

Candidate Name _____

Centre Number

Candidate
Number

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**International General Certificate of Secondary Education
CAMBRIDGE INTERNATIONAL EXAMINATIONS**

PHYSICS

PAPER 2

0625/2

MAY/JUNE SESSION 2002

1 hour

Candidates answer on the question paper.
No additional materials required.

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

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

INFORMATION FOR CANDIDATES

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

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).

FOR EXAMINER'S USE

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This question paper consists of 19 printed pages and 1 blank page.



- 1 Here are two statements made by people who haven't learned their Physics very well. Each statement is incorrect. In the space alongside each statement, say what is wrong with the statement.

statement	what is wrong with this statement
"The weight of this bag of peas is 1 kg."	
"The mass of this object is another name for its weight."	

[2]

2 (a) Which of the following statements describe the property of a substance that would be suitable for measuring temperature? Tick the box alongside any acceptable statement.

(i) a property that increases regularly with temperature

(ii) a property that decreases regularly with temperature

(iii) a property that remains constant as the temperature changes

[2]

(b) Fig. 2.1 shows how the length of the thread in a liquid-in-glass thermometer varies with temperature.

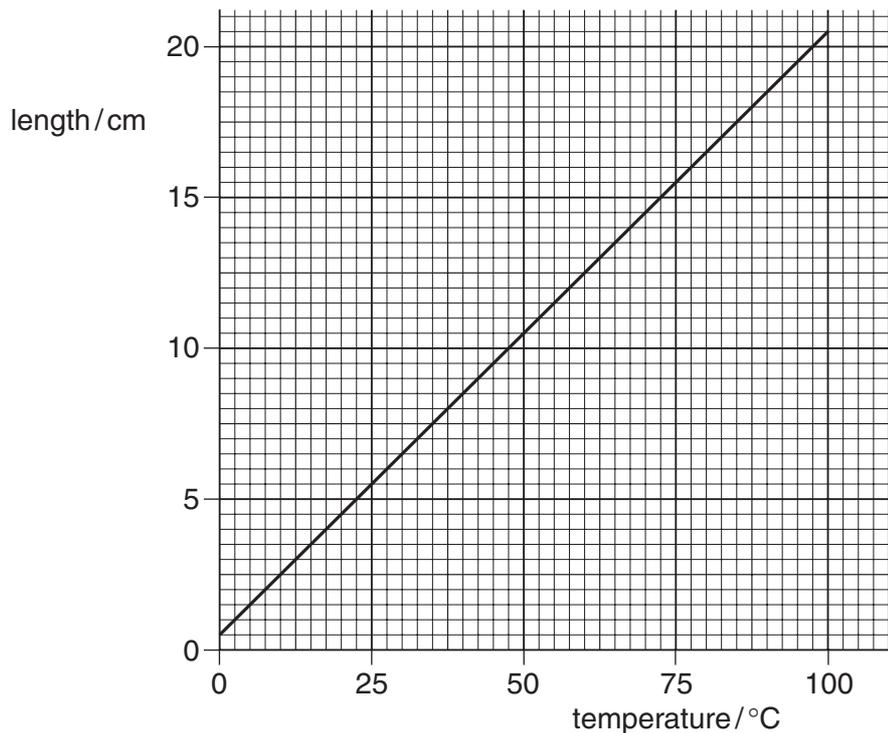


Fig. 2.1

(i) What temperature is indicated by a thread length of 14.5 cm?

temperature = °C

(ii) What happens to the thread of the thermometer if the temperature drops below the ice point?

.....

[2]

- 3 (a) Fig. 3.1 shows a machine for making loud sounds. It is called a siren. This consists of a rotating disc with 25 holes. As each hole passes the jet, a puff of air passes through the hole.

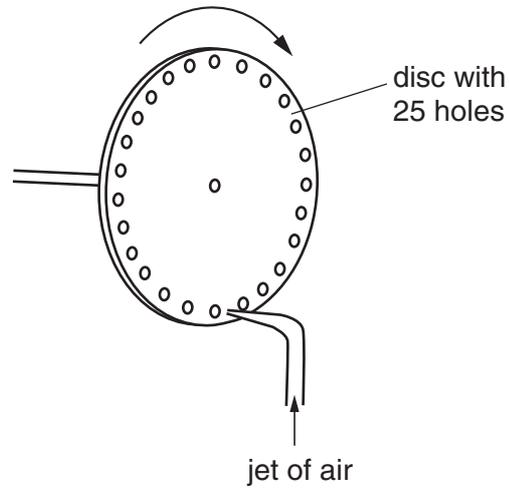


Fig. 3.1

- (i) How many puffs of air will there be during one revolution of the disc?

number of puffs =

- (ii) The disc rotates 40 times per second.

Show that the frequency of the note produced by the siren is 1000 Hz.

[3]

- (b) The siren described in (a) is located some distance from a large building, as shown in Fig. 3.2.



Fig. 3.2

The siren is briefly sounded once. A short time later, the sound is heard again.

- (i) Why is this second sound heard?

.....

- (ii) What is the frequency of this second sound? Tick one box.

less than 1000 Hz

1000 Hz

more than 1000 Hz

- (iii) What is the amplitude of this second sound? Tick one box.

less than the original sound

the same as the original sound

more than the original sound

[3]

- 4 (a) In the following table, tick the appropriate boxes to indicate where protons, neutrons and electrons are found in an atom.

particle	found in the nucleus	found in an orbit
proton		
neutron		
electron		

[3]

- (b) A neutral atom of phosphorus (P) contains 15 protons, 16 neutrons and 15 electrons.

- (i) Write down the proton number (atomic number) of phosphorus.
- (ii) Write down the nucleon number (mass number) of phosphorus.
- (iii) The nuclide notation for oxygen is $^{16}_8\text{O}$.

Write down the nuclide notation for phosphorus.

[3]

5 (a) Describe one method of magnetising a steel rod.

.....

.....

.....[2]

(b) How would you check that the steel rod had been magnetised?

what I would do	what would show that the steel rod had been magnetised

[2]

(c) A glass tube is supported vertically on a bench. A strong bar magnet A is placed in the bottom of the tube, as shown in Fig. 5.1.

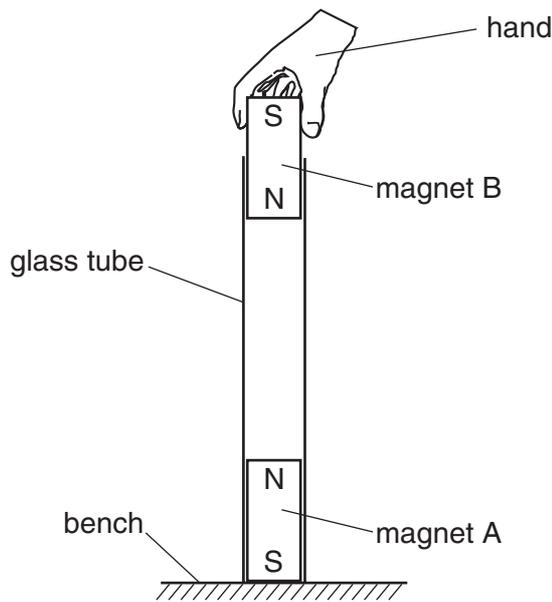


Fig. 5.1

A second magnet B is now dropped into the tube. Describe what happens to magnet B, and explain why.

what happens to magnet B	explanation

[3]

6 Fig. 6.1 shows a vacuum tube in which it is hoped to generate cathode rays.

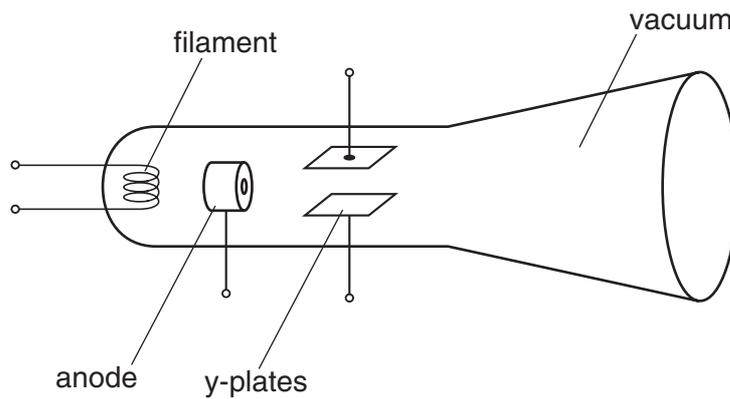


Fig. 6.1

- (a) (i) On Fig. 6.1, draw the symbol for a battery connected so that thermionic emission occurs.
- (ii) What particles are emitted in thermionic emission? [2]

(b)

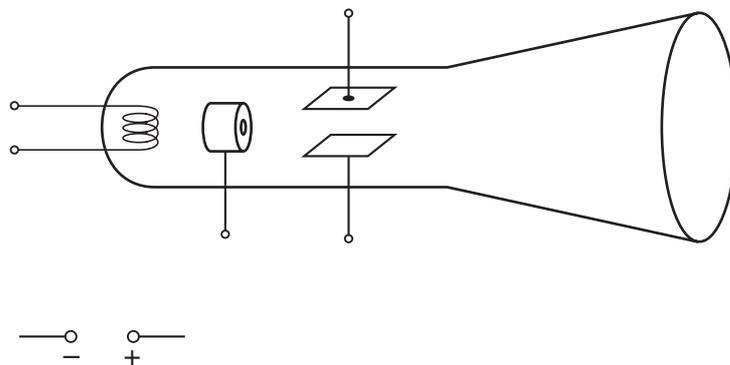


Fig. 6.2

- (i) On Fig. 6.2, show the + and – terminals suitably connected so that cathode rays may pass along the tube.
- (ii) On Fig. 6.2, draw a line showing the path of the cathode rays.
- (iii) How are the cathode rays detected in the tube?

.....
.....

[4]

(c) Fig. 6.3 shows the same vacuum tube, with the terminals labelled.

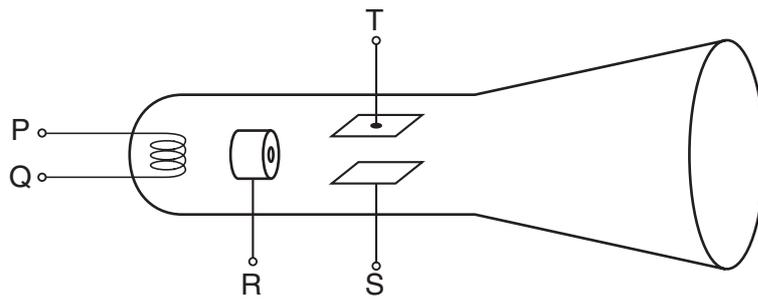


Fig. 6.3

Between which two points should a battery be connected if the cathode rays are to be deflected upwards?

between point and point [1]

- 7 Fig. 7.1 illustrates one country's system for transmitting electricity around the country, from the power station to people's houses.

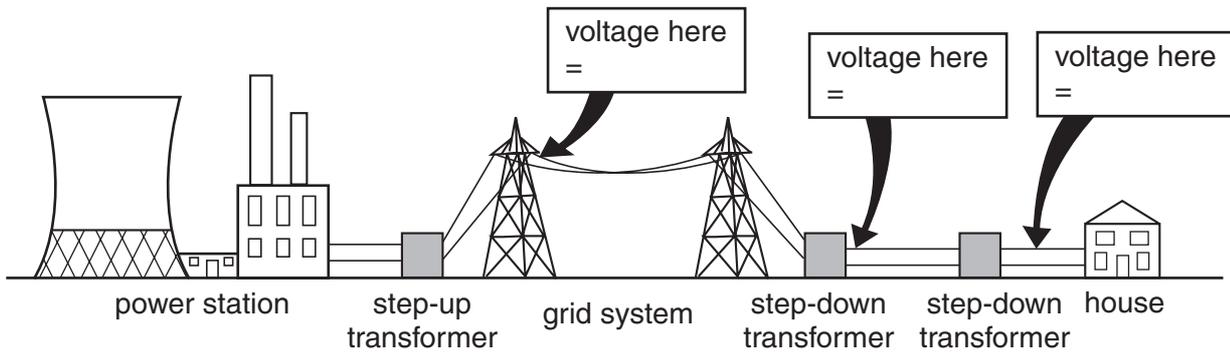


Fig. 7.1

- (a) At different points in this system, the voltage is 220 V, 11 000 V or 132 000 V. At the three places marked on Fig. 7.1, write in the appropriate value of the voltage. [3]
- (b) State one advantage of using high voltages for the transmission of electricity.

.....

.....[1]

- 8** In a research laboratory using radioactive materials, safety precautions have to be observed. Some of the safety precautions adopted by the laboratory are listed below.

On the lines after each precaution, state reasons why it is a wise precaution.

- (a)** Radioactive materials should only be picked up using long-handled tools.

REASON 1

.....

REASON 2

.....[2]

- (b)** Food must not be taken where radioactive materials are being used.

REASON

.....[1]

- (c)** The researchers must wash their hands after the source has been put away safely.

REASON

.....[1]

- (d)** Radioactive materials must be stored in a locked drawer or cabinet.

REASON

.....[1]

- 9 (a) Fig. 9.1 shows a circuit that includes three ammeters. The resistance of the ammeters and the battery can be ignored.

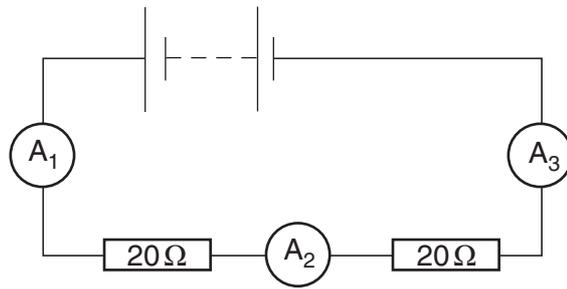


Fig. 9.1

- (i) What is the total resistance of the circuit?

resistance = Ω

- (ii) Ammeter A₁ reads 0.2 A. What do the other two ammeters read?

A₂ reads A

A₃ reads A

[3]

(b) Fig. 9.2 shows the same components as in (a), but connected differently.

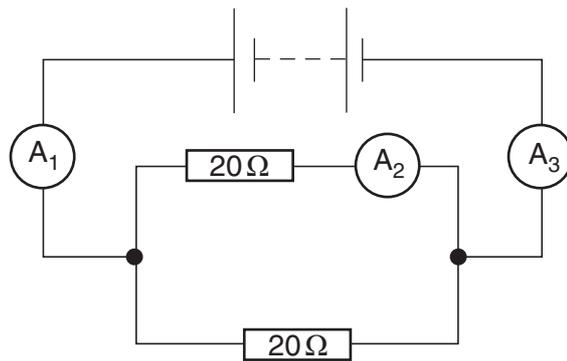


Fig. 9.2

(i) What is the total resistance of the circuit? Tick one box.

40 Ω

30 Ω

20 Ω

10 Ω

(ii) Ammeter A_1 reads 0.8 A. What do the other two ammeters read? Tick the appropriate boxes.

	more than 0.8 A	0.8 A	less than 0.8 A
A_2 reads			
A_3 reads			

[3]

10 (a) A manufacturer of car tyres estimates that the area of a car tyre in contact with the road is about the same as the area of a person's shoe in contact with the ground.

(i) A car weighs 10 000 N and a person weighs 500 N.

Calculate the ratio

$$\frac{\text{pressure of car on ground}}{\text{pressure of person on ground}}$$

Remember that the car has 4 tyres and a person has 2 feet.

(ii) Suggest why it might be a good idea to reduce the pressure of the air in car tyres if the car is to be driven over soft sand or over snow.

.....

.....

.....

[5]

(b) A U-tube manometer is used to measure lung pressure by blowing at A, as shown in Fig. 10.1.

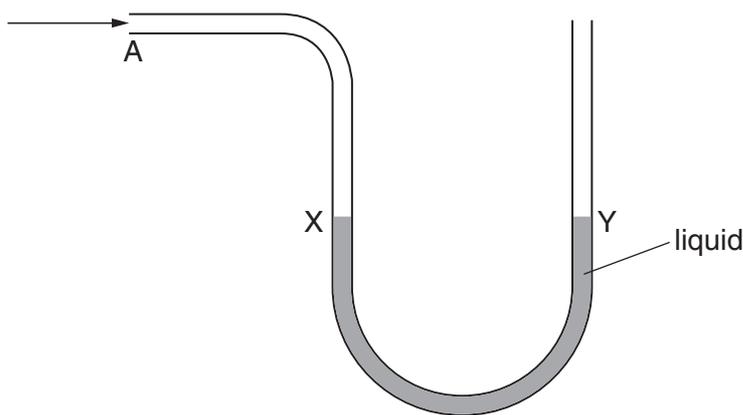


Fig. 10.1

(i) Before the person blows at A, the liquid levels X and Y are the same.

State the reason for this.

.....

(ii) Which way do the liquid levels move when the person blows at A?

level X moves

level Y moves

(iii) What would you measure in order to find the person's lung pressure?

.....
.....

[4]

- 11 In an experiment, different weights are hung on the end of a spring, and the length of the spring is measured. The results are as follows.

weight/N	0	1	2	3	4	5	6	7
length/mm	40	48	60	64	72	80	88	96
extension/mm	0	8	20					

- (a) What is the length of the unstretched spring?

length of unstretched spring = mm [1]

- (b) Some of the extensions have been calculated for you.

Complete the table by writing in the remaining extensions. [2]

- (c) (i) On the graph grid of Fig 11.1, plot the values from your table.

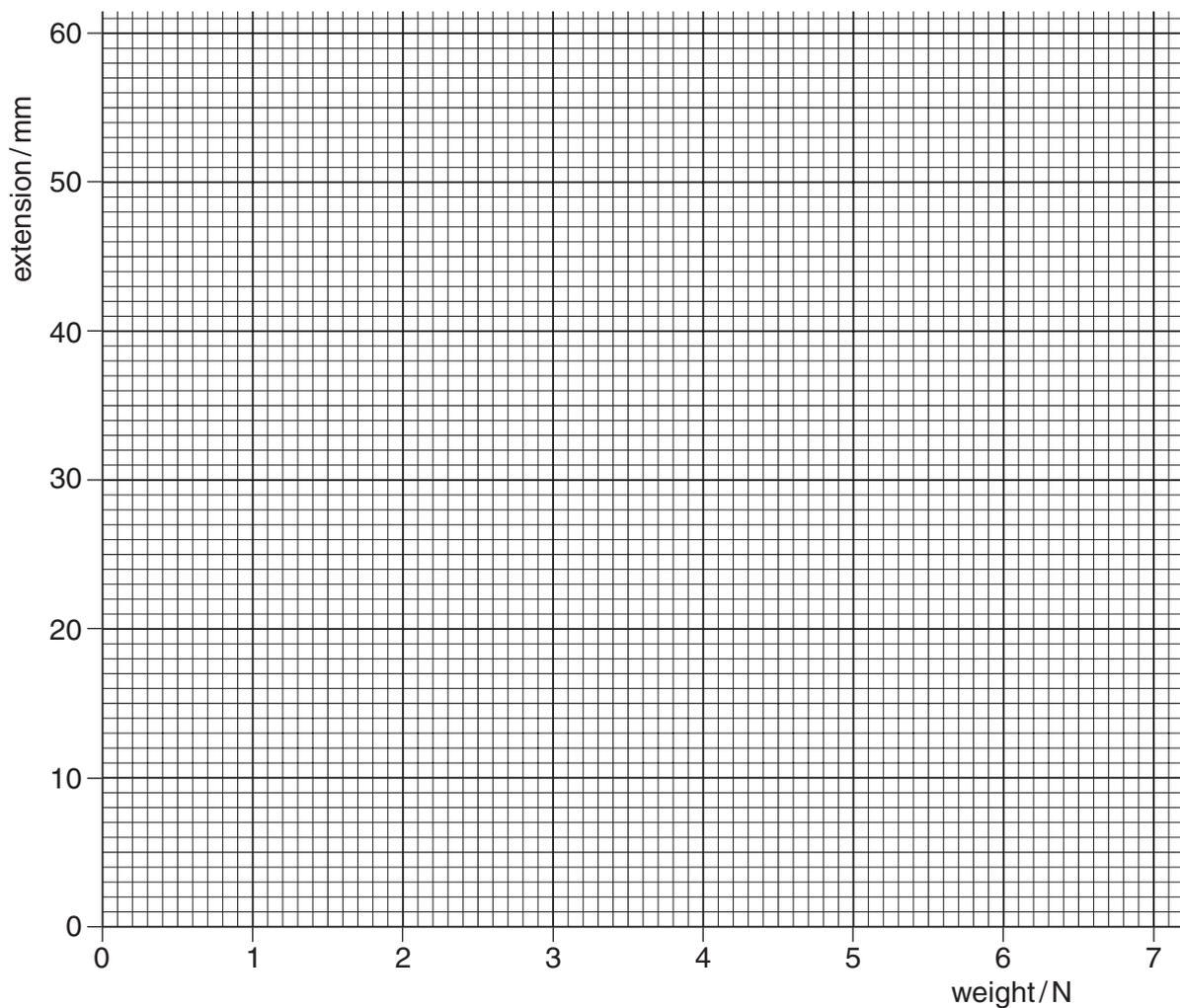


Fig. 11.1

- (ii) Draw the best straight line through your points.
- (iii) The experimenter has read one of the lengths incorrectly.
 1. Which one is it?
 2. What do you think the length reading should have been? mm

[5]

(d) The spring is now attached to a block resting on a rough surface, as shown in Fig. 11.2.

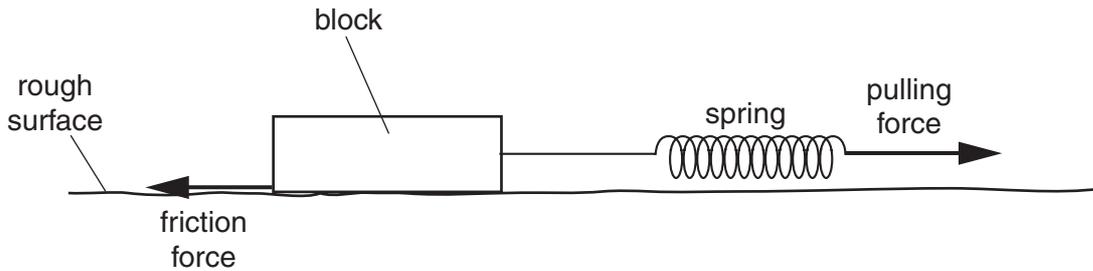


Fig. 11.2

As the pulling force is increased, the block just starts to move to the right when the spring is 68 mm long.

- (i) What is the extension of the spring when it is 68 mm long?

extension = mm
- (ii) Use your graph to find the force that causes this extension.

force = N
- (iii) What is the value of the friction force as the block starts to move?

friction force = N

[4]

- 12 (a) A beam of light is travelling parallel to the axis of a thin lens, as shown in Fig. 12.1.

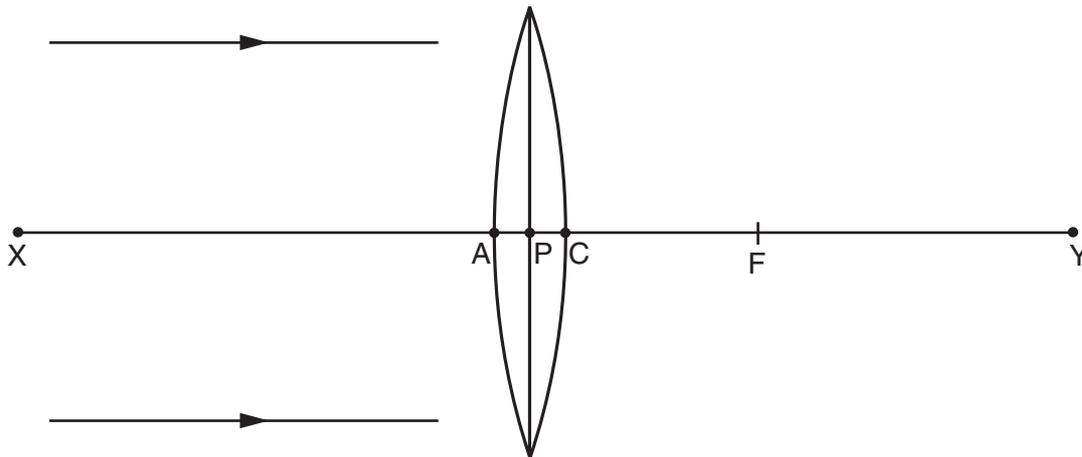


Fig. 12.1

After passing through the lens, the rays all pass through the point F.

- (i) Which word best describes what happens to the rays? Tick one box.

The rays	converge	<input type="checkbox"/>
	diffract	<input type="checkbox"/>
	disperse	<input type="checkbox"/>
	reflect	<input type="checkbox"/>

- (ii) On Fig. 12.1, complete the paths of the two rays.
 (iii) Complete the following sentence, referring to Fig. 12.1.

“The focal length of the lens is the distance between point and point”

[3]

(b) In this part of the question, you are required to draw an accurate ray diagram on Fig. 12.2 for the lens in part (a).

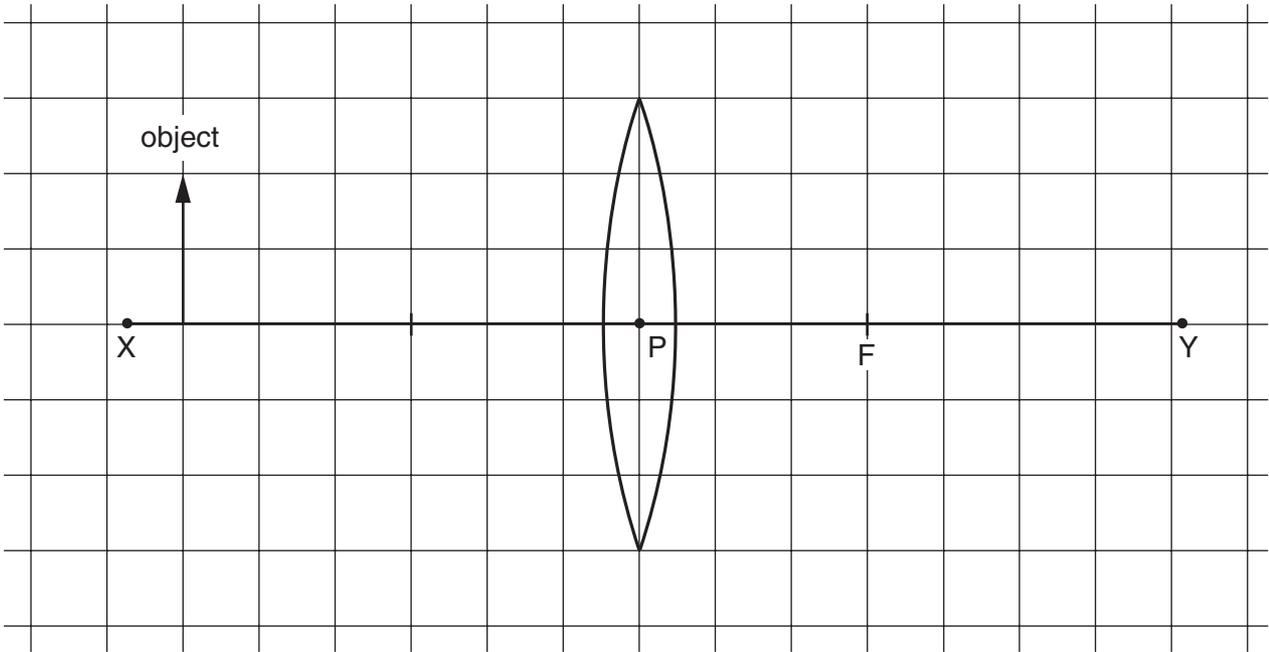


Fig. 12.2

- (i) From the top of the object, draw a ray that, after leaving the lens, passes through F.
- (ii) From the top of the object, draw a ray that passes through P.
- (iii) Mark in the image, and write "image" alongside it.
- (iv) From your diagram, state two things that are the same (or approximately the same) about the image and the object.

1.

2.

- (v) From your diagram, state one thing that is definitely different about the image and the object.

.....

[9]

