(b) A hairdryer connected to the mains supply takes a current of 5.5 A.

(i) Which of these fuses should be used with the hairdryer?

(1)

- ☒ **A** 3 A
- ☒ **B** 5 A
- ☒ **C** 7 A
- ☒ **D** 13 A

(ii) Explain your answer.

(1)

(iii) The hairdryer has a plastic case so there is no need for an earth wire connection in the plug.

Explain why the hairdryer is still safe to use.

(2)

(Total for Question 1 = 6 marks)

2 A student measures the density of water.

She uses a measuring cylinder and an electronic balance.

(a) State the equation linking density, mass and volume.

(1)

(b) A correct unit for density is

(1)

- ☒ **A** g/cm
- ☒ **B** kg/cm
- ☒ **C** g/cm^2
- ☒ **D** g/cm^3

(c) Complete the table to show what is measured by an electronic balance.

(1)

Measuring instrument	What it measures
measuring cylinder	volume
electronic balance	

(d) Describe how the student should use each instrument to make her measurements as accurate as possible.

(4)

Measuring cylinder

Electronic balance

(e) The student wants to make sure her experiment is a fair test.

(i) State **one** factor that she should keep the same throughout her experiment.

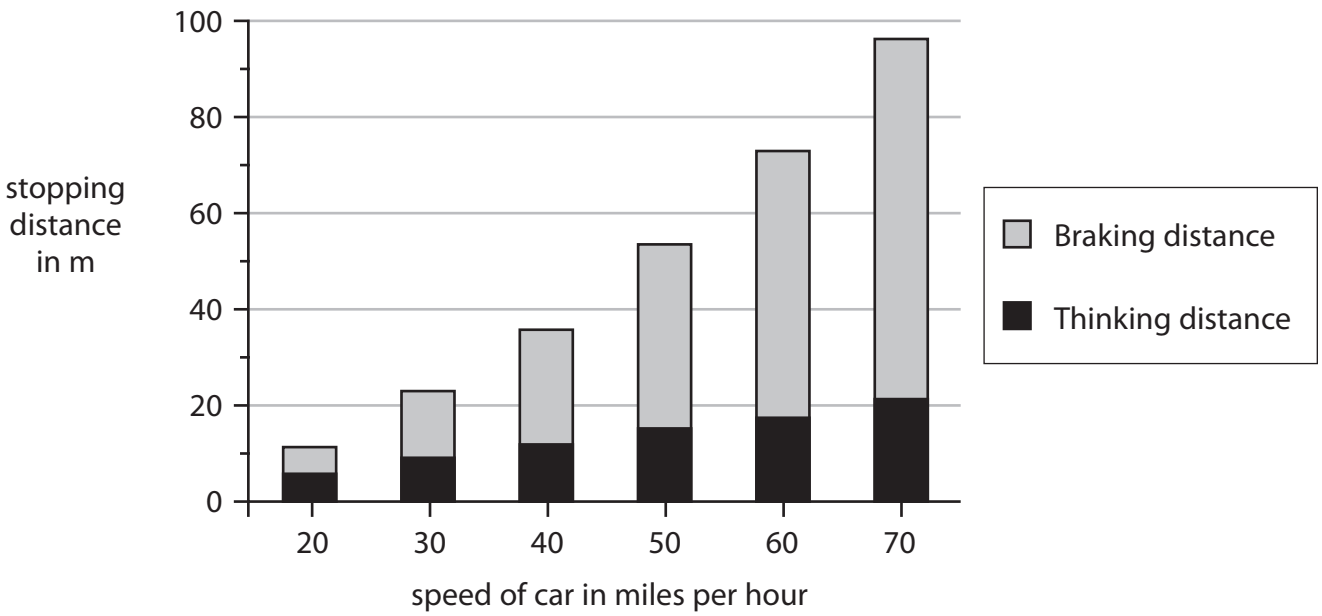
(1)

(ii) Why is it important that she keeps this factor constant?

(1)

(Total for Question 2 = 9 marks)

3 The graph shows the minimum stopping distances, in metres, for a car travelling at different speeds on a dry road.



(a) Complete the equation to show the link between stopping distance, thinking distance and braking distance.

(1)

Stopping distance = ...

(b) Describe the patterns shown in the graph.

(2)

.....

.....

.....

.....

.....

(c) Use the graph to estimate the stopping distance for a car travelling at 35 miles per hour.

(1)

Stopping distance = ... m

(d) To find the minimum stopping distance, several different cars were tested.

Suggest how the data from the different cars should be used to give the values in the graph.

(1)

(e) The tests were carried out on a dry road.

If the road is icy, describe and explain what change there would be, if any, to

(i) the thinking distance

(2)

(ii) the braking distance

(2)

(Total for Question 3 = 9 marks)

4 A student is investigating refraction of light.

(a) What is **refraction**?

(1)

.....

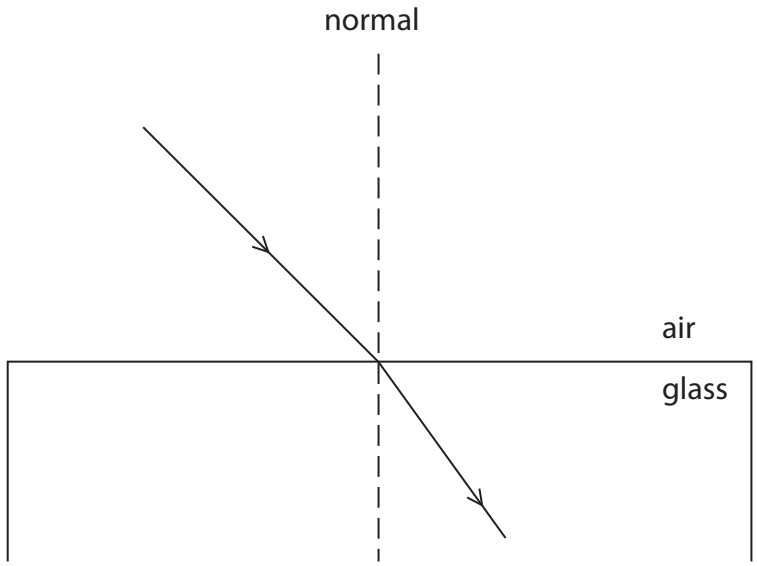
.....

.....

(b) The diagram shows a ray of light travelling from air to glass.

Add labels to show the angle of incidence, *i*, and the angle of refraction, *r*.

(2)

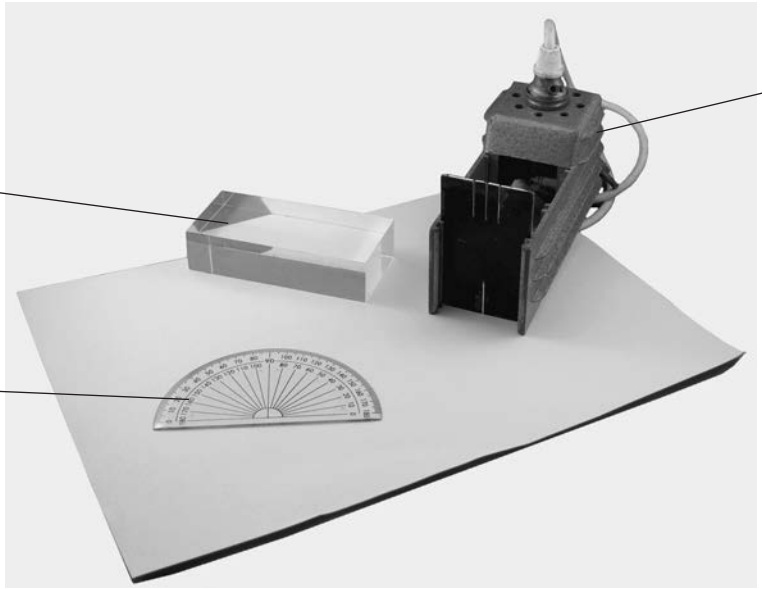


(c) The student wants to find the refractive index of the glass.

(i) State the equation linking refractive index, angle of incidence and angle of refraction.

(1)

(ii) The photograph shows the apparatus the student has available.



Describe how the student should carry out the experiment.

You should include:

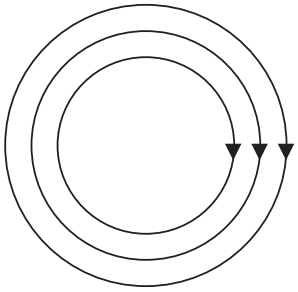
- what the student should measure
- how the measurements should be made
- how the student should use a graph to find the refractive index.

(6)

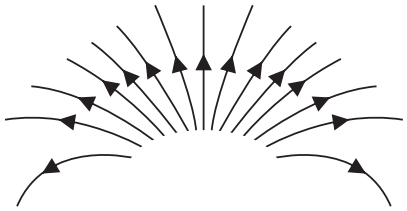
(Total for Question 4 = 10 marks)

5 A magnetic field pattern can be shown using lines.

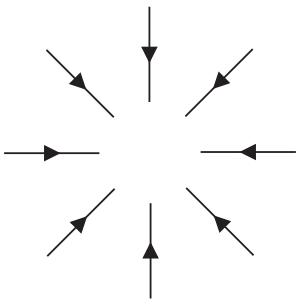
(a) The diagram shows some magnetic field patterns.



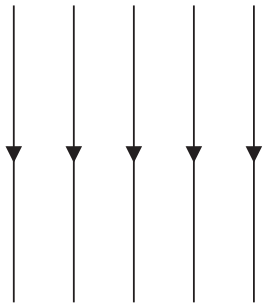
A



B



C



D

Which pattern shows a **uniform** magnetic field? Explain your answer.

(2)

Pattern .....

Explanation .....

.....

.....

(b) Explain how to produce a uniform magnetic field.

(3)

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(Total for Question 5 = 5 marks)

6 A teacher shows his class how to investigate the half-life of a radioactive source.

(a) The readings from the counter need to be corrected for background radiation.

(i) State **one** source of background radiation.

(1)

.....

(ii) Describe the method the teacher should use to correct for background radiation.

(3)

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