Cambridge IGCSE

Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER | | | | | |

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0781809913

PHYSICS **0625/32**

Paper 3 Theory (Core) **May/June 2019**

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 1.0 kg to be 10 N (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.

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

This document consists of **16** printed pages.

1 A student moves a model car along a bench.

Fig. 1.1 is the speed-time graph for the motion of the model car.

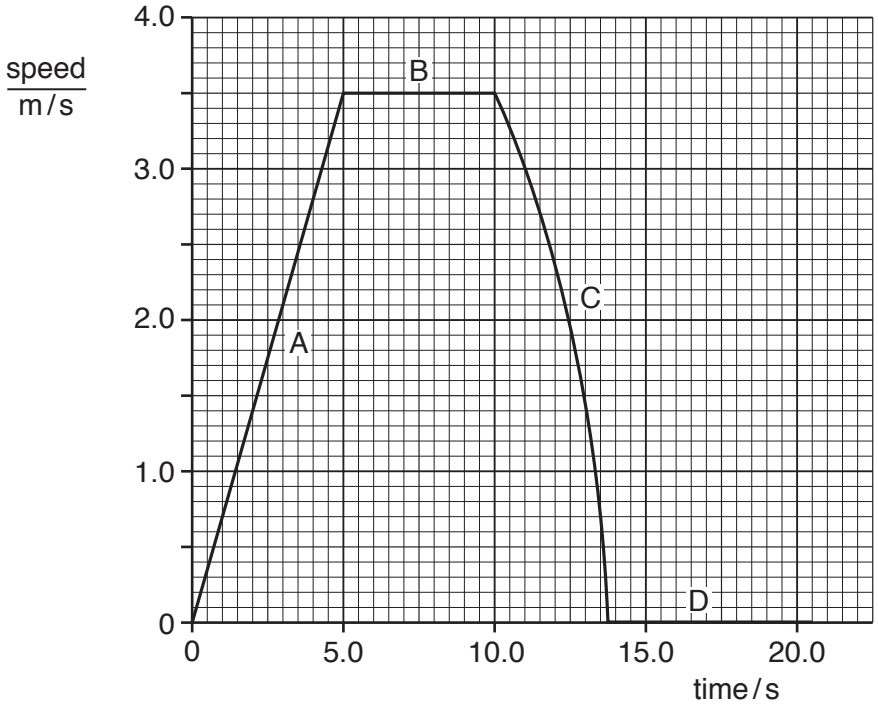

Fig. 1.1

(a) Describe the motion of the car in each of the sections A, B, C and D.

A .....

B .....

C .....

D .....

[4]

(b) Determine the distance moved by the model car in the first five seconds.

distance = ... m [3]

[Total: 7]

2 A bottle contains some oil.

(a) The mass of the oil and the bottle is 678 g. The mass of the empty bottle is 318 g.

Calculate the mass of the oil.

mass = ... g [1]

(b) Some of the oil from **(a)** is poured into measuring cylinder A. The rest of the oil is poured into measuring cylinder B, as shown in Fig. 2.1.

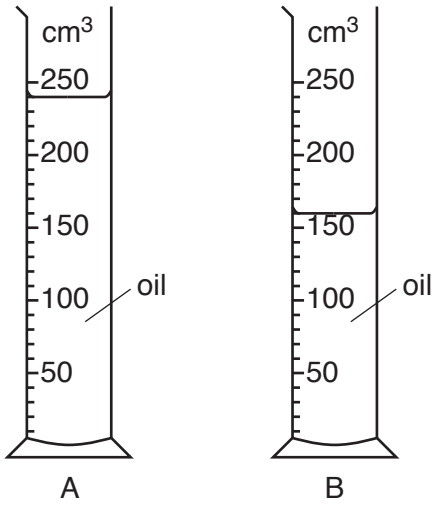

Fig. 2.1

(i) State the volume of oil in measuring cylinder B, as shown in Fig. 2.1.

volume = ... cm^3 [1]

(ii) Calculate the total volume of oil.

volume = ... cm^3 [1]

(iii) Calculate the density of the oil.

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

[Total: 6]

3 Fig. 3.1 shows a simple pendulum swinging backwards and forwards between P and Q. One complete oscillation of the pendulum is when the bob swings from P to Q and then back to P.

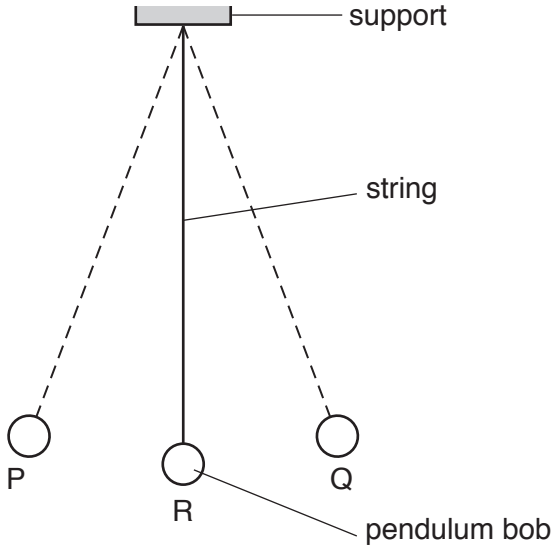

Fig. 3.1

(a) A student starts two stopwatches at the same time while the pendulum bob is swinging.

The student stops one stopwatch when the pendulum bob is at P. He stops the other stopwatch when the pendulum bob next is at Q.

Fig. 3.2 shows the readings on the stopwatches.

reading at P **reading at Q**

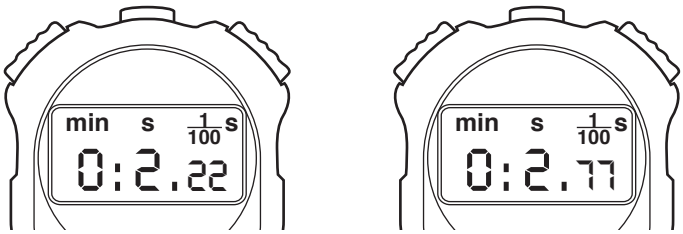

Fig. 3.2

(i) Use readings from Fig. 3.2 to determine the time for one complete oscillation of the pendulum.

time = ... s [2]

(ii) The method described in **(a)** does not give an accurate value for one complete oscillation of the pendulum.

Describe how the student could obtain an accurate value for one complete oscillation of the pendulum.

.....

.....

.....

.....

.....

..... [4]

(b) As the pendulum bob moves from R to Q it gains 0.4 J of gravitational potential energy.

Air resistance can be ignored.

State the value of kinetic energy of the pendulum bob at

1. R ..... J

2. Q .....J [2]

[Total: 8]

4 A student places a balloon filled with air next to a window, as shown in Fig. 4.1. The Sun warms the air in the balloon.

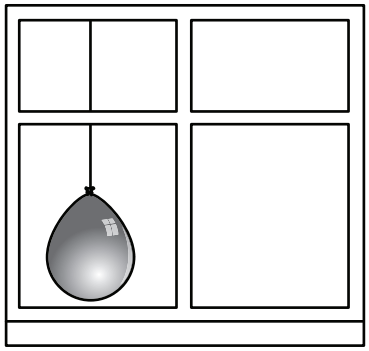

Fig. 4.1

(a) (i) Suggest what happens to the balloon as the air in it becomes hotter than the surroundings.

..... [1]

(ii) Use ideas about molecules to explain your answer to **(a)(i)**.

.....

.....

.....

.....

..... [3]

(b) The student uses a pump to inflate another balloon.

Fig. 4.2 shows the student inflating a balloon.

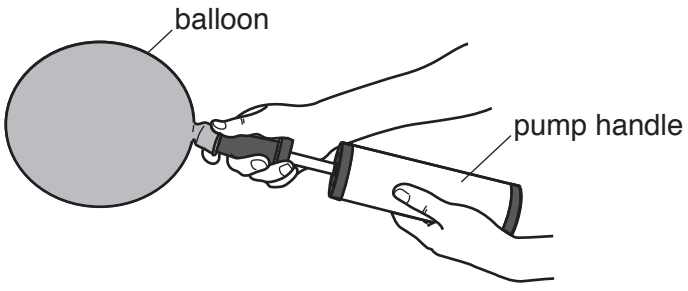

Fig. 4.2

The student applies a force of 30 N to the pump handle. The force acts on an area of 12 cm^2.

Calculate the pressure on the pump handle. Include the unit.

pressure = ... [4]

[Total: 8]

5 **(a)** A nuclear power station generates electrical energy.

The main stages in the operation of the nuclear power station are listed. They are **not** in the correct order.

E Electrical energy is produced.

F The fission of uranium nuclei releases thermal energy.

G A turbine drives a generator.

H Thermal energy heats water to produce steam.

Complete the flow chart to describe how a nuclear power station works.

In each empty box, insert the letter for the correct statement.

The nuclear power station uses uranium as a fuel.

↓

☐

↓

☐

↓

The steam drives a turbine.

☐

↓

☐

↓

Electrical energy is transmitted.

[2]

[Turn over

(b) Electrical energy from the power station is used to power two different lamps. Fig. 5.1 shows how the light outputs from two types of lamp vary with the power input.

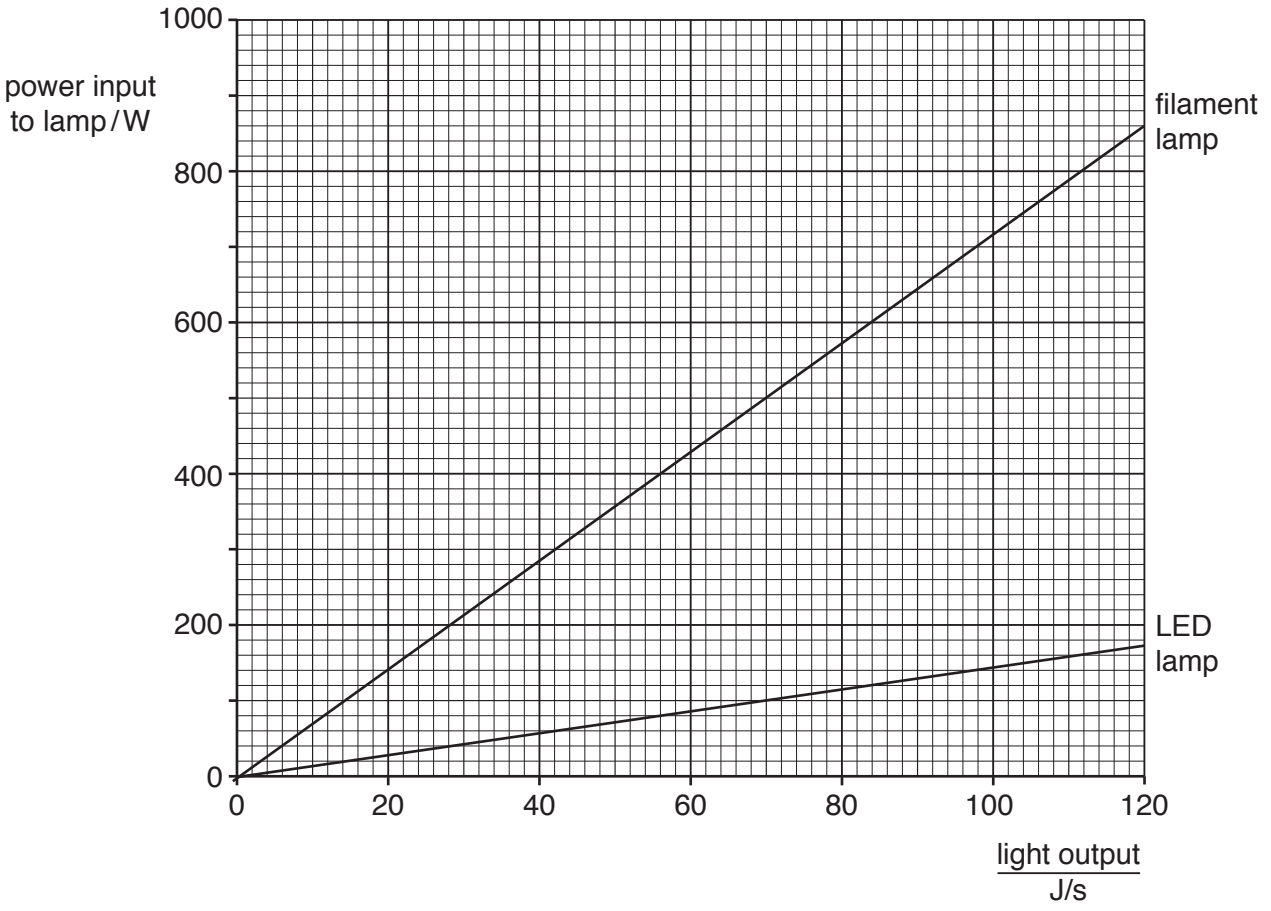

Fig. 5.1

(i) An experiment requires a lamp with a light output of 70 J/s.

For the LED lamp and for the filament lamp determine the input power required to give a light output of 70 J/s. Use information from Fig. 5.1.

1. For the LED lamp, input power = ... W

2. For the filament lamp, input power = ... W

[2]

(ii) Explain why using LED lamps is better for the environment. Use information from Fig. 5.1 in your answer.

.....

.....

.....

..... [2]

[Total: 6]

6 Fig. 6.1 shows a ray of light that is reflected by a mirror.

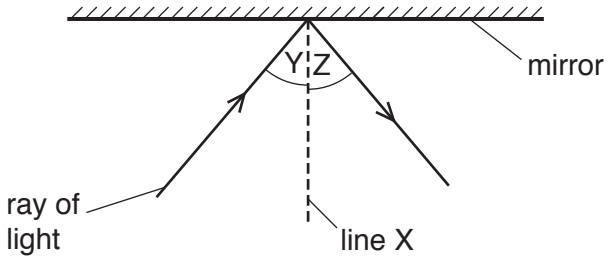

Fig. 6.1

(a) **(i)** State the name of line X shown on Fig. 6.1.

..... [1]

(ii) State the name of angle Y shown on Fig. 6.1.

..... [1]

(iii) A student moves the ray of light and doubles the size of angle Y. State the effect on angle Z.

..... [1]

(b) Fig. 6.2 shows a converging lens used to form an image I of an object O.

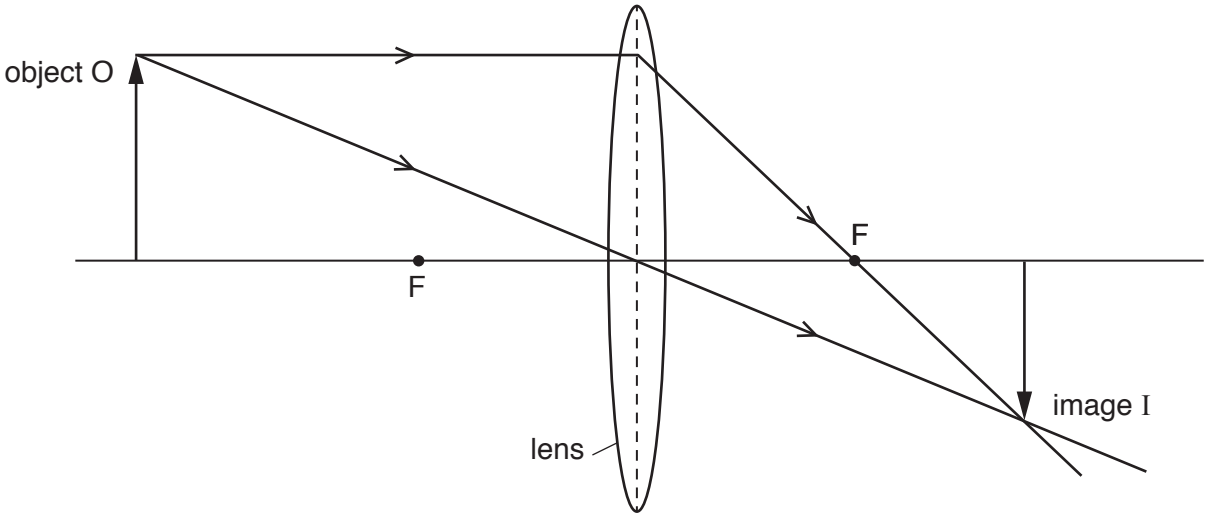

Fig. 6.2

(i) State the name of the points labelled F on Fig. 6.2.

..... [1]

(ii) Describe the nature of the image I.

.....

.....

..... [2]

[Total: 6]

7 **(a)** Solid, liquid and gas are three states of matter.

For each state of matter describe the arrangement of the molecules.

solid .....

.....

liquid .....

.....

gas .....

.....

[3]

(b) A liquid is spilt on a bench in a warm laboratory. After a short time, the liquid disappears.

(i) State the name of the process that causes the liquid to disappear.

..... [1]

(ii) The process in **(b)(i)** causes a cooling effect.

Explain why the cooling effect occurs. Use your ideas about molecules.

.....

.....

.....

.....

..... [3]

[Total: 7]

8 **(a)** Fig. 8.1 shows the magnetic field pattern around a bar magnet.

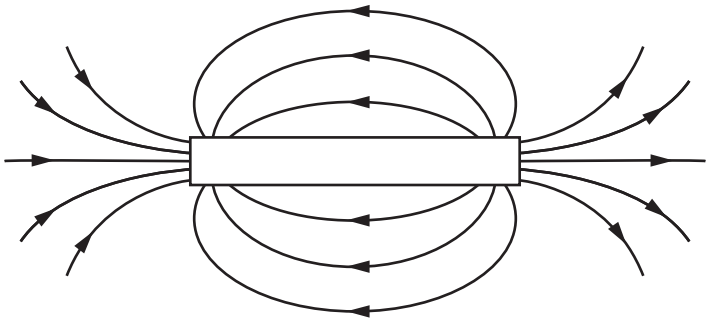

Fig. 8.1

(i) On Fig. 8.1, mark the North and South poles of the magnet. Use the letter N for the North pole and S for the South pole. [1]

(ii) A small bar of unmagnetised iron is placed next to a bar magnet, as shown in Fig. 8.2.

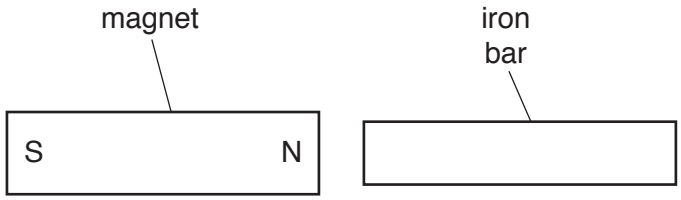

Fig. 8.2

The iron bar moves towards the magnet.

Explain why the iron bar moves.

.....

.....

..... [2]

(b) Fig. 8.3 shows a coil of wire wrapped around an iron core. A student uses these to make an electromagnet.

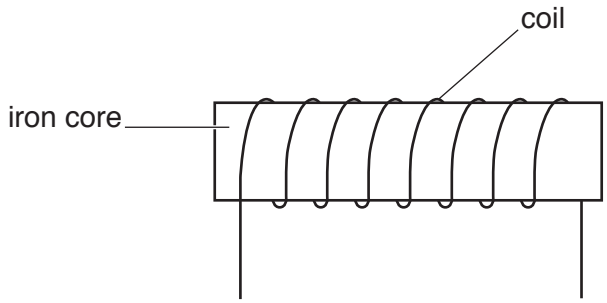

Fig. 8.3

(i) Complete the diagram in Fig. 8.3 to show how it could be used to make an electromagnet. [1]

(ii) State **one** advantage of an electromagnet compared to a permanent magnet.

..... [1]

[Total: 5]

9 Fig. 9.1 shows a plastic ruler.

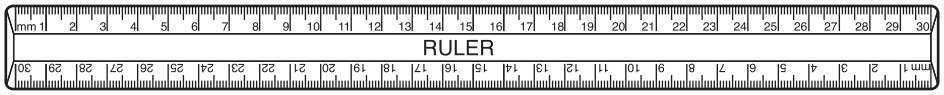

Fig. 9.1

(a) Suggest and explain how a student could give a positive charge to a plastic ruler.

.....

.....

..... [3]

(b) A plastic ruler is given a positive charge. A sphere hangs from an insulating thread.

A student holds the ruler near the sphere, as shown in Fig. 9.2. The ruler repels the sphere.

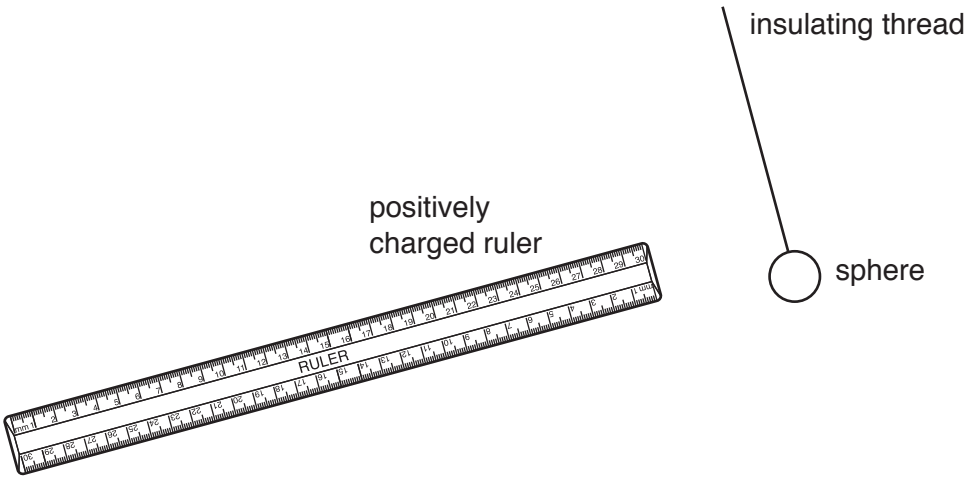

Fig. 9.2

(i) State what charge, if any, the sphere carries.

..... [1]

(ii) Explain your answer to **(b)(i)**.

..... [1]

[Total: 5]

10 Fig. 10.1 shows an incomplete circuit diagram for two identical lamps arranged in parallel. The circuit contains an ammeter and a voltmeter.

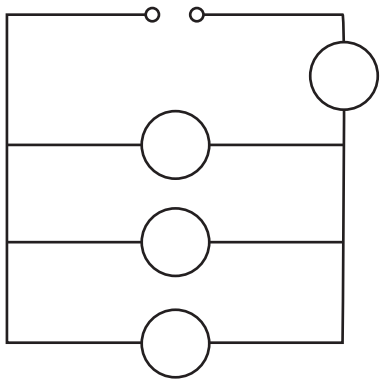

Fig. 10.1

(a) On Fig. 10.1, complete the symbols for two lamps, an ammeter and a voltmeter positioned correctly. [5]

(b) One of the lamps breaks.

State the effect, if any, this has on the brightness of the other lamp. Explain your answer.

effect .....

explanation .....

.....

[2]

[Total: 7]

11 Fig. 11.1 shows a transformer that can provide two different output voltages from a 240 volt mains a.c. supply.

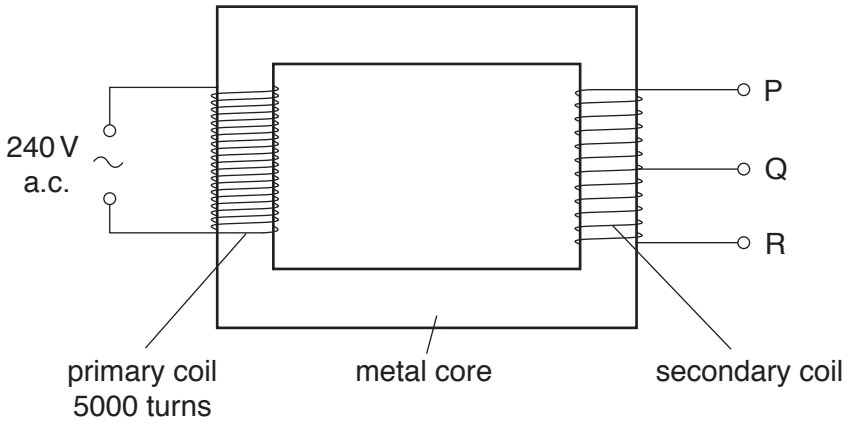

Fig. 11.1

In the transformer, the primary coil has 5000 turns.

The secondary coil has 250 turns between P and R.

(a) State the term used to describe this type of transformer.

..... [1]

(b) The primary and secondary coils are mounted on a metal core.

State the metal used for the core and explain why it is suitable.

metal .....

explanation .....

.....

[2]

(c) **(i)** The secondary coil has 125 turns between P and Q. Calculate the output voltage between connections P and Q.

voltage = ... V [3]

(ii) Compare the output voltage between P and Q with the output voltage between P and R.

Explain your answer.

comparison .....

explanation .....

[2]

[Total: 8]

12 (a) Radioactive emission is a random process.

Explain the meaning of the word *random*.

.....

..... [1]

(b) The table compares three types of radioactive emission.

emission	relative ionising ability	relative penetrating ability
alpha		
beta		
gamma		

Table 12.1

Complete the table by choosing words from the box.

high	low	medium

[3]

(c) A radioactive substance decays by emitting an α-particle.

An α-particle can be represented as ${}^{4}_{2}\alpha$.

Draw a labelled diagram showing the composition of an α-particle.

[3]

[Total: 7]