Bethany decided to test how quickly water would boil when using either the yellow flame or blue flame of the Bunsen burner.

They set up identical experiments, except that David used a blue flame and Bethany used a yellow flame. Their results are graphed below.



(c) What was the temperature of Bethany's water **when David's water boiled**?

(d) Explain how you worked out the answer to (c).

(e) Bethany quickly placed David's Bunsen burner under her beaker **at 16 minutes**. Assuming that the temperature of her beaker did not drop while swapping Bunsen burners, predict **the time** at which her water would boil. Explain how you predicted this.

END OF EXAM

