Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

4669960870

PHYSICS **0625/23**

Paper 2 Core **May/June 2015**

1 hour 15 minutes

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 or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.
Take the weight of 1 kg to be 10 N (i.e. acceleration of free fall = $10\,m/s^2$).

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **19** printed pages and **1** blank page.

DC (CW/CGW) 90391/2

CAMBRIDGE International Examinations

1 In the past, burning candles were used as timers.

A boy carries out an experiment to make his own timer using a burning candle.

Fig. 1.1 shows the length of the candle, and the clock he used, at the start of the experiment and at the end of the experiment.

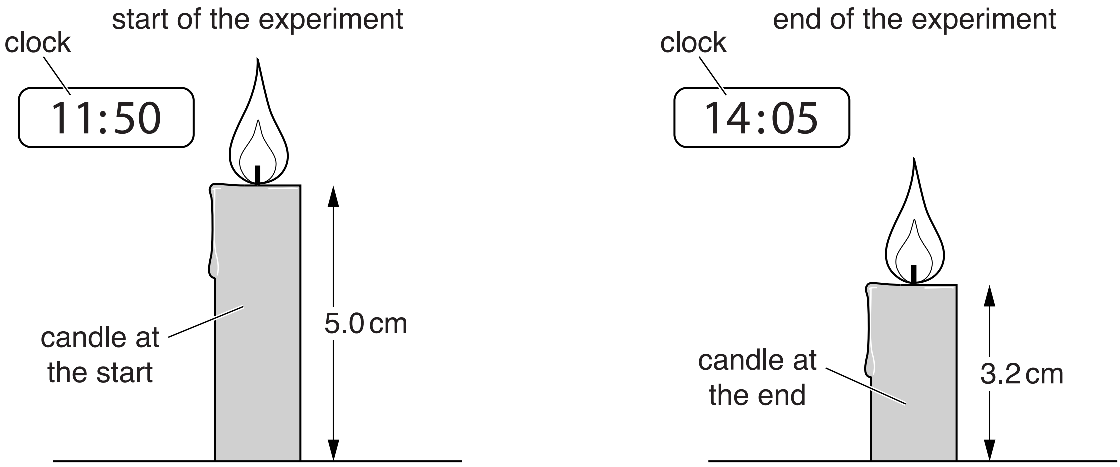


Fig. 1.1 (not to scale)

(a) The candle has a cross-sectional area of $1.6\,cm^2$.

Calculate the volume of candle at the start of the experiment.

volume = ... cm^3 [2]

(b) Use Fig. 1.1 to complete the table.

time at start of the experiment	
time at end of the experiment	
time for which the candle was burning	.... hours ....minutes = ... hours

[2]

(c) The difference in the length of the candle from the start to the end of the experiment was 1.8 cm.

Calculate the rate, in cm / hour, at which the candle burns.

rate = ... cm / hour [2]

(d) The boy estimates that he would need a candle about 24 cm long, of the same material and diameter, to make a candle timer that would last at least one day.

State whether the boy's estimate is correct. Give a reason for your answer.

....

....

....[2]

[Total: 8]

2 **(a)** A student is asked to find the density of a small block of metal, as shown in Fig. 2.1.

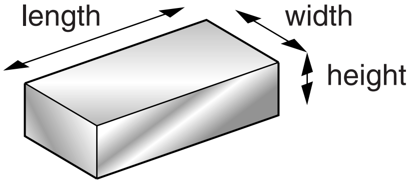


Fig. 2.1

Use words from the list below to complete the following sentences.

balance   beaker   measuring cylinder   protractor   rule   thermometer

(i) The student should use a .... to measure the length, width and height of the metal block.

(ii) The student should use a .... to find the mass of the metal block.

[2]

(b) A jeweller has a small block of metal. The block has a mass of 15.2 g and a volume of 1.36 cm^3.

(i) Calculate the density of the metal.

density = ... g/cm^3 [3]

(ii) The jeweller looks up the values for the density of various metals and produces a table, part of which is shown below.

metal	density g/cm^3
gold	19.3
lead	11.3
platinum	21.5
silver	10.5

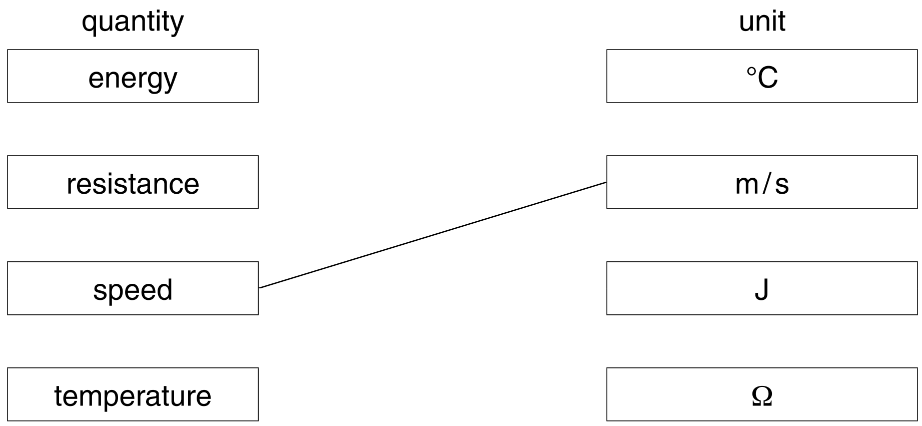
Using your answer to **(b)(i)** and the information in the table, state which metal the block is most likely to be made from.

....[1]

[Total: 6]

3 In the columns below are physical quantities and the units in which they are measured.

Draw a line from each quantity to its corresponding unit. One line is drawn for you.



[Total: 2]

4 A toy car is rolling down a slope. Fig. 4.1 shows the total forward force and the total backward force acting on the car.

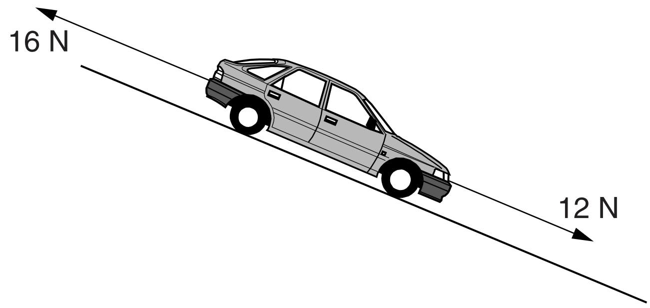


Fig. 4.1

(a) Calculate the resultant force on the car.

size of force = ... N

direction of force = ...
[2]

(b) What will be the effect of this resultant force on the car's motion?

....

....[2]

[Total: 4]

5 A girl cycles to meet a friend. The distance-time graph for her journey from start to finish is shown in Fig. 5.1.

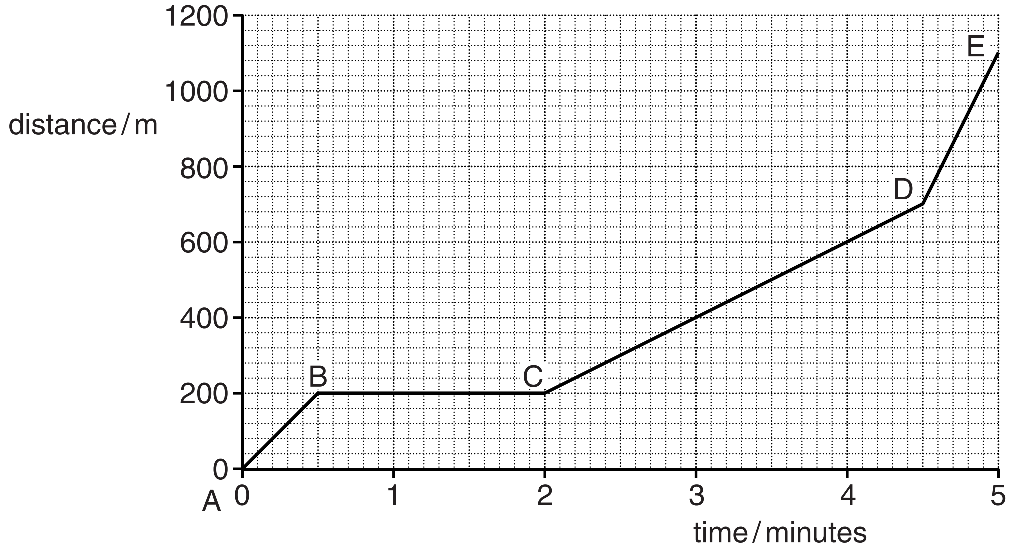


Fig. 5.1

(a) How far does the girl travel from start to finish?

distance = ...[1]

(b) Describe the motion of the girl between points B and C.

....[1]

(c) Which section of the graph shows

(i) the part of the girl's journey that involves cycling up a hill 500 m long,

between .... and .... [1]

(ii) the girl travelling at the fastest speed?

between .... and .... [1]

(d) Calculate her average speed, in m / s, for the whole journey.

average speed = ... m / s [3]

[Total: 7]

6 Different types of power station use different sources of energy.

(a) Draw one straight line from each energy source to the type of power station that uses it.

energy source	type of power station
	hydroelectric
fossil fuel	nuclear
hot rocks underground	geothermal
uranium fuel rods	coal-fired
	wind farm

[3]

(b) Fig. 6.1 shows part of a solar power station.

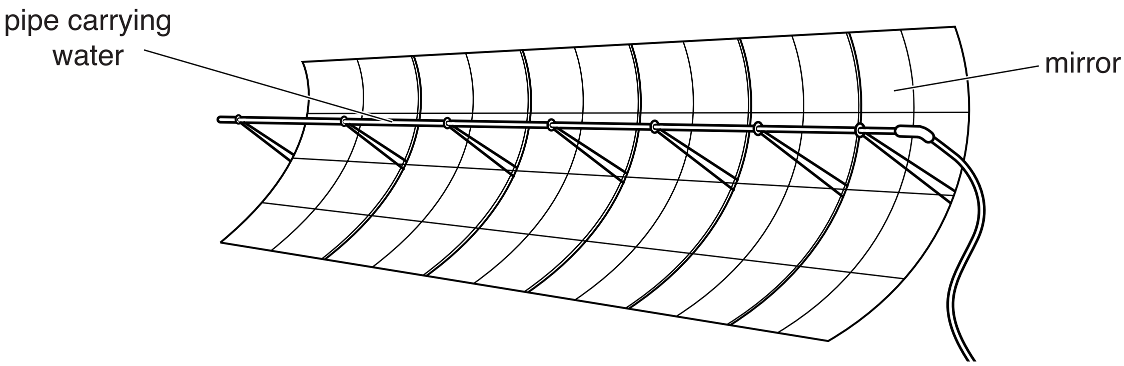


Fig. 6.1

These are some of the stages explaining how the power station works. They are not in the correct order.

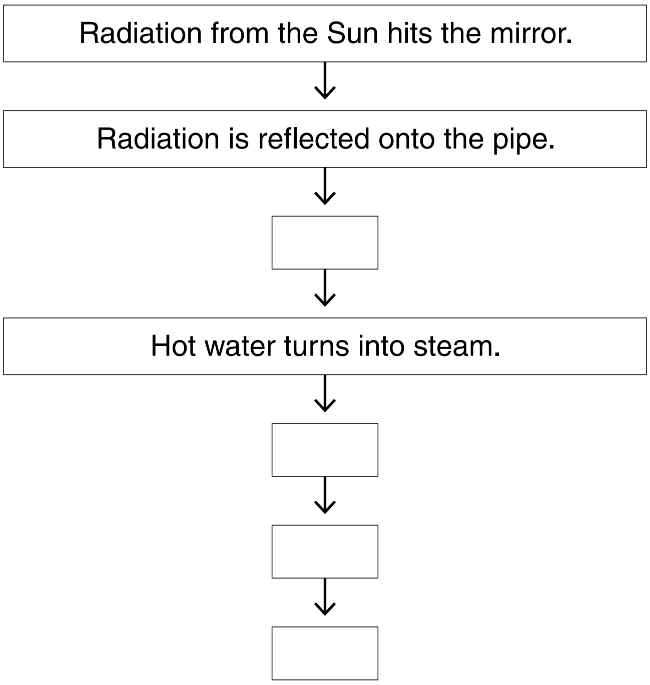
A Electricity is generated.

B The turbine turns the generator.

C Steam drives the turbine.

D Water in the pipe absorbs energy.

Use the letters A, B, C and D to complete the flow chart to explain how the power station works.



[3]

[Total: 6]

7 **(a)** The arrows on Fig. 7.1 represent four changes of state.

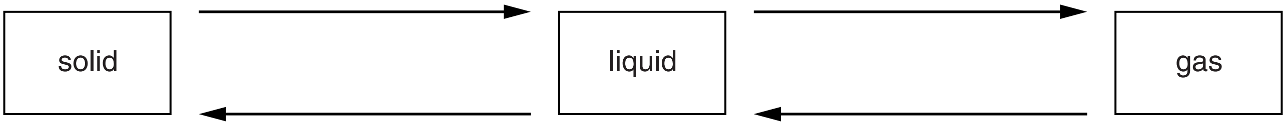


Fig. 7.1

On each arrow, write the name for the change of state. [3]

(b) The statements below are about particles in a gas.

Tick **three** boxes to show which statements are correct.

☐ The particles move randomly.

☐ The particles are in a regular repeating pattern.

☐ The particles are much further apart than they are in a solid.

☐ The particles vibrate about fixed positions.

☐ The particles expand when they are heated.

☐ The particles move faster when they are heated.

[3]

(c) A student spills a small amount of nail varnish remover on one of her hands. Nail varnish remover is a liquid with a low boiling point.

Explain why this hand feels colder than her other hand.

....

....

....

....[3]

[Total: 9]

8 A student looks into a vertical mirror to see the reflection of a burning candle.

Fig. 8.1 shows one ray of light being reflected by the mirror.

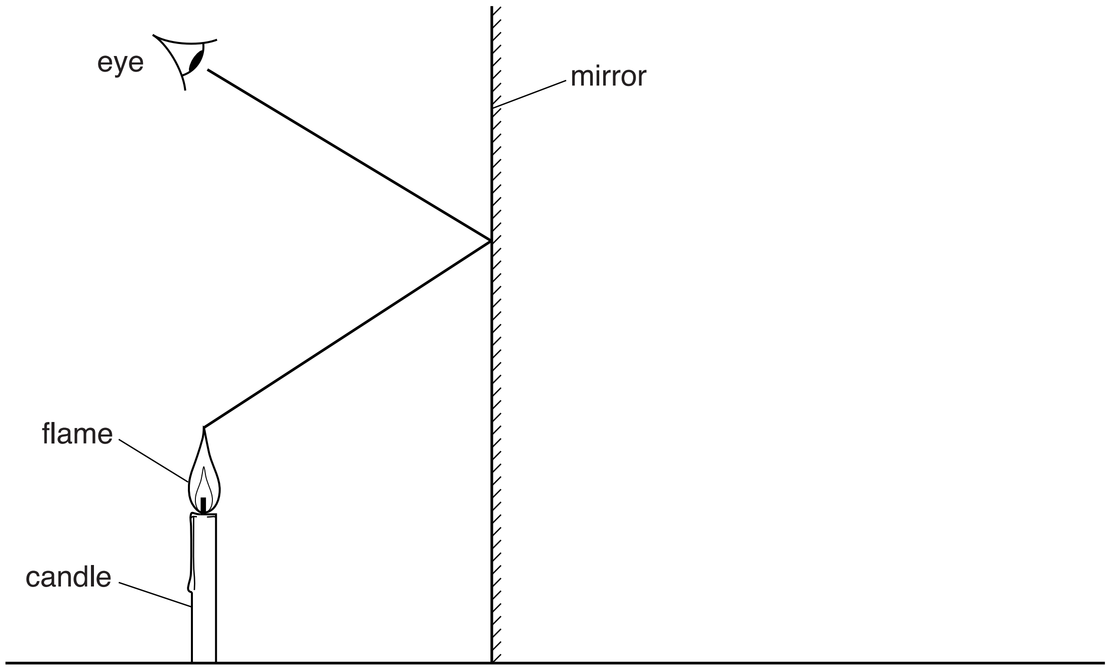


Fig. 8.1

(a) On the ray in Fig. 8.1, mark arrows to indicate the direction of travel of the light. [1]

(b) On Fig. 8.1, carefully mark the position of the image of the candle flame. [2]

(c) The candle is moved further from the mirror.

State what, if anything, happens to

(i) the position of the image

....

(ii) the size of the image.

....
[2]

[Total: 5]

9 **(a)** Fig. 9.1 represents a wave in a water tank. Five distances are shown, labelled A, B, C, D and E.

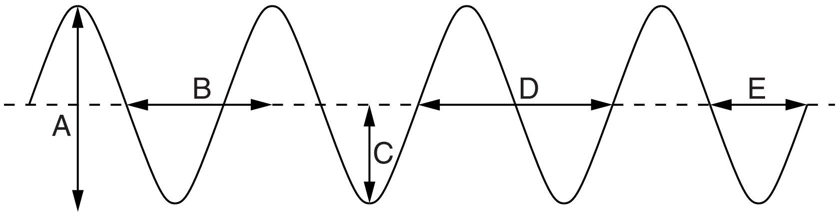


Fig. 9.1

(i) **1.** Which property of the wave is represented by distance C?

....[1]

2. Which of the labelled distances represents the wavelength of the wave?

....[1]

(ii) Water waves are transverse waves.

State another example of a transverse wave.

....[1]

(iii) The speed of the wavefronts is 7.5 cm / s.

Calculate the distance moved by a wavefront in 4.0 s.

distance = ... cm [2]

(b) Fig. 9.2 shows, from above, a wave travelling on water.

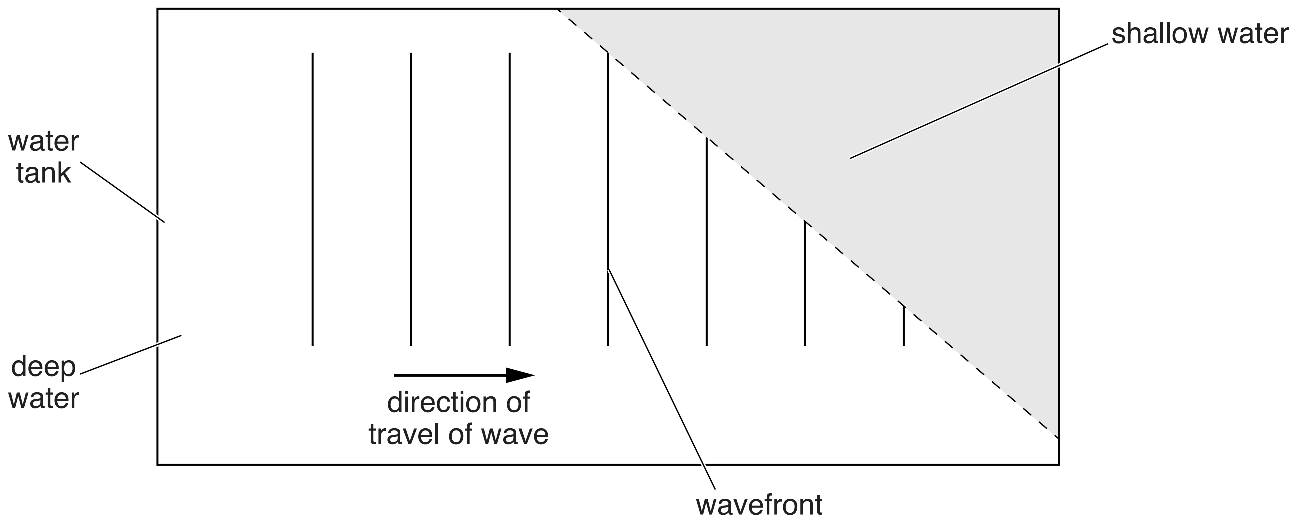


Fig. 9.2

The wave has reached an area of shallow water, where it travels more slowly.

(i) Complete the diagram to show the wavefronts in the shallow water. [3]

(ii) State the term used to describe what happens to the wave as it enters the shallow water.

....[1]

[Total: 9]

10 A student is investigating static electricity.

(i) The student charges a plastic rod by rubbing it with a dry cloth. The rod becomes positively charged as shown in Fig. 10.1.

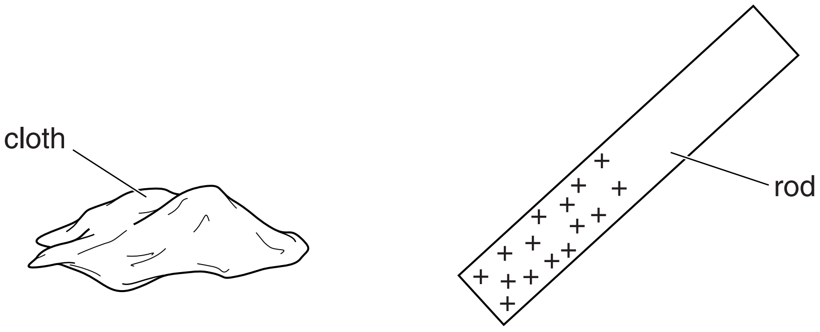


Fig. 10.1

1. State the sign of the charge, if any, on the cloth.

....[1]

2. State which particles the cloth has gained for it to have this charge.

....[1]

(ii) The student then rubs two thin plastic strips with another dry cloth. The strips are suspended so that they are free to move.

Fig. 10.2 shows the two plastic strips before and after the student rubs them with the dry cloth.

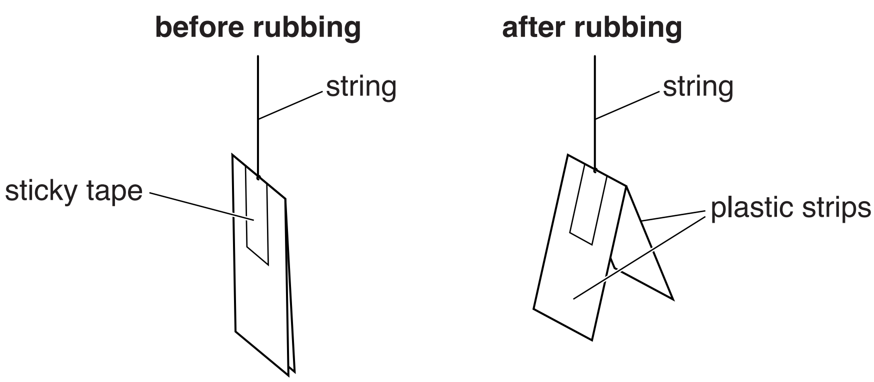


Fig. 10.2

Explain why the bottom ends of the strips move apart after rubbing.

....

....[2]

(iii) A boy wears a shirt made from nylon. After wearing the shirt for some time he finds the shirt clinging to his body.

Use your knowledge of electrostatic charges to explain why this occurs.

....

....

....[2]

[Total: 6]

11 Some cars have electrically heated front seats. Each seat has a warm and a hot setting, controlled by a switch.

The circuit for one seat is shown in Fig. 11.1.

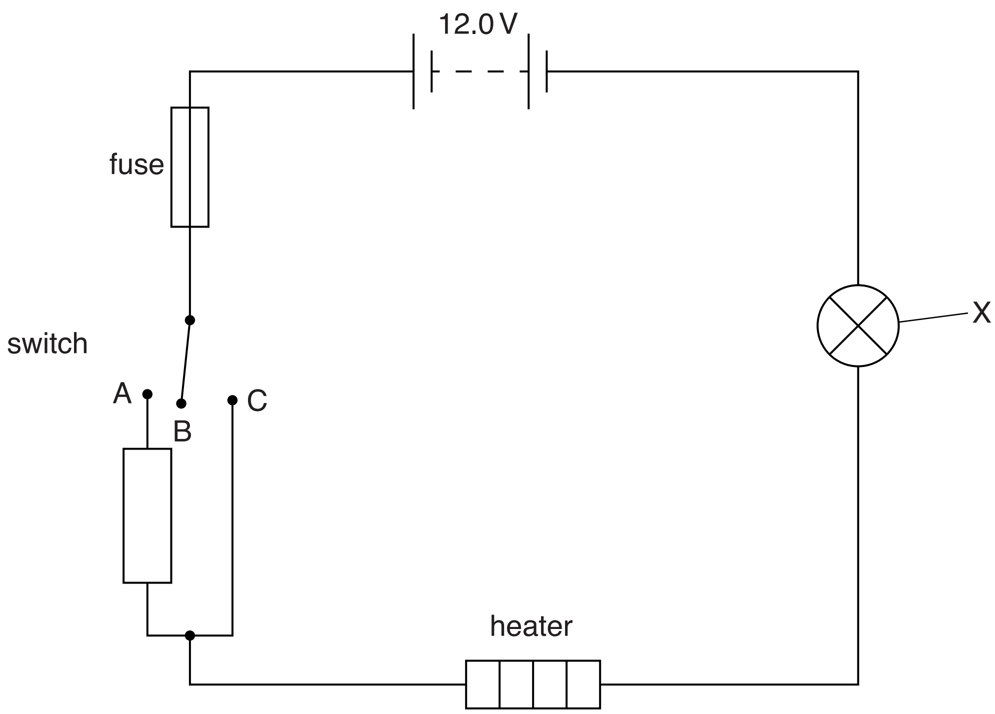


Fig. 11.1

(a) The circuit contains a switch that can connect to any of the contacts A, B or C.

In the table below, put **one** tick for each switch setting to indicate the condition of the seat.

	condition of seat		
switch setting	off	warm	hot
A			
B			
C			

[3]

(b) When the heater setting is on 'hot', the current in the heater is 6.0 A. The potential difference across the heater is 10.0 V.

Calculate the resistance of the heater.

resistance = ... [3]

(c) What is the name and purpose of component X?

name of component ....

purpose ....

.... [2]

(d) The heated seat develops a fault and there is a large current in the circuit.

Explain what happens to prevent further damage to the circuit.

....

....

....[2]

[Total: 10]

12 Fig. 12.1 represents an atom of carbon.

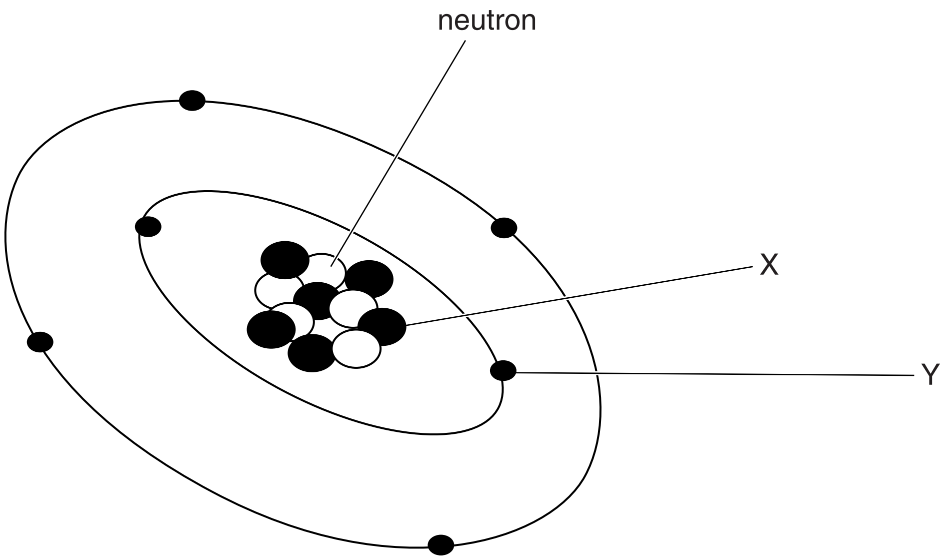


Fig. 12.1 (not to scale)

(a) **(i)** State the name of particle X.

....[1]

(ii) State the name of particle Y.

....[1]

(b) Carbon-14 is unstable. It decays by beta emission to form nitrogen.

Complete the equation for this decay.

$$^{14}_{6}\mathrm{C} \longrightarrow \,^{\dots\dots}_{\dots\dots}\mathrm{N} + \,^{0}_{-1}\mathrm{e}$$

[2]

(c) The half-life of carbon-14 is 5800 years.

A piece of wood contained 20 000 carbon-14 atoms when it was buried in a landslide.

Calculate the number of years it takes until the number of carbon-14 atoms in the wood is 2500.

number of years = ... [4]

[Total: 8]

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