UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

PHYSICS **0625/02**

Paper 2 Core **May/June 2008**

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 a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
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.

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1	
2	
3	
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9	
10	
11	
12	
Total	

This document consists of **14** printed pages and **2** blank pages.

For Examiner's Use

1 **(a)** Fig. 1.1 shows a uniform rod.

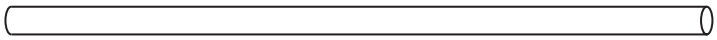

Fig. 1.1

(i) Use your rule to find the length of the rod.

length = ...cm [1]

(ii) On Fig. 1.1, show the position of the centre of mass of the rod using the letter **C**. [1]

(b) Fig. 1.2 shows another rod, of the same length as the previous one, but this rod is thicker at one end.

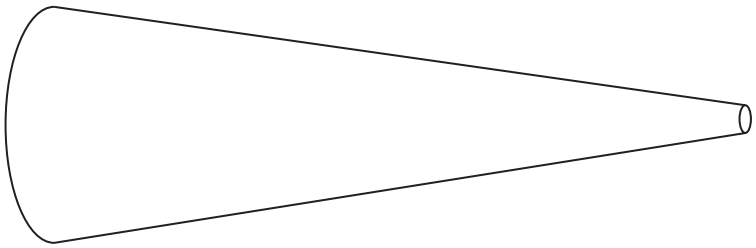

Fig. 1.2

Use your judgement to mark with the letter **M** approximately where the centre of mass of this rod will be.

[2]

[Total: 4]

2 A motorcyclist is travelling along a country road, as shown in Fig. 2.1.

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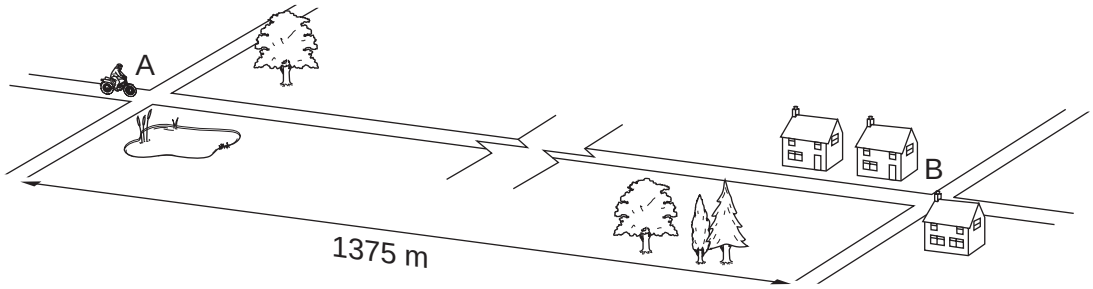

Fig. 2.1

The statements below describe the motion of the motorcycle from point A to point B.

1. The motorcycle accelerates uniformly from rest at point A, increasing its speed to 25 m/s in 10 s.
2. It then travels at a constant speed of 25 m/s for 40 s.
3. It then decelerates uniformly to rest at point B, 70 s after leaving point A.

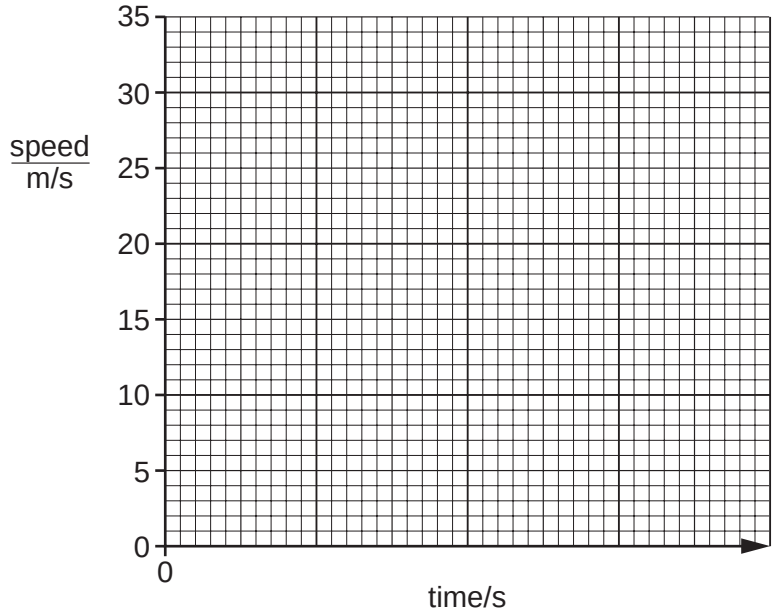

Fig. 2.2

(a) For the motorcycle moving from point A to point B, draw on Fig. 2.2,

(i) a suitable time scale, [1]

(ii) the graph of the motion of the motorcycle. [5]

(b) The distance from A to B is 1375 m.

Calculate the average speed of the motorcycle between A and B. Give your answer to the nearest m/s.

average speed = ...m/s [4]

[Total: 10]

3 A beam is pivoted at its centre. Three forces, F_1, F_2 and F_3, act on the beam as shown in Fig. 3.1.

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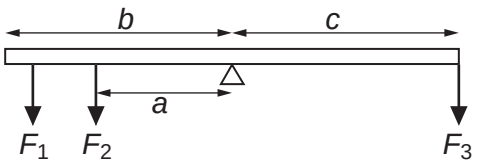

Fig. 3.1

(a) Which of the forces exert(s)

a clockwise moment, ...

an anticlockwise moment? ..... [3]

(b) When the beam is released, the right-hand side of the beam starts to go down.
Which of the three distances, *a*, *b* or *c*, should be decreased in order to balance the beam? Explain your answer.

Which distance? .....

Explanation

.....

.....

.....[3]

(c) Fig. 3.2 represents a simple beam-balance with the pivot accurately at its centre.

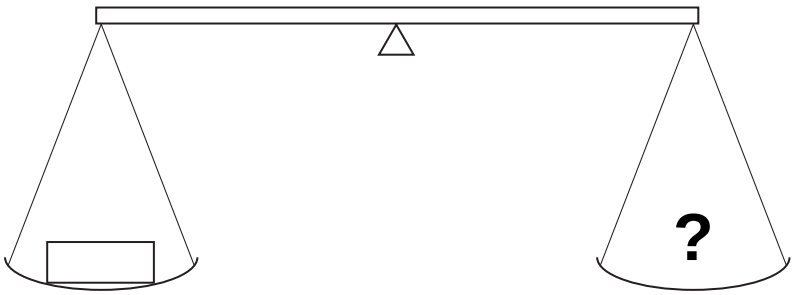

Fig. 3.2

The person using the beam-balance puts the object to be weighed in the left-hand pan. He has a selection of standard masses to put in the right-hand pan, but he finds he cannot exactly balance the beam.

His best attempts are

masses used	effect
10 g, 10 g, 5 g, 2 g, 2 g	beam tips down slightly on the left-hand side
20 g, 10 g	beam tips down slightly on the right-hand side

Estimate the mass of the object.

mass = ... g [1]

[Total: 7]

4

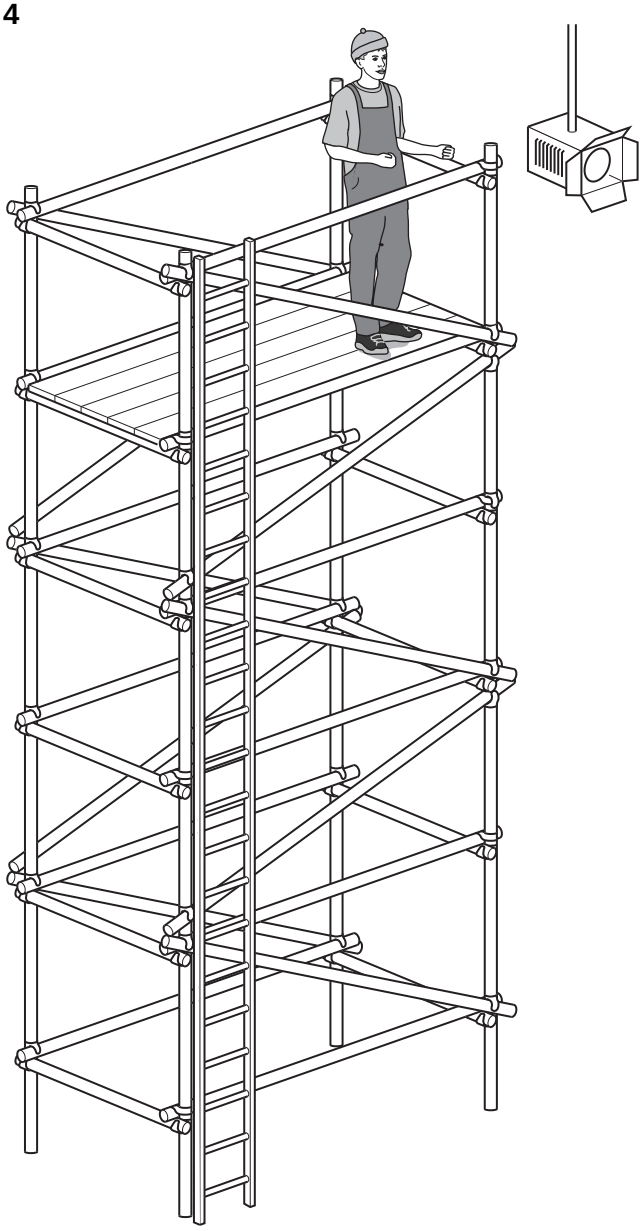

Fig. 4.1

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(a) An electrician climbs up to the platform of a special tower, in order to reach a high-level spotlight, as shown in Fig. 4.1.

Which form of energy, possessed by the electrician's body,

(i) is greater at the top of the tower than it was at the bottom,

..... [1]

(ii) is less at the top of the tower than it was at the bottom?

..... [1]

(b) One of the electrician's assistants also climbs up to the platform. The assistant weighs less than the electrician.

Which of the two people does the most work climbing up to the platform, and why?

Which person? .....

Why? .....

.....

.....

..... [1]

(c) The electrician wishes to know what power he develops as he climbs the tower.

Which quantities does he need to know in order to do this?

.....

..... [1]

[Total: 4]

5 In the atomic model, the atom has a central mass. Much smaller particles orbit this central mass, as shown in Fig. 5.1.

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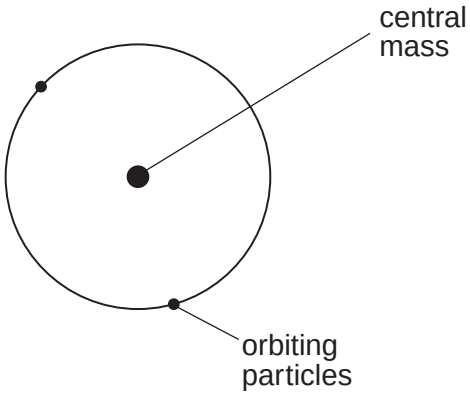

Fig. 5.1

(a) State the name given to the central mass.

.....[1]

(b) State the name given to the orbiting particles.

.....[1]

(c) State the names of the particles from which the central mass is made.

..... and .....[2]

(d) The central mass of the helium atom is identical to one of the particles emitted in radioactive decay.

Which particle is this?.....[1]

(e) State the name of the particles that form cathode rays.

.....[1]

[Total: 6]

6 Fig. 6.1 and Fig. 6.2 show two of the rays from the top of an object, passing through a lens.

For Examiner's Use

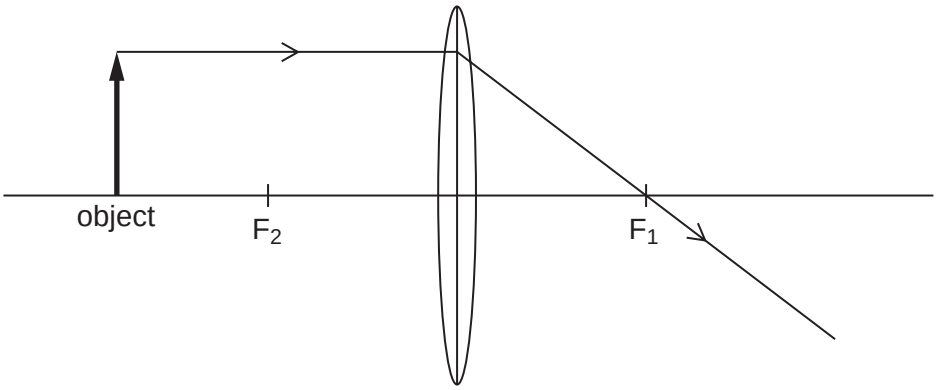

Fig. 6.1

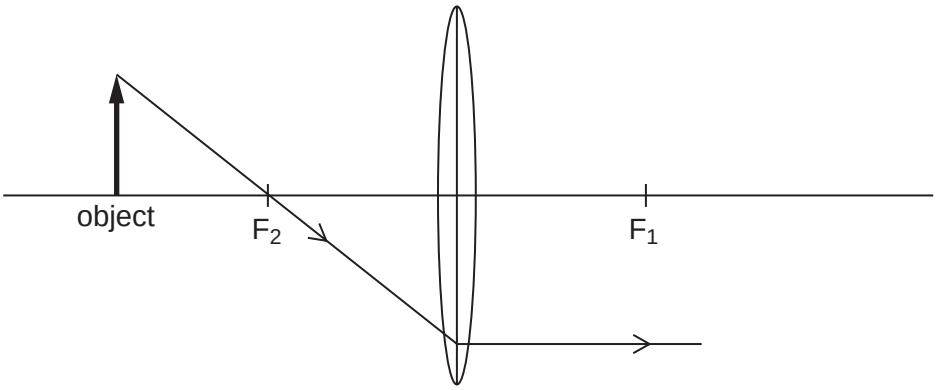

Fig. 6.2

(a) On Fig. 6.1, draw the third ray whose path from the top of the object through the lens is known. [1]

(b) On Fig. 6.2,

(i) copy the ray shown on Fig. 6.1 and complete the diagram to locate the image formed by the lens, [1]

(ii) mark and label the image. [2]

(c) On Fig. 6.2, indicate clearly where you would position a screen on which to see the focused image. [1]

[Total: 5]

7 **(a)** The table below describes the conditions of the molecules of a substance in each of the three states of matter, solid, liquid and gas.

In the right-hand column, write the state of the substance that is described in the left-hand column.

condition of the molecules	state in which the substance exists
The molecules are a great distance apart, moving very rapidly, with negligible interaction. The substance occupies all the space available.	
The molecules are only able to vibrate rapidly about fixed positions. The substance does not need a container to maintain its shape.	
The molecules move about amongst each other, with attractive forces between them. The substance does not necessarily fill its container.	

[2]

(b) **(i)** What is the state of matter just before a substance boils?

.....[1]

(ii) Describe what happens to the molecules during boiling.

.....

.....[2]

(iii) State two differences between boiling and evaporating.

1. .....

2. .....[2]

(c) **(i)** What is the state of matter just before a substance melts?

.....[1]

(ii) Aluminium melts at 660 °C. At what temperature does it freeze?

.....[1]

[Total: 9]

8 **(a)** The thermometer in Fig. 8.1 is calibrated at two fixed points, and the space between these is divided into equal divisions.

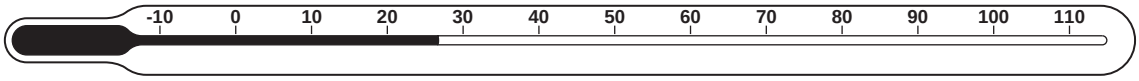

Fig. 8.1

A thermometer is being calibrated with the Celsius scale.

(i) 1. Write down another name for the lower fixed point.

.....[1]

2. How is this temperature achieved?

.....

.....

.....[2]

3. What is the temperature of this fixed point?.....[1]

(ii) 1. Write down another name for the upper fixed point.

.....[1]

2. How is this temperature achieved?

.....

.....

.....[2]

3. What is the temperature of this fixed point?.....[2]

(b) A block of copper and a block of aluminium have identical masses. They both start at room temperature and are given equal quantities of heat. When the heating is stopped, the aluminium has a lower temperature than the copper.
Fill in the missing words in the sentence below, to explain this temperature difference.

The aluminium block has a smaller temperature rise than the copper block because the aluminium block has a larger ..... than the copper block. [1]

[Total: 10]

9 Fuses are often included in circuits.

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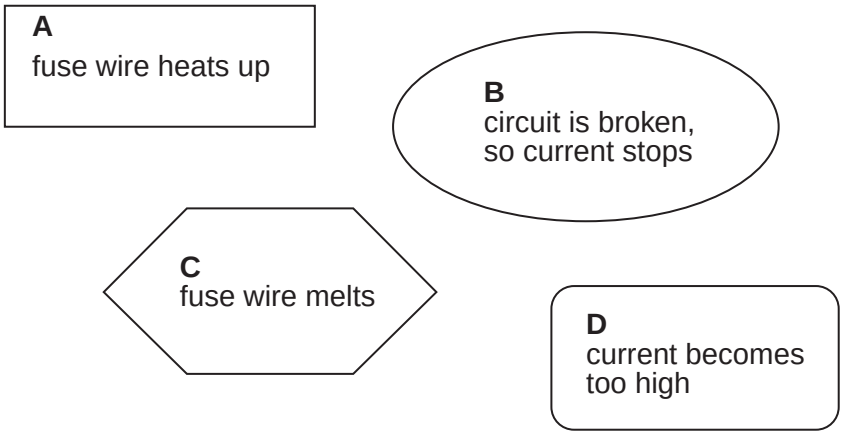
(a) In the space below, draw the circuit symbol for a fuse.

[1]

(b) When the statements in the boxes below are put in the correct order, they describe how a fuse protects a circuit.



On the line below, list the letters of the four boxes in the correct order.

.....[2]

(c) By mistake, a fuse with too high a rated value is put in the fuse-holder in a circuit.

State two possible outcomes of this mistake.

1. .....

2. .....[2]

[Total: 5]

10 Fig. 10.1 shows a series circuit.

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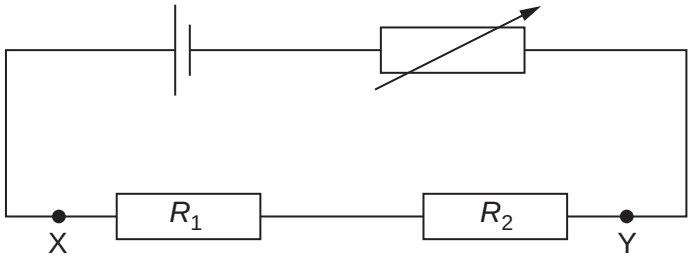

Fig. 10.1

Resistance R_1 = 25 Ω and resistance R_2 = 35 Ω. The cell has zero resistance.

(a) Calculate the combined resistance of R_1 and R_2.

resistance = ... Ω [2]

(b) On Fig. 10.1, use the correct circuit symbol to draw a voltmeter connected to measure the potential difference between X and Y. [1]

(c) The variable resistor is set to zero resistance. The voltmeter reads 1.5 V.

(i) Calculate the current in the circuit.

current = ...[4]

(ii) State the value of the potential difference across the cell.

potential difference = ... V [1]

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(d) The resistance of the variable resistor is increased.

(i) What happens to the current in the circuit? Tick one box.

increases	☐
stays the same	☐
decreases	☐

[1]

(ii) What happens to the voltmeter reading? Tick one box.

increases	☐
stays the same	☐
decreases	☐

[1]

(iii) State the resistance of the variable resistor when the voltmeter reads 0.75 V.

resistance = ...Ω [1]

[Total: 11]

11 **(a)** An experimenter uses a length of wire ABC in an attempt to demonstrate electromagnetic induction. The wire is connected to a sensitive millivoltmeter G.

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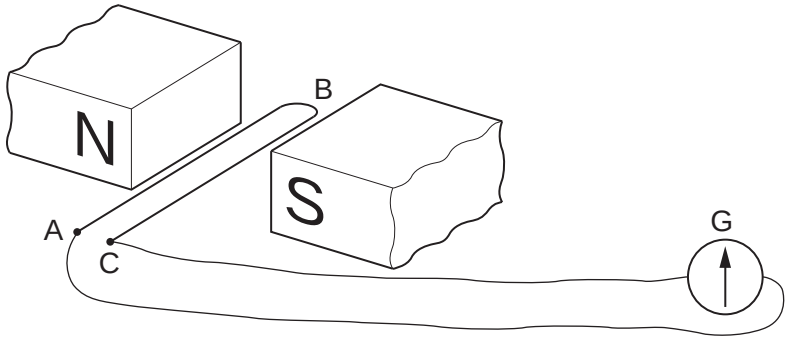

Fig. 11.1

Using the arrangement in Fig. 11.1, the experimenter finds that she does not obtain the expected deflection on G when she moves the wire ABC down through the magnetic field.

(i) Explain why there is no deflection shown on G.

.....

.....

.....[2]

(ii) What change should be made in order to observe a deflection on G?

.....

.....[1]

(b) Name one device that makes use of electromagnetic induction.

.....[1]

[Total: 4]

12 **(a)** The table below shows how the activity of a sample of a radioactive substance changes with time.

time/minutes	activity / counts/s
0	128
30	58
60	25
90	11
120	5

Use the data in the table to estimate the half-life of the radioactive substance.

half-life = ...min [2]

(b) The half-lives of various substances are given below.

radon-220	55 seconds
iodine-128	25 minutes
radon-222	3.8 days
strontium-90	28 years

(i) If the radioactive substance in **(a)** is one of these four, which one is it?

.....[1]

(ii) A sample of each of these substances is obtained.

Which sample will have the greatest proportion of decayed nuclei by the end of one year, and why?

Which? .....

Why? .....

.....[2]

[Total: 5]

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