New Specification

Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2012–2013

Science: Single Award

Unit 3 (Physics)

Foundation Tier

[GSS31]

GSS31

WEDNESDAY 14 NOVEMBER 2012, AFTERNOON

TIME

1 hour.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all eight** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 60.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
Quality of written communication will be assessed in question **8(a)**.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
Total Marks	

Examiner Only	
Marks	Remark

1 **(a)** The table below gives some information about the planets in our Solar System.

(i) Complete the table below by naming the first planet. [1]

Planet	Distance from the Sun /million km	Surface temperature /°C
	58	430
Venus	108	470
Earth	150	22
Mars	228	−23
Jupiter	778	−150
Saturn	1427	−180
Uranus	2870	−210
Neptune	4497	−220

(ii) Using the information above suggest why humans would find it impossible to live on Venus.

_____

_____ [1]

(b) Complete the following sentences.

Choose from:

fusion : star : friction

planet : gravity : fission

The Sun is our nearest _____, it is made from a gas called hydrogen. This gas is pulled together by the force of _____. This gas is used to make energy in a nuclear process called _____. [3]

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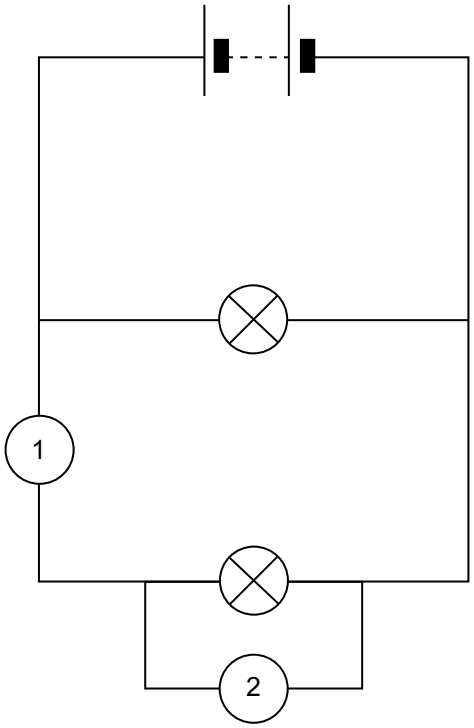
Examiner Only	
Marks	Remark

2 **(a)** The circuit below uses meters 1 and 2 to measure current and voltage.



(i) What type of meter is placed at position 1 to measure current?

Circle the correct answer.

newtonmeter : ammeter : voltmeter [1]

(ii) Complete the following sentences.

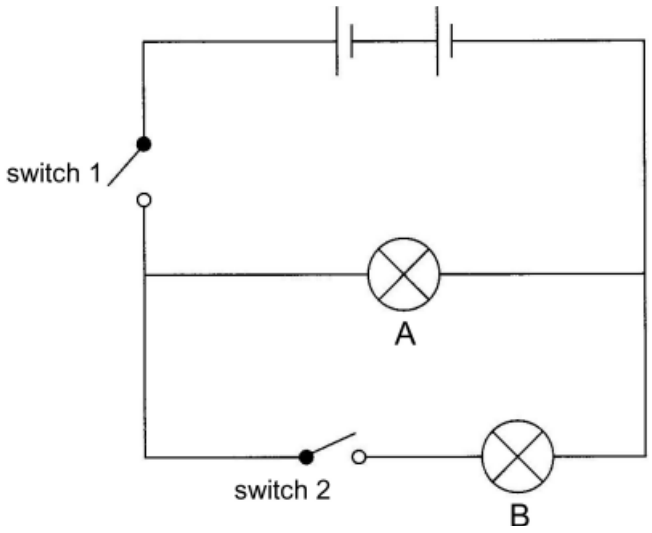
Choose from:

parallel : goes out

gets dimmer : stays lit : series

In this circuit meter 2 is connected in _____ and the bulbs are connected in _____. If one of the bulbs is broken the other bulb _____. [3]

(b) A student set up the following circuit.



Complete the table to show if the bulbs are lit or not lit for the switch positions given.

Use a tick (✓) to show if the bulb is lit and a cross (✓) if it is not lit.

Switch 1	Switch 2	Bulb A	Bulb B
open	open		
closed	open		

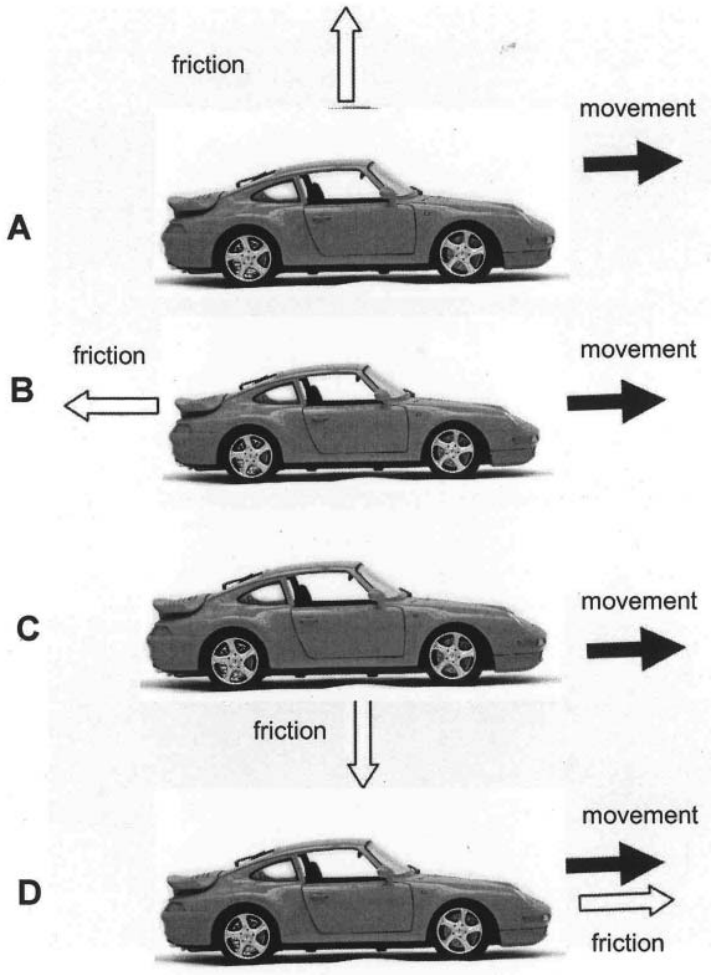
[2]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

3 The diagram below shows a car moving on a flat straight road.



(a) Which diagram **A**, **B**, **C** or **D** shows the correct direction in which friction acts?

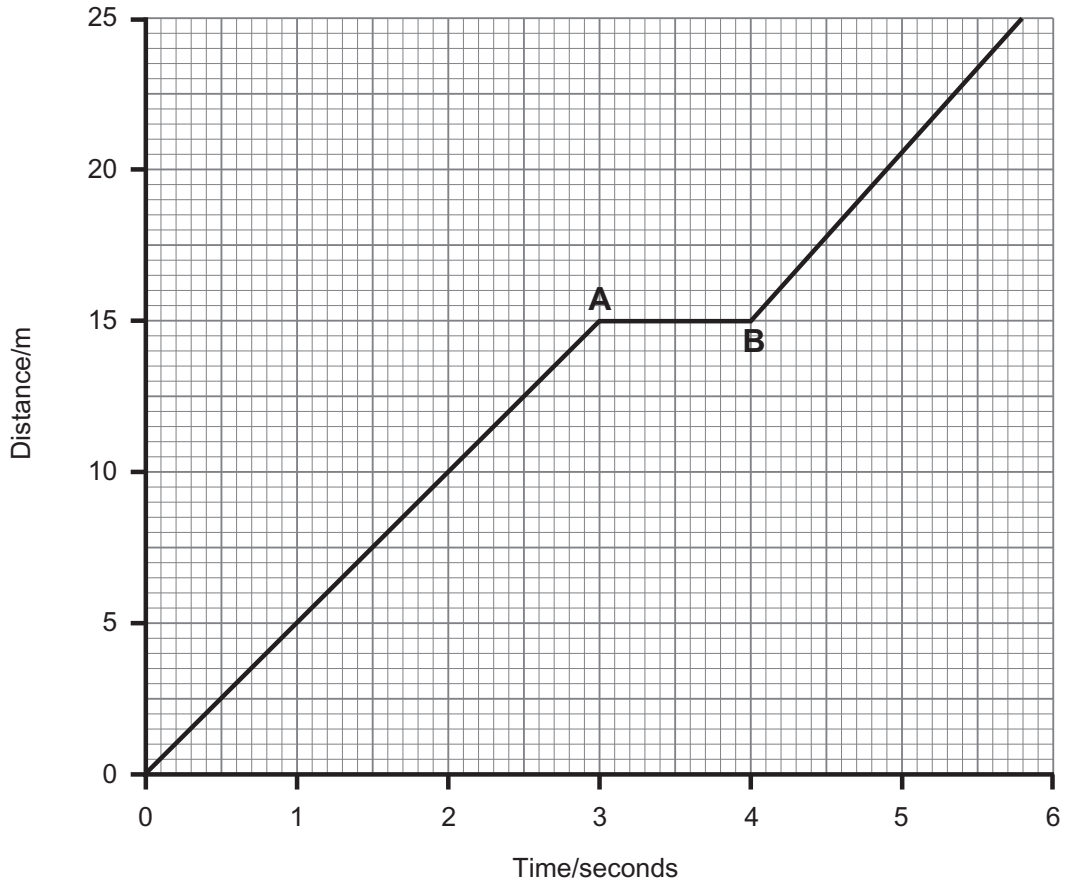
Answer _____ [1]

(b) Complete the sentence below.

Friction is a _____ which _____

moving objects. [2]

(c) Shown below is a distance–time graph for a car.



(i) Describe the motion of the car from **A** to **B**.

Choose from:

stopped : steady speed : accelerating

Answer _____ [1]

(ii) Use the graph to find the distance the car travels in the first two seconds.

Answer _____ m [1]

(iii) Use the equation:

$$\textbf{speed} = \frac{\textbf{distance}}{\textbf{time}}$$

to calculate the speed of the car in the first two seconds.

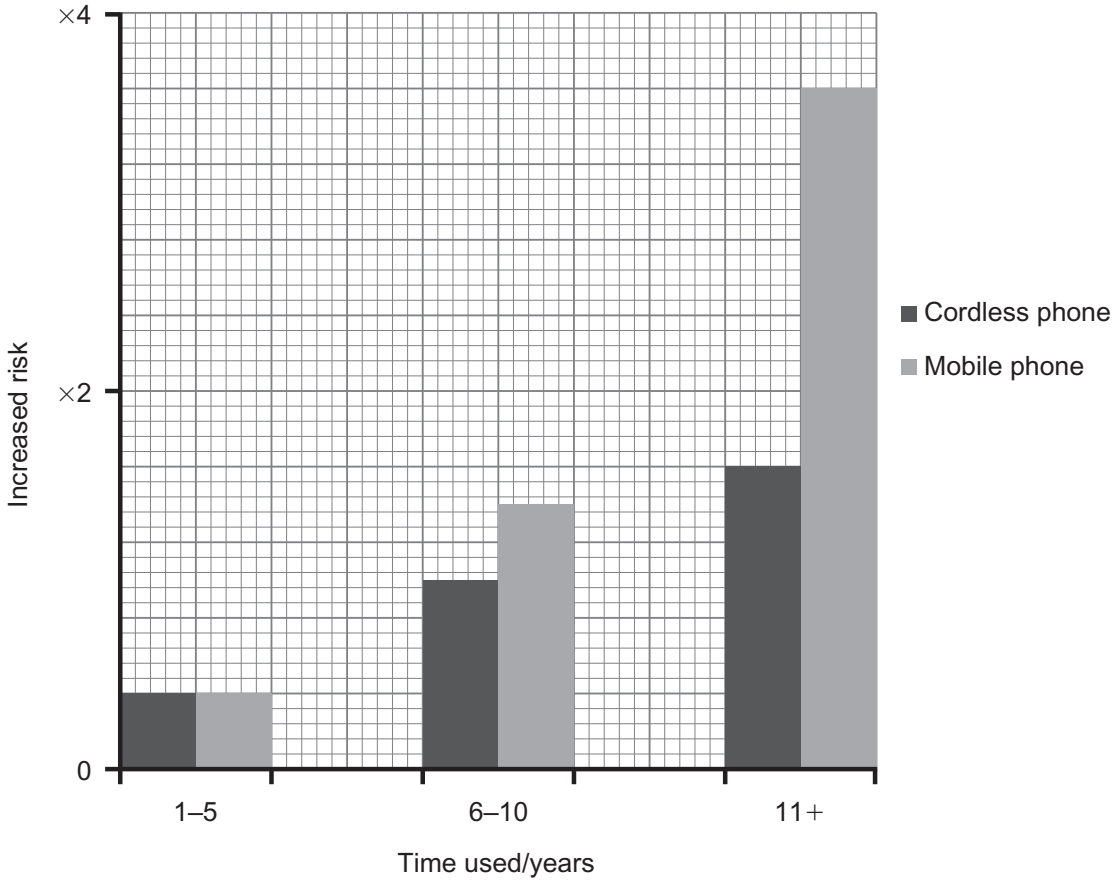
Answer _____ m/s [1]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

4 **(a)** The bar graph below shows how the use of two types of phone increases the risk of developing cancer.



(i) State **two** trends shown by this graph.

1. _____

_____

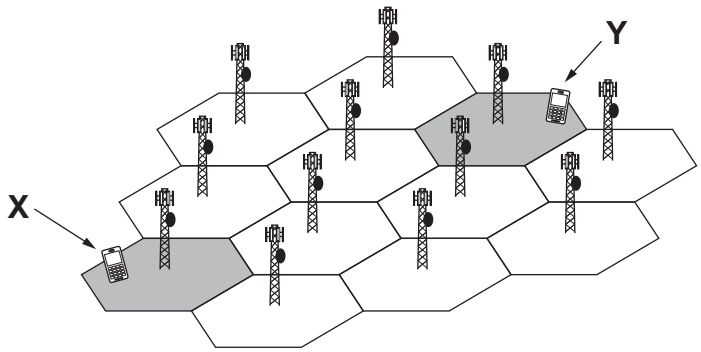
2. _____

_____ [2]

(ii) Name the part of the body most likely to develop cancer when using these phones.

_____ [1]

The diagram below shows a mobile phone network.



(b) Using the diagram explain fully how a signal goes between phone **X** and phone **Y**.

_____

_____

_____ [2]

(c) Given below are some types of electromagnetic radiation and some uses. Using lines link each type to **one** common use.

Radiation	Use
X-rays	to treat cancer
infrared	T.V. remote controls
gamma rays	sun tanning
	to look at broken bones

[3]

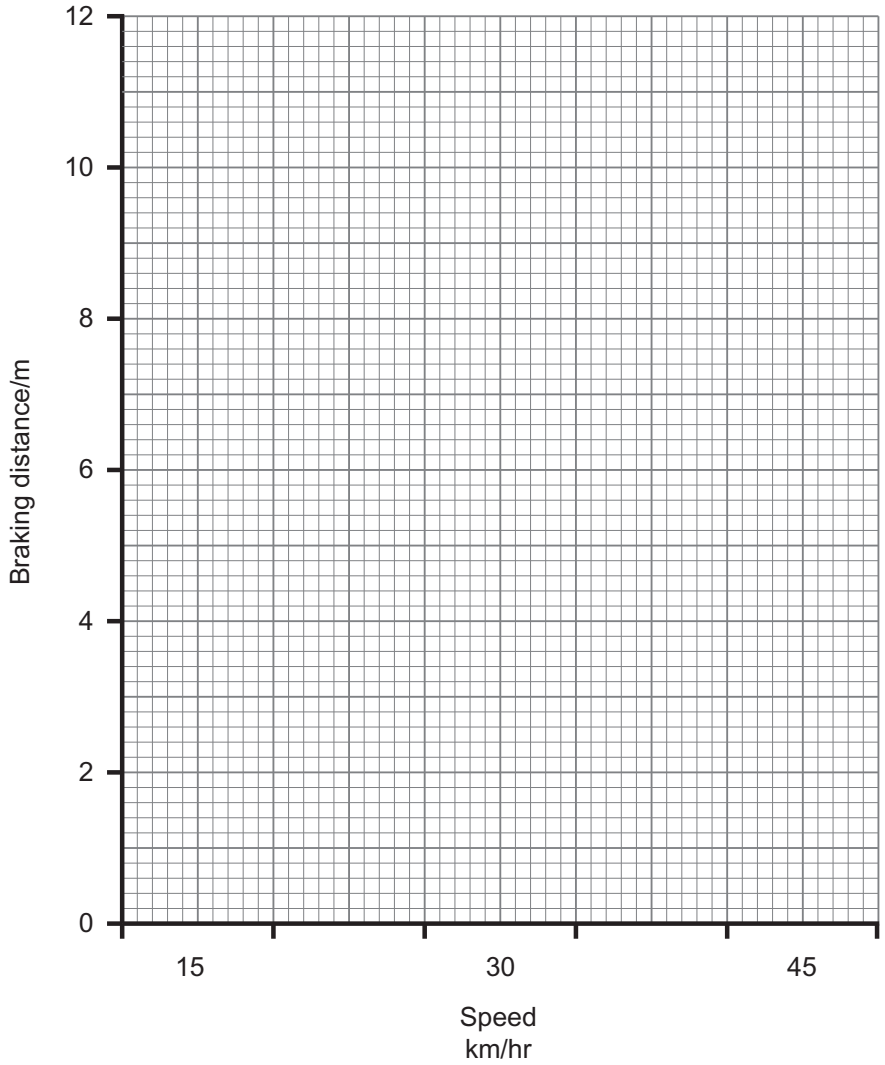
Examiner Only

Marks	Remark

5 **(a)** The table below shows the braking distance at different speeds.

Speed km/hr	Braking distance/m
15	1
30	5
45	12

Draw a **bar graph** for the braking distance on the grid below.



[2]

Examiner Only

Marks	Remark

(b) The table below shows how the braking and thinking distances can be affected by the number of people in a car at different speeds.

Speed km/hr	braking distance/m		thinking distance/m	
	car and driver only	car, driver and three passengers	car and driver only	car, driver and three passengers
15	1	3	3	3
30	5	7	6	6
45	12	14	8	8
60	21	23	11	11

(i) Calculate the **stopping** distance for a car with a driver and three passengers travelling at 60 km/hr.

Answer _____ m [1]

(ii) Explain fully what is meant by the term 'braking distance'.

_____

_____ [1]

(iii) In what way, if any, does the thinking distance change if the car has passengers?

_____

_____ [1]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

(c) The table below is used by crash investigators to work out how fast a car was travelling before a collision. They do this by measuring the length of a skid.

Length of skid /m	Initial speed on different surfaces km/hr		
	Dry tarmac	Wet tarmac	Ice
1	13.4	11.8	6.2
2	18.8	16.7	8.7
3	23.1	20.5	10.7
4	26.7	23.6	12.3
5	29.8	26.4	13.4

(i) Suggest **two** factors which must have been kept the same to make sure the results were valid.

1. _____

2. _____ [2]

(ii) How many **times** longer is a skid on ice compared to a skid on dry tarmac at 13.4 km/hr?

_____ [1]

(iii) State **two** conclusions that can be seen from the results in the table.

1. _____

2. _____ [2]

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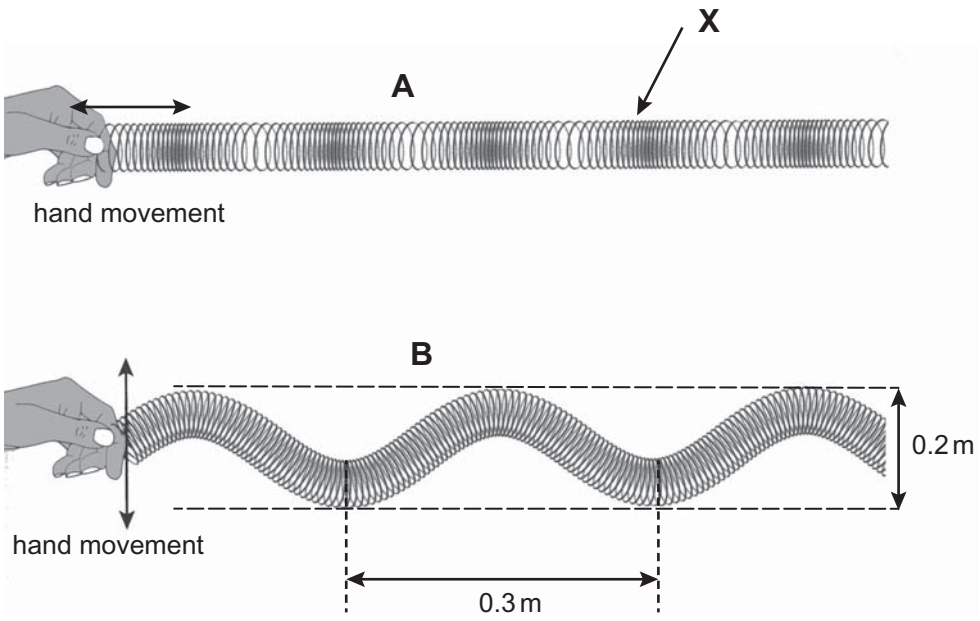
Examiner Only	
Marks	Remark

6 **(a)** Slinky springs are often used to demonstrate waves as shown in the diagrams **A** and **B** below.



(i) Name the type of wave represented by diagram **A**.

_____ [1]

(ii) Describe fully how point **X** moves as the wave passes along the slinky in diagram **A**.

_____

_____ [2]

(iii) What is the amplitude of the wave represented by diagram **B**?

Answer _____ m [1]

(iv) What is the wavelength of the wave represented by diagram **B**?

Answer _____ m [1]

(b) Wave **B** produces 20 complete waves in 5 seconds.

Calculate the frequency of the wave.

Answer _____ Hz [1]

(c) Use the equation:

speed = frequency × wavelength

to calculate the speed of a wave with a frequency of 20 Hz and a wavelength of 90 m.

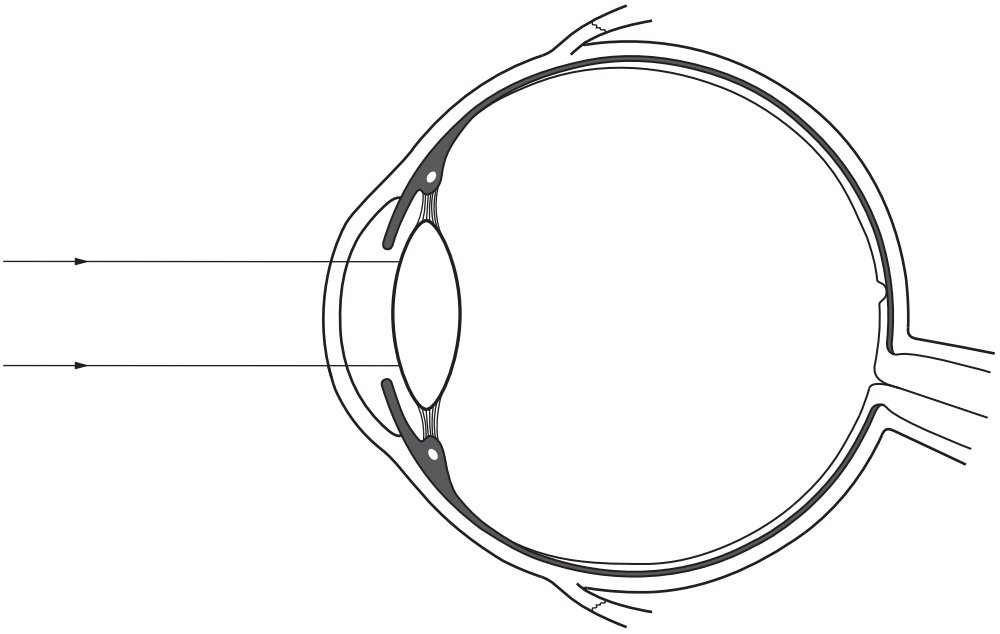
(Show your working out.)

Answer _____ m/s [2]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

7 **(a)** The diagram below shows two parallel rays of light entering the eye. Complete the diagram to show the path of the rays in the formation of a clear image.



[2]

(b) **(i)** Short sight is a common eye defect. Explain fully the cause and effect of short sight.

_____

_____

_____

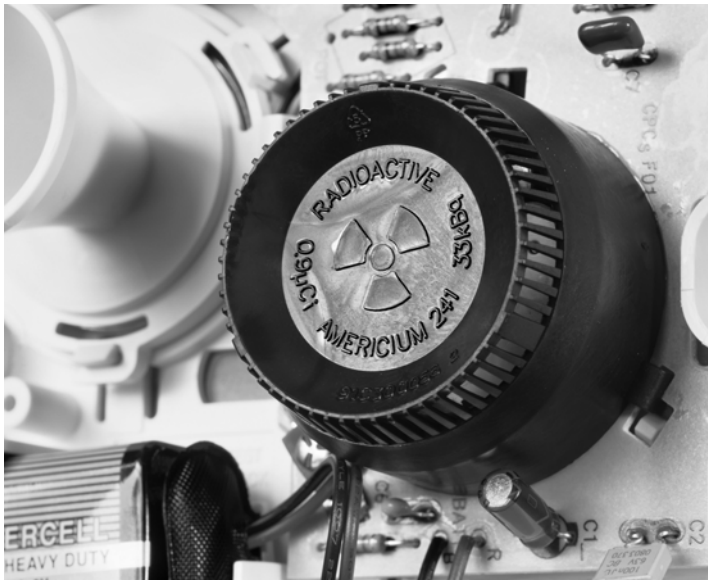
_____ [3]

(ii) Name the type of lens used to correct short sight.

_____ [1]

Examiner Only	
Marks	Remark

8 **(a)** The photograph below shows the radioactive source found in a smoke alarm.



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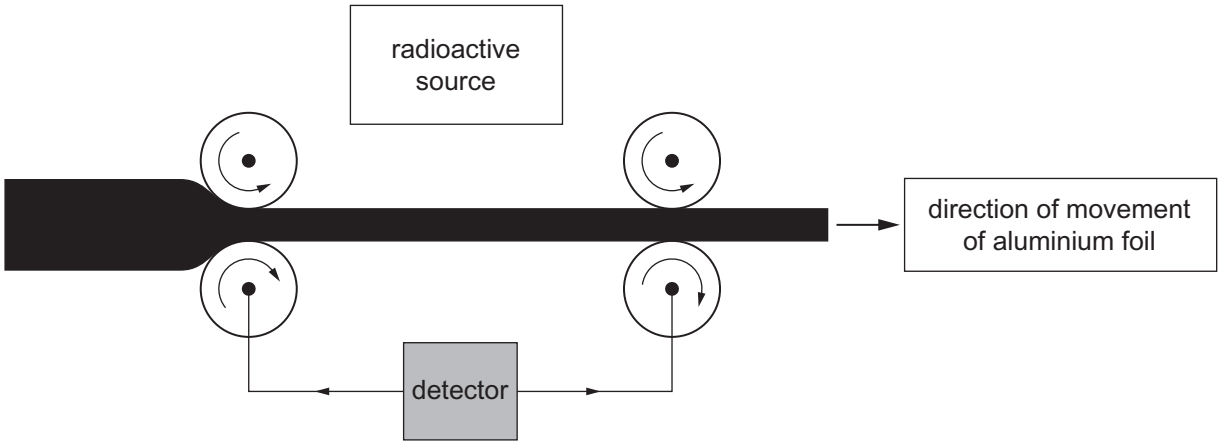
Describe a simple experiment to show which type of radiation (alpha, beta or gamma) is emitted by the radioactive source in the smoke alarm.

Your answer should include one way to ensure valid results.

In this question you will be assessed on your written communication skills including the use of specialist scientific terms.

[6]

(b) The equipment shown below is used in industry to monitor the thickness of aluminium foil.



Examiner Only	
Marks	Remark

The table below gives possible radioactive sources which could be used.

Radioactive source	Radiation emitted	Half-life
A	alpha	1000 years
B	beta	1000 years
C	beta	2 minutes
D	gamma	4 years

(i) Explain fully what is meant by the term 'half-life'.

_____

_____ [2]

(ii) Which source, **A**, **B**, **C** or **D** would be best to monitor the thickness of the aluminium? Explain your answer.

Source _____ [1]

Explanation _____

_____

_____ [2]

THIS IS THE END OF THE QUESTION PAPER

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