| Centre Number | Candidate Number | Name |
|---|---|---|
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UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

**PHYSICS** **0625/02**

Paper 2 Core

October/November 2006

**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.

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.

| For Examiner's Use |
|---|
| |

This document consists of **15** printed pages and **1** blank page.

**1** A worker on the production line in a factory is making brackets. An inspector times the worker whilst he makes 5 brackets. To start, the stopwatch is set to zero.

After 5 brackets have been made, the stopwatch is as shown in Fig. 1.1.

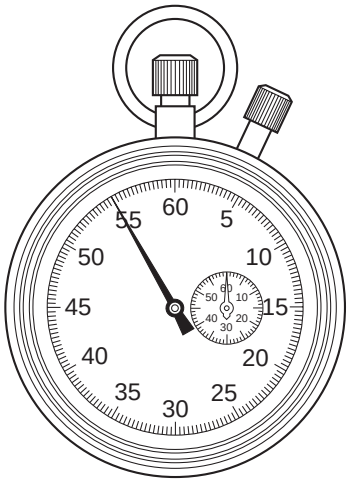


**Fig. 1.1**

**(a)** State the reading on the stopwatch.

reading = ..... s [1]

**(b)** Calculate the time taken to make 1 bracket.

time taken = ..... s [2]

**(c)** The worker has a target of making 300 brackets per hour.

Does the worker meet his target? Tick one box and show the working which led you to your answer.

Does the worker meet his target? Yes ☐

No ☐ [4]

**2** Some IGCSE students were asked to write statements about mass and weight.

Their statements are printed below. Put a tick in the box alongside each of the **two** correct statements.

| | |
|---|---|
| Mass and weight are the same thing. | ☐ |
| Mass is measured in kilograms. | ☐ |
| Weight is a type of force. | ☐ |
| Weight is the acceleration caused by gravity. | ☐ |

[2]





**[Turn over**

**3** Fig. 3.1 shows the speed/time graph for a journey travelled by a tractor.

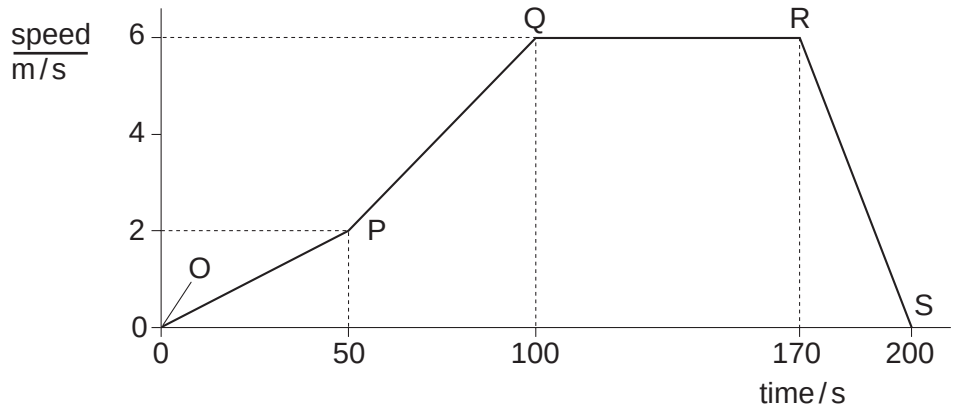


**Fig. 3.1**

**(a)** Use the graph to describe the motion of the tractor during each of the marked sections.

OP .....

PQ .....

QR .....

RS ..... [4]

**(b)** Which two points on the graph show when the tractor is stationary?

point ..... and point ..... [1]

**(c)** State the greatest speed reached by the tractor.

greatest speed = ..... m/s [1]

**(d)** For how long was the tractor travelling at constant speed?

at constant speed for ..... s [1]

**(e)** State how the graph may be used to find the total distance travelled during the 200 s journey. Do **not** attempt a calculation.

..... [1]

**4** **(a)** Name the process by which thermal energy is transferred

**(i)** from the Sun to the Earth, .....

**(ii)** through the metal of a cooking pot. .....
[2]

**(b)** A child is sitting on an oscillating swing, as shown in Fig. 4.1. At the top of the oscillation, the child and swing are momentarily at rest.

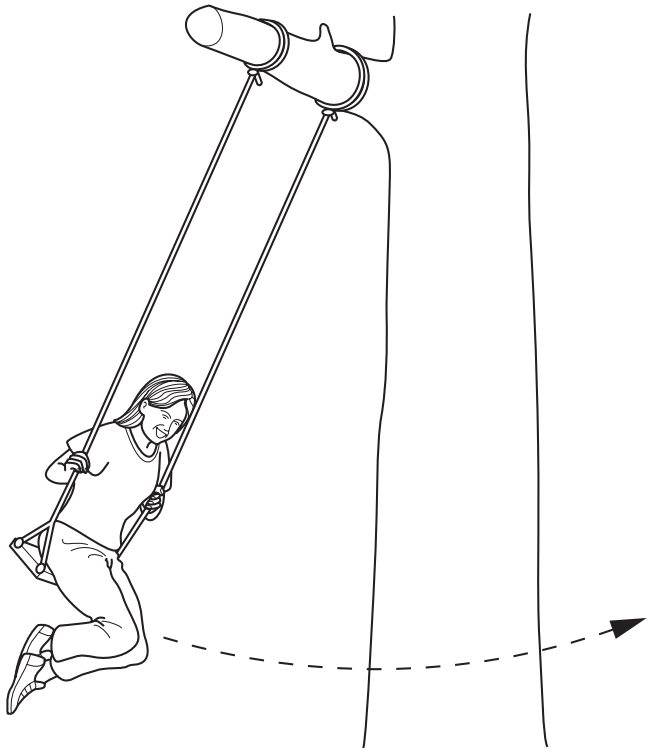

**Fig. 4.1**

**(i)** Use the names of appropriate types of energy to complete the following word equation. Write on the lines in the boxes.

| | | | | | | |
|---|---|---|---|---|---|---|
| gravitational potential energy at the top of the oscillation | = | ..... energy at the bottom of the oscillation | + | ..... energy at the bottom of the oscillation | + | energy losses |

**(ii)** The child continues to sit still on the swing. The amplitude of the oscillations slowly decreases.

Explain why this happens.

.....

.....
[3]





**[Turn over**

**5** **(a)** State the two factors on which the turning effect of a force depends.

1. .....

2. ..... [2]

**(b)** Forces $F_1$ and $F_2$ are applied vertically downwards at the ends of a beam resting on a pivot P. The beam has weight $W$. The beam is shown in Fig. 5.1.

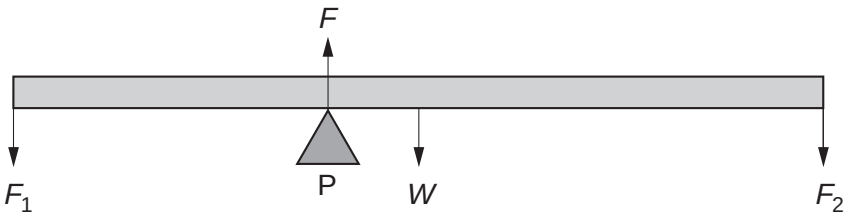


**Fig. 5.1**

**(i)** Complete the statements about the two requirements for the beam to be in equilibrium.

1. There must be no resultant .....

2. There must be no resultant .....

**(ii)** The beam in Fig. 5.1 is in equilibrium. $F$ is the force exerted on the beam by the pivot P.

Complete the following equation about the forces on the beam.

$F =$ .....

**(iii)** Which one of the four forces on the beam does **not** exert a moment about P?

.....

[4]

**6** A woman stands so that she is 1.0 m from a mirror mounted on a wall, as shown in Fig. 6.1.

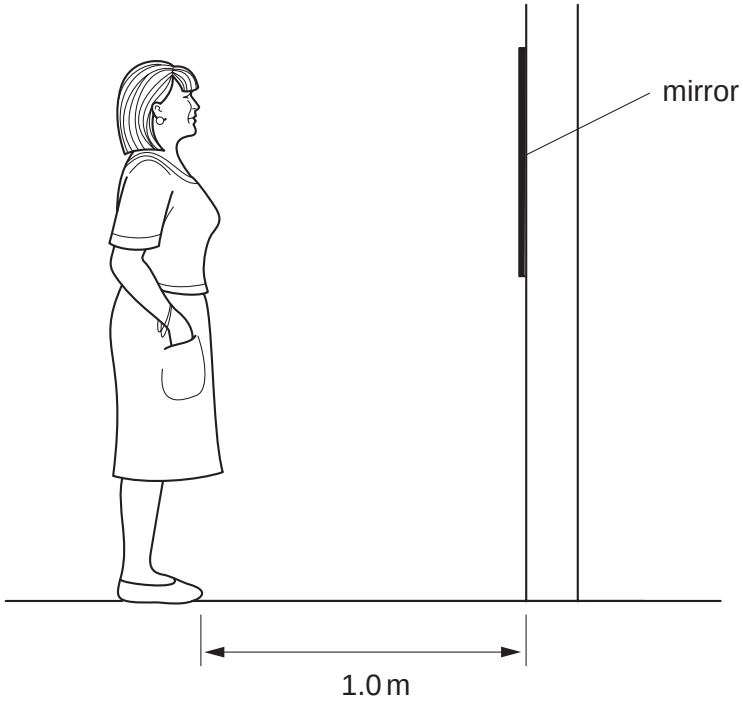


**Fig. 6.1**

**(a)** On Fig. 6.1, carefully draw

**(i)** a clear dot to show the position of the image of her eye,

**(ii)** the normal to the mirror at the bottom edge of the mirror,

**(iii)** a ray from her toes to the bottom edge of the mirror and then reflected from the mirror.

[5]

**(b)** Explain why the woman cannot see the reflection of her toes.

.....

..... [1]

**(c)** **(i)** How far is the woman from her image?

..... m

**(ii)** How far must the woman walk, and in what direction, before the distance between her and her image is 6.0 m?

distance walked = ..... m

direction = .....

[4]

**7** A man is using an axe to chop down a tree, as shown in Fig. 7.1.

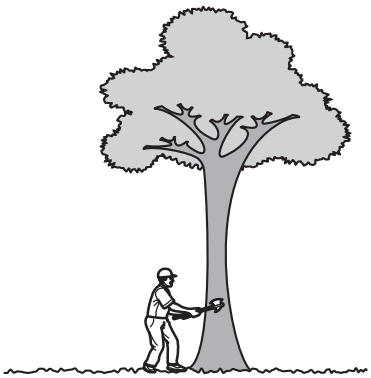

**Fig. 7.1**

**(a)** A short time after the axe hits the tree, the man hears a clear echo.

He estimates that the echo is heard 3 seconds after the axe hits the tree.

**(i)** Suggest what type of obstacle might have caused such a clear echo.

.....

**(ii)** The speed of sound in air is 320 m/s.

Calculate the distance of the obstacle from the tree.

obstacle distance = ..... m
[4]

**(b)** A branch from the tree falls into some shallow water in a pond nearby. The branch sets up a wave. The wave moves to the left a distance of 3.0 m before hitting the side of a moored boat and reflecting back again.

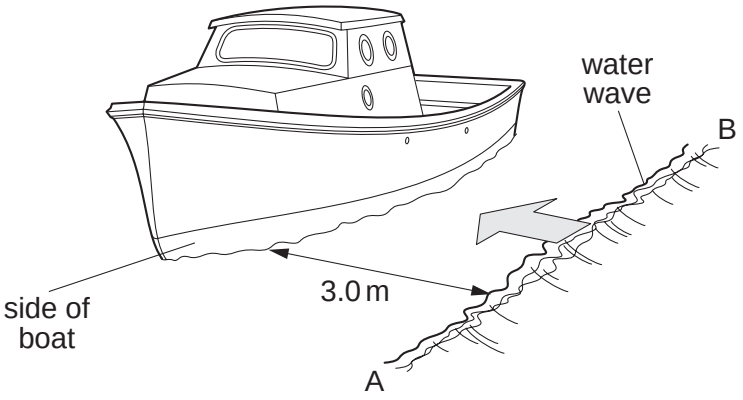


**Fig. 7.2**

The wave takes 5.0 s to travel from AB to the boat and back to AB.

Calculate the speed of the water-wave.

speed of wave = ..... m/s [2]

**8** **(a)** Fig. 8.1 shows two groups of materials.

| GROUP 1 | GROUP 2 |
|---|---|
| copper | plastics |
| iron | silk |
| gold | glass |
| aluminium | ebonite |

**Fig. 8.1**

**(i)** Which group contains metals?

.....

**(ii)** Which group contains insulators?

.....

**(iii)** Write down the name of one of the eight materials above that may be charged by rubbing it with a suitable dry cloth.

.....

[3]

**(b)** Two charged metal balls are placed close to a positively-charged metal plate.

One is attracted to the plate and one is repelled.

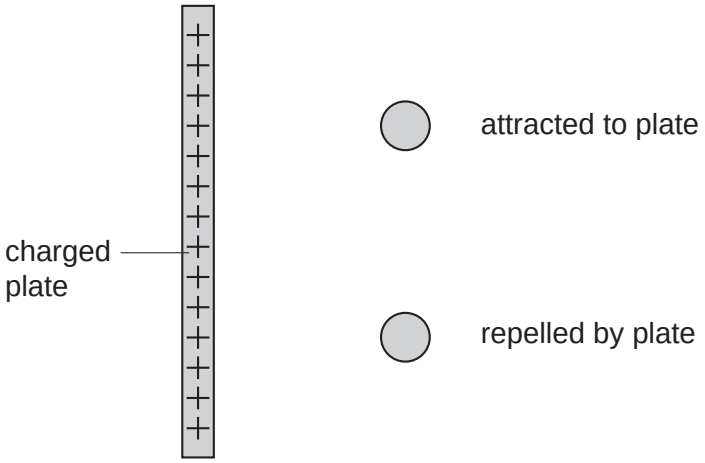


**Fig. 8.2**

Write a + sign on the ball that is positively charged and a – sign on the one that is negatively charged. [1]

**(c)** State what is meant by an *electric field*.

.....

..... [3]

**9** The points plotted on the grid shown in Fig. 9.1 were obtained from a spring-stretching experiment.

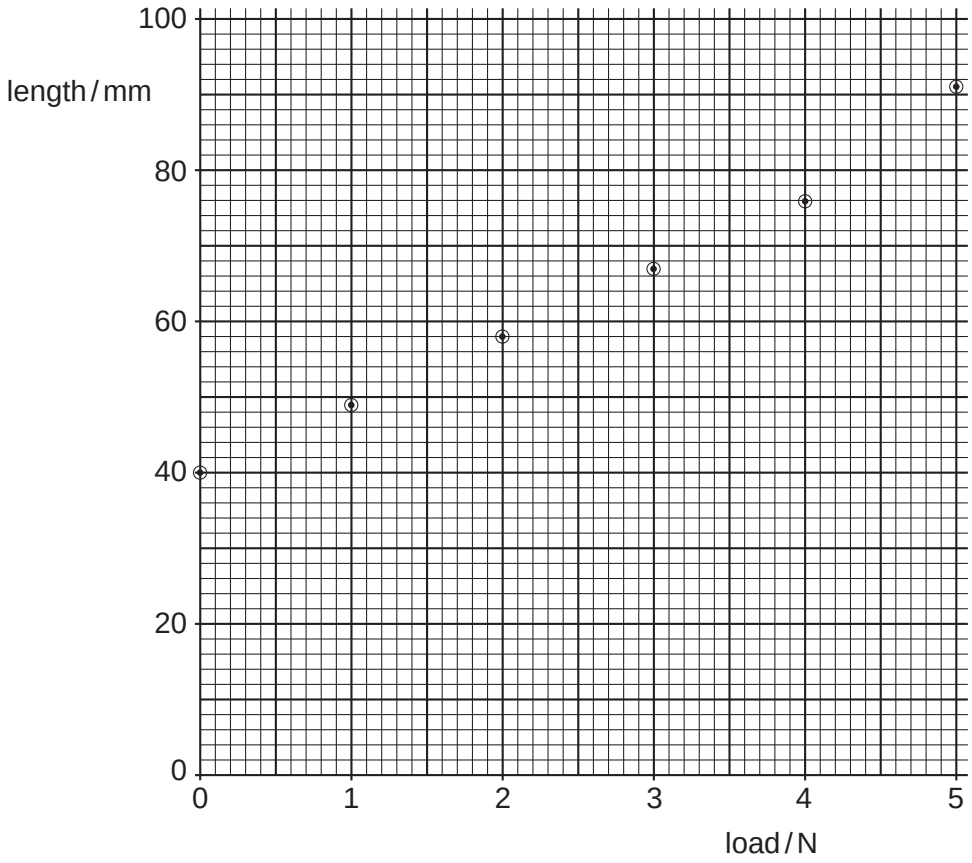


**Fig. 9.1**

**(a)** Using a straight edge, draw a straight line through the first 5 points. Extend your line to the edge of the grid. [1]

**(b)** Suggest a reason why the sixth point does not lie on the line you have drawn.

..... [1]

**(c)** Calculate the extension caused by the 3 N load.

extension = ..... mm [2]

**(d)** A small object is hung on the unloaded spring, and the length of the spring becomes 62 mm.

Use the graph to find the weight of the object.

weight of object = ..... N [1]

**10** A person has a 6 V bell. He hopes to operate the bell from a 240 V a.c. mains supply, with the help of the transformer shown in Fig. 10.1.

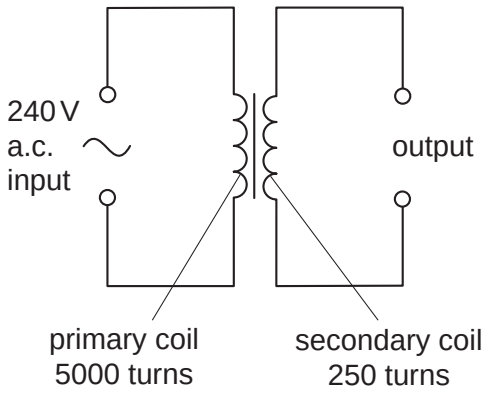


**Fig. 10.1**

**(a)** State how you can tell from Fig. 10.1 that the transformer is a step-down transformer.

..... [1]

**(b)** State how the output voltage compares with the input voltage in a step-down transformer.

..... [1]

**(c)** Calculate the output voltage of the transformer when connected to the 240 V mains supply.

output voltage = ..... V [3]

**(d)** Why would it not be wise for the person to connect the 6 V bell to this output?

.....

..... [1]

**11** The table below contains some information about uranium-238.

| |
|---|
| proton number $Z = 92$ |
| nucleon number $A = 238$ |
| decays by emitting $\alpha$-particle |

**(a)** State how many electrons there are in a neutral atom of uranium-238.

..... [1]

**(b)** State where in the atom the electrons are to be found.

..... [1]

**(c)** State how many neutrons there are in an atom of uranium-238.

..... [1]

**(d)** State where in the atom the neutrons are to be found.

..... [1]

**(e)** State what happens to the number of protons in an atom of uranium-238 when an $\alpha$-particle is emitted.

..... [2]

**12** Fig. 12.1 shows an electric circuit.

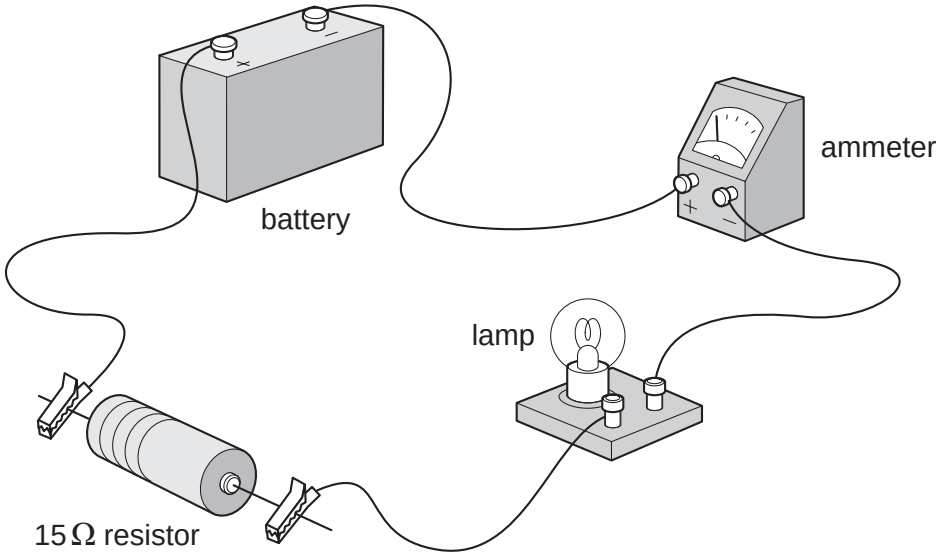


**Fig. 12.1**

**(a)** The lamp lights, but the ammeter needle moves the wrong way.

What change should be made so that the ammeter works correctly?

..... [1]

**(b)** What does an ammeter measure?

..... [1]

**(c)** In the space below, draw a circuit diagram of the circuit in Fig. 12.1, using correct circuit symbols.

[2]

**(d)** **(i)** Name the instrument that would be needed to measure the potential difference (p.d.) across the 15 Ω resistor.

.....

**(ii)** Using the correct symbol, add this instrument to your circuit diagram in **(c)**, in a position to measure the p.d. across the 15 Ω resistor.

[2]

**(e)** The potential difference across the 15 Ω resistor is 6 V.

Calculate the current in the resistor.

current = ..... A [3]

**(f)** Without any further calculation, state the value of the current in the lamp.

lamp current = ..... A [1]

**(g)** Another 15 Ω resistor is connected in parallel with the 15 Ω resistor that is already in the circuit.

**(i)** What is the combined resistance of the two 15 Ω resistors in parallel?

Tick one box.

30 Ω ☐

15 Ω ☐

7.5 Ω ☐

zero ☐

**(ii)** State what effect, if any, adding this extra resistor has on the current in the lamp.

.....

[2]

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