

Candidate Name _____

Centre Number

Candidate
Number

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CAMBRIDGE INTERNATIONAL EXAMINATIONS

**Joint Examination for the School Certificate
and General Certificate of Education Ordinary Level**

SCIENCE

5124/2, 5125/2

PAPER 2 Physics

OCTOBER/NOVEMBER SESSION 2002

1 hour 15 minutes

Additional materials:
Answer paper

TIME 1 hour 15 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page and on all separate answer paper used.

Section A

Answer **all** questions.

Write your answers in the spaces provided on the question paper.

Section B

Answer any **two** questions.

Write your answers on the lined paper provided and, if necessary, continue on separate answer paper.

At the end of the examination,

1. fasten all separate answer paper securely to the question paper;
2. enter the numbers of the **Section B** questions you have answered in the grid below.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [] at the end of each question or part question.

FOR EXAMINER'S USE	
Section A	
Section B	
TOTAL	

This question paper consists of 8 printed pages and 4 lined pages.

Section A

Answer **all** the questions.

Write your answers in the spaces provided on the question paper.

- 1 Fig. 1.1 shows the change of speed with time as a feather falls vertically through the air.

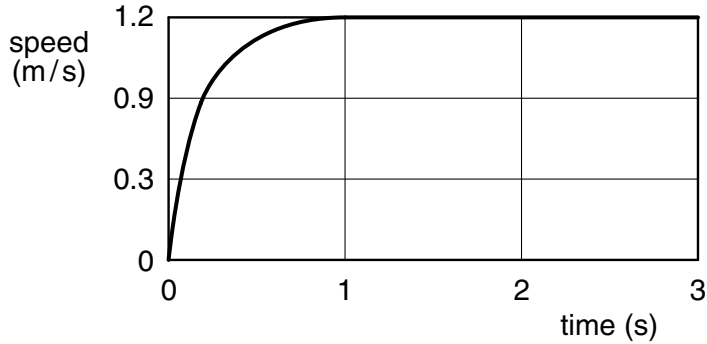


Fig. 1.1

- (a) Name the two forces which act on the feather as it falls.

Force 1

Force 2 [2]

- (b) State which of these two forces is bigger at time 0.5 s. Explain your answer.

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

- (c) Explain why the feather reaches a maximum downward speed (terminal velocity).

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

- (d) What is the value of the maximum speed of the feather?

.....
..... [1]

2 Given a jar containing a large number of identical small steel spheres, explain briefly how you would measure the density of the steel from which they are made.

.....
.....
.....
..... [4]

3 A man exerts a horizontal force of 200 N on a 60 kg box to move it across a room. The box moves with a constant speed of 0.5 m/s.

(a) How big is the force of friction on the box? Explain your answer.

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

(b) Calculate the kinetic energy of the box.

[3]

(c) (i) How much work does the man do on the box every second?

[2]

(ii) How much power is the man producing to move the box?

..... [2]

(iii) What is the main form of energy into which his work is converted?

..... [1]

4 Fig. 4.1 shows ripples travelling across the surface of a lake.

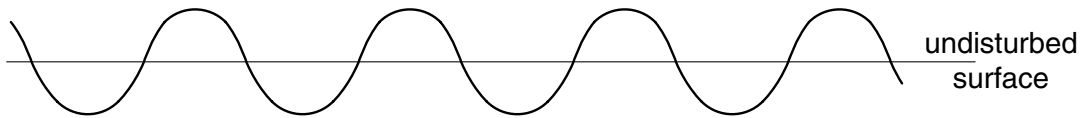


Fig. 4.1

(a) What property of the ripples means that a transverse wave motion is formed?

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

(b) The frequency of the wave is 3 Hz. On Fig. 4.1, mark a distance which shows how far the ripples travel in 1 second, and explain how you obtain your answer.

.....
..... [3]

- 5 Fig. 5.1 shows the position of a thin converging lens which forms an image **I** of an object **O**.

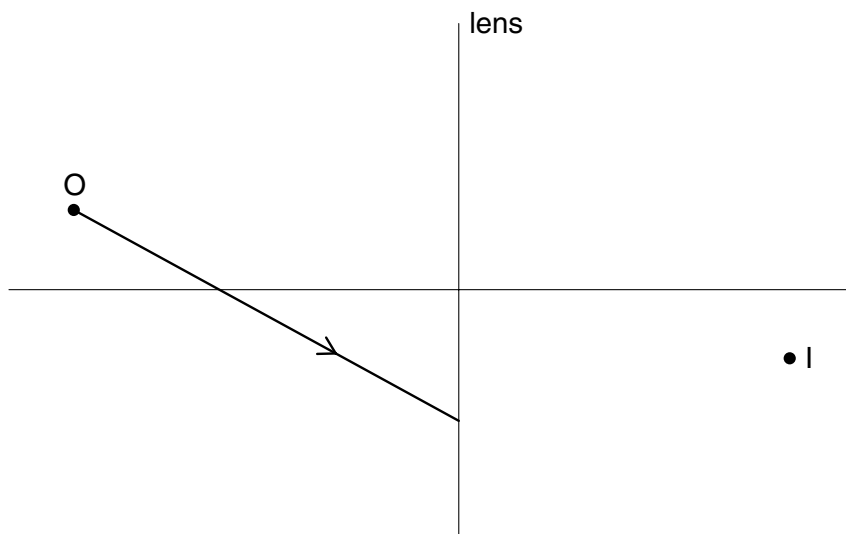


Fig. 5.1

On Fig. 5.1,

- (a) complete the path of the ray shown leaving **O**, after it passes through the lens, [1]
- (b) draw a second ray which enables you to find the position of the focal point of the lens. Mark this position **F**. [3]

6 A 240 V, 60 W lamp is operating under normal conditions. Calculate

(a) the current in the filament,

[2]

(b) the resistance of the filament,

[2]

(c) the amount of electrical energy used in 5 minutes.

[3]

7 Three steel bars look alike, but two are magnetised and one is unmagnetised. Explain how you would decide which bar is unmagnetised, without using any additional equipment.

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

8 Fig. 8.1 shows a circuit in which a cell is being used to operate two light bulbs L_1 and L_2 .

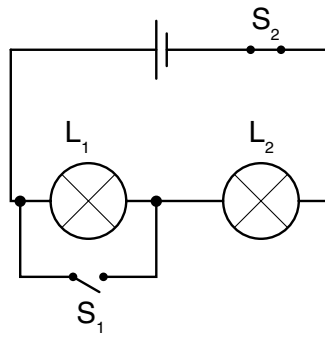


Fig. 8.1

Initially, switch S_1 is open and switch S_2 is closed (as shown in the diagram).

Describe and explain what happens to the brightness of L_1 and L_2 when

(a) S_1 is closed and S_2 remains closed,

.....

 [4]

(b) S_1 remains closed and S_2 is opened.

.....
 [2]

Section B

Answer any **two** questions.

Write your answers on the lined paper provided and, if necessary, continue on separate answer paper.

- 9 (a) Describe an experiment that would enable you to produce the extension-load graph for a spring. Draw a diagram to show the arrangement of the apparatus, and state the readings you would take. Explain what is meant by the *limit of proportionality*. [7]
- (b) A spring is suspended from a stand, and a mass of 500 g is hung from its free end. The extension is 1.6 cm. The mass is then removed, and a second identical spring is hung from the free end of the first. State and explain what will be the total extension when the mass of 500 g is hung from the lower spring. [3]
- 10 (a) An electric heater is surrounded by crushed ice in a vacuum flask. The ice is initially at a temperature of -5°C . The heater is then switched on. Sketch a graph of temperature against time for the contents of the flask, assuming that boiling eventually takes place. Include a temperature scale and describe the contents of the flask for each region on your graph. Assume that the contents of the flask have a uniform temperature at all times. [7]
- (b) A resistor has a resistance of $8.0\ \Omega$ when placed in pure melting ice and $12.0\ \Omega$ when in the steam from boiling water. At what temperature does the resistor have a value of $10.5\ \Omega$? [3]
- 11 (a) Describe an experiment to show that a given radioactive source emits alpha, beta and gamma radiation. [7]
- (b) The count rate from a radioactive substance is measured and found to be 12 000 counts per second. Calculate the expected count rate 12 minutes later, given that the half-life of the substance is 4 minutes. [3]

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