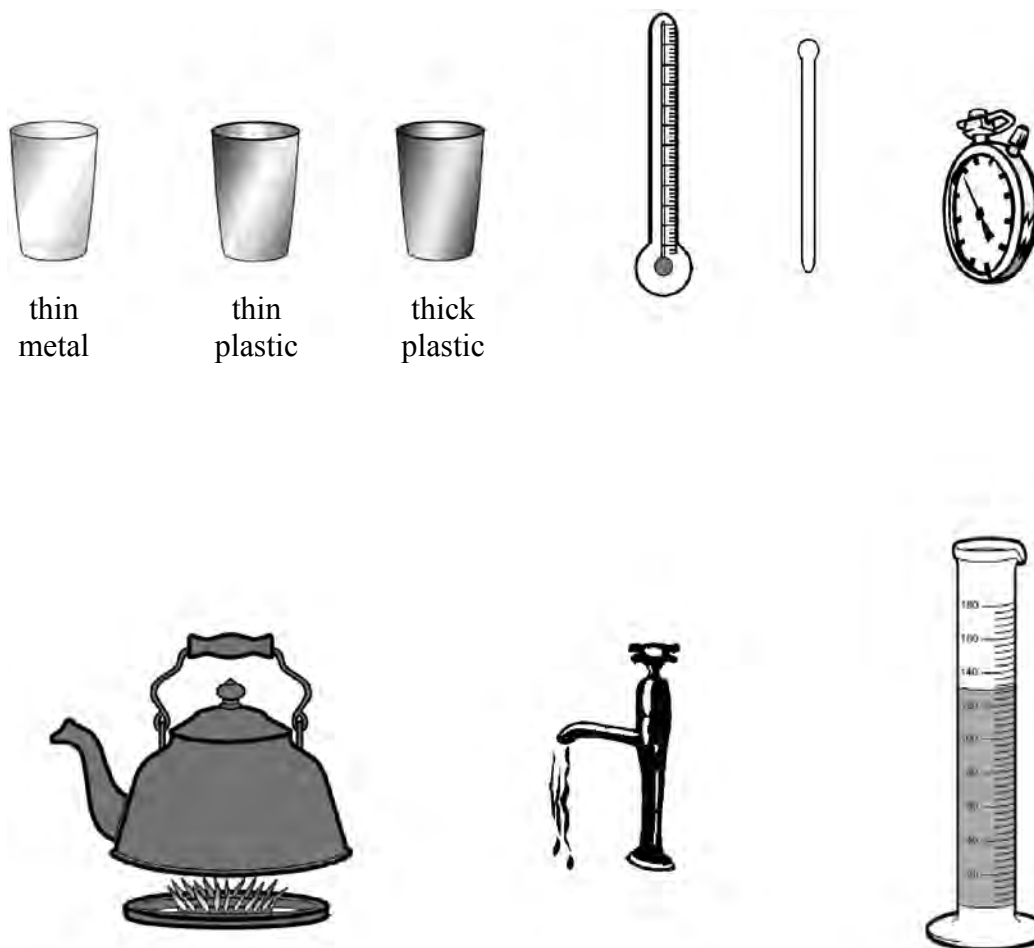


1. A student is asked to investigate the properties of three different cups. The cups are all of the same size and shape but made from different materials. These cups keep drinks hot for as long as possible.

She has the following apparatus.



- (a) Describe how the student would use the apparatus to determine which cup keeps the liquid hottest.

.....

.....

.....

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.....
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(8)

(b) List two things that she should keep constant when comparing cups in this investigation.

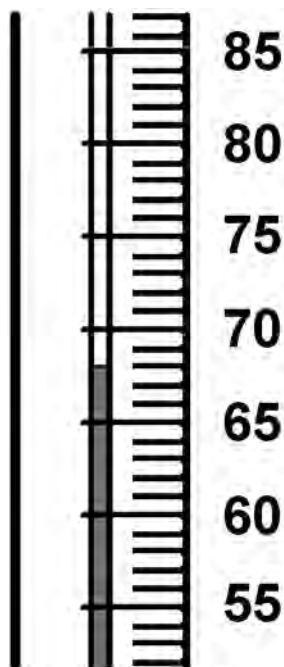
1

2

(2)

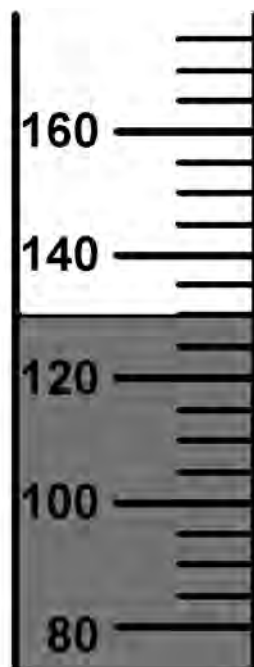
(c) During the investigation she takes readings from the measuring cylinder and the thermometer.

Record her readings.



thermometer

..... °C



measuring cylinder

..... ml

(2)



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(d) The student makes the following notes during the investigation with the three cups.

PLASTIC
32.46 °C after about half a minute

List four criticisms of her recording of data and experimental method.

- 1
- 2
- 3
- 4

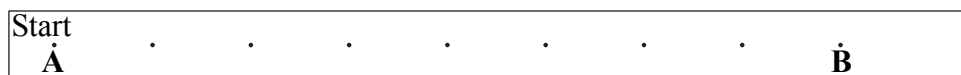
(4)

Q1

(Total 16 marks)



2. A teacher attaches a tape to a trolley. The tape passes through a ticker-timer which makes a dot on the tape every 0.020 seconds. He sets the trolley in motion. Part of the tape from the experiment is shown below.



- (a) (i) Count the number of spaces between dot **A** and dot **B**.

..... (1)

- (ii) Calculate the time, in seconds, that the trolley takes to travel the distance **AB**.

.....
 Time = s (2)

- (b) How can you tell from the tape that the trolley is travelling at constant speed?

..... (1)

- (c) Measure the distance **AB** in mm.

Distance = mm (1)

- (d) (i) Use your values of time and distance to determine the average speed of the trolley. Give your answer to an appropriate number of significant figures and include a suitable unit.

$$\text{average speed} = \frac{\text{distance}}{\text{time}}$$

.....

 Speed = (3)

- (ii) Justify the number of significant figures for your calculated value of speed.

.....

 (2)



(e) In a different experiment the student marks every tenth dot. These marked dots are shown below.



(i) Measure the smallest gap between two neighbouring dots.

Smallest gap = mm
(1)

(ii) Measure the largest gap between two neighbouring dots.

Largest gap = mm
(1)

(iii) Describe the motion represented by this tape.

.....
(1)

(f) Using a tape the student is able to determine the speed of a trolley at different times.

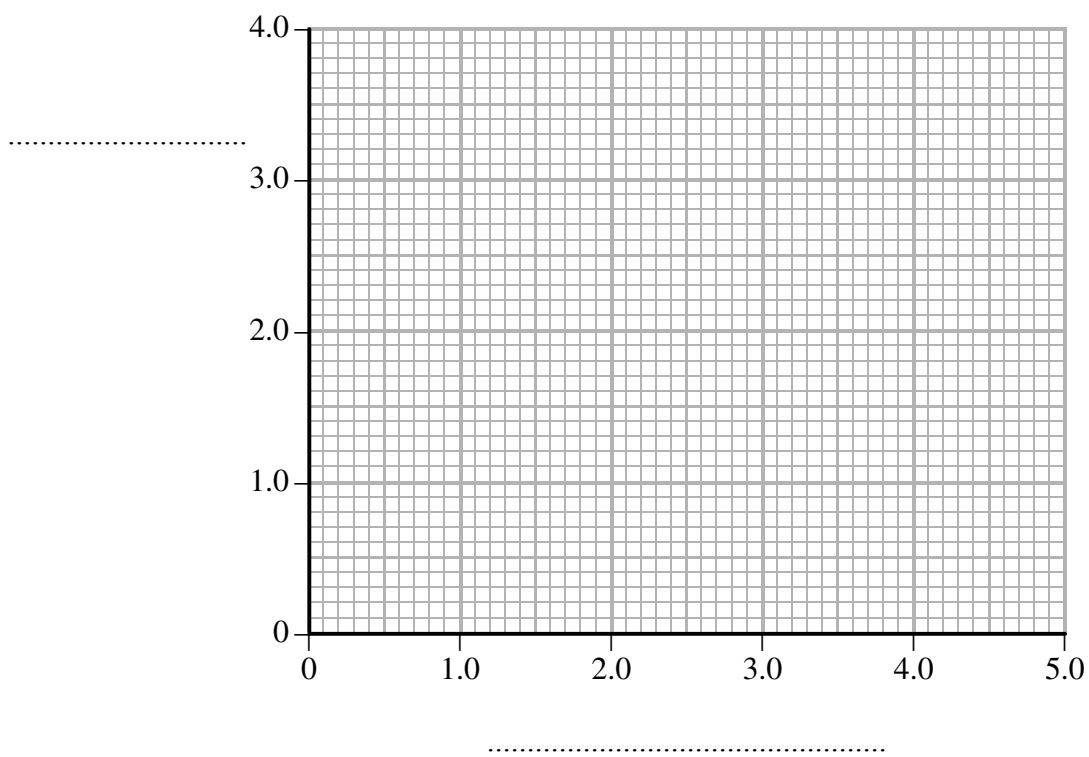
His experiment produces the following data.

Speed (m/s)	Time (s)
0.8	1.0
1.5	2.0
2.3	3.0
3.0	4.0
3.8	5.0



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- (i) On the grid, plot a graph of speed (y -axis) against time (x -axis).
Draw the best straight line through your plotted points.
Label the axes of your graph on the dotted lines.



(4)

- (ii) Give two reasons why the tape in (e) could be part of the student's experiment.

- 1
-
- 2
-

(2)

Q2

(Total 19 marks)

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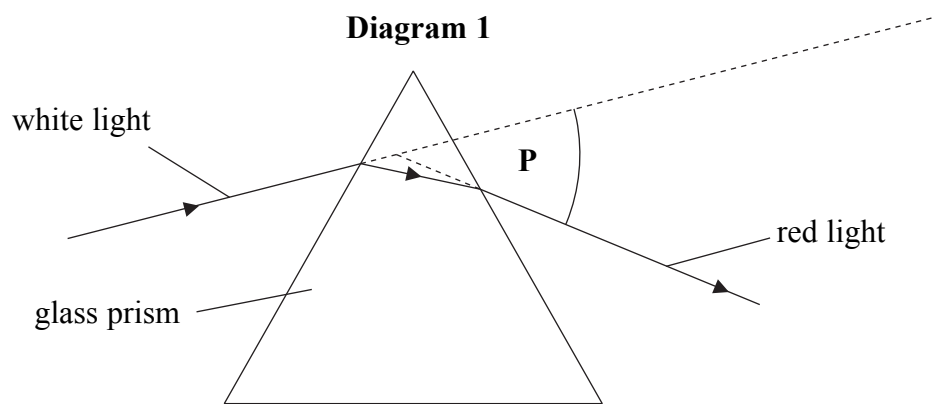
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3. On entering a glass prism, white light splits up into many colours.

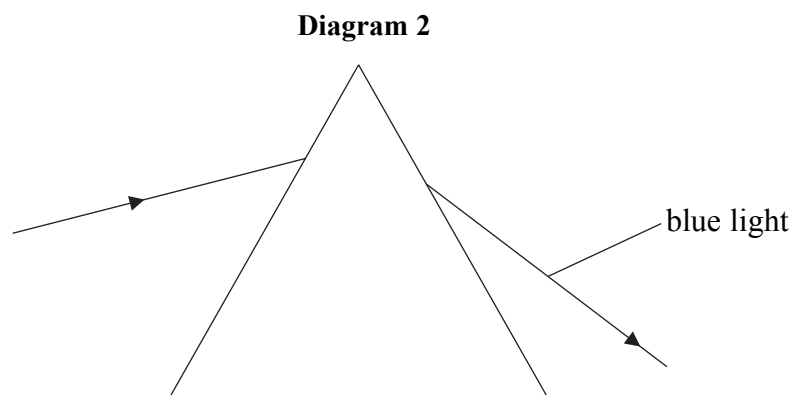
- (a) Diagram 1 shows white light entering a glass prism. The path of the red light is shown passing through the prism and emerging after refraction. The angle **P** is called the angle of deviation for red light. It is the angle between the direction of the white light entering the prism and the red light emerging from the prism.



Measure the angle **P**.

(1)

- (b) Diagram 2 shows white light entering the glass prism as before. Blue light is shown emerging from the prism.



- (i) Draw the path of the blue light as it passes through the prism.

(1)

- (ii) Draw two more lines on diagram 2 to show the angle of deviation for blue light. Label this angle **Q**.

(3)

- (iii) Measure the angle **Q**.

(1)

- (c) Suggest a value for the angle of deviation for green light.

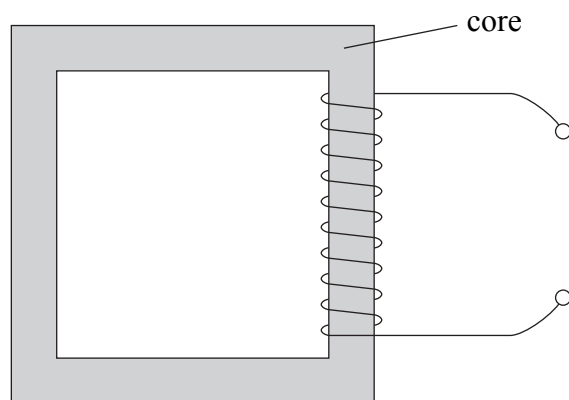
.....

(2) **Q3**

(Total 8 marks)



4. The diagram shows part of a transformer. There are 10 turns of insulated wire wrapped around the right side of the core.



- (a) Draw 5 turns of wire around the left side of the core. (1)
- (b) Below are the symbols for an alternating current (a.c.) supply and a 0–10 V a.c. voltmeter.



Add these to the diagram to represent a step-up transformer from which the output voltage can be measured. (2)

- (c) When a student uses the apparatus as a step-up transformer he gets the following readings.

Supply voltage (V)	Voltmeter reading (V)
2.4	4.8
3.7	7.4
6.2	

There is a gap in the table of readings. Explain why the student could not get a reading to fill this gap.

.....

.....

.....

(2)



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(d) Suggest two reasons why the student did not use a 240 V.a.c. supply with this equipment.

1

2

(2)

Q4

(Total 7 marks)

TOTAL FOR PAPER: 50 MARKS

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ERRATUM NOTICE

4420/3
LONDON EXAMINATIONS IGCSE
Physics
Thursday 5 May 2005 - Afternoon
Paper 3: Common to both tiers

To be issued to invigilators immediately before the examination.

Instructions to the Examinations Officer

When Paper 3 has been given to candidates please ask them to amend part (f)(ii) of question 2 which is printed on page seven.

This currently reads

- Give two reasons why the tape in (e) could be part of the student's experiment.

It should read

- Give one reason why the tape in (e) could be part of the student's experiment.