



Rewarding Learning

General Certificate of Secondary Education  
2012–2013

Centre Number

71	
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Candidate Number

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## Science: Single Award

Unit 3 (Physics)

Foundation Tier

[GSS31]

ML

THURSDAY 23 MAY 2013, MORNING

### TIME

1 hour, plus your additional time allowance.

### 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 nine** 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.

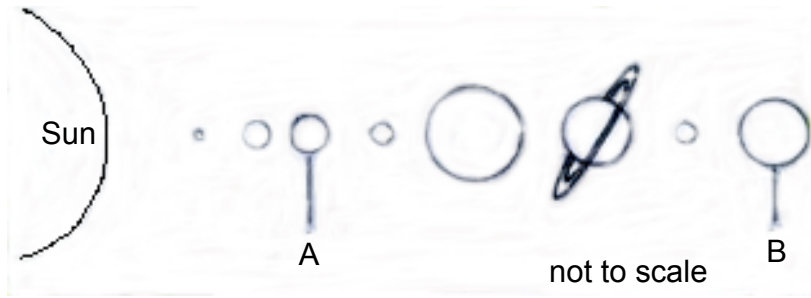
Quality of written communication will be assessed in question **9**.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	

<b>Total Marks</b>	
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1 (a) The diagram below shows the Sun and its eight planets.



© GCSE Science Single Award for CCEA by James Napier, Alyn G McFarland and Roy White, published by Hodder Education, 2013. ISBN 978-1-444-195729. Reproduced by permission of Hodder Education

(i) Name the planets labelled A and B.

Planet A \_\_\_\_\_

Planet B \_\_\_\_\_

[2]

(ii) Complete the following sentence.

The Sun and its planets are known as the \_\_\_\_\_

[1]

(b) Complete the following sentences.

Choose from:

**moon      star      galaxy      planet**

A \_\_\_\_\_ is a huge collection of stars.

A \_\_\_\_\_ is an object that orbits a planet.

A \_\_\_\_\_ is an object that orbits a star.

[3]

(c) Place a tick (✓) in the correct box, to describe the movement, if any, of the galaxies.

They are not moving

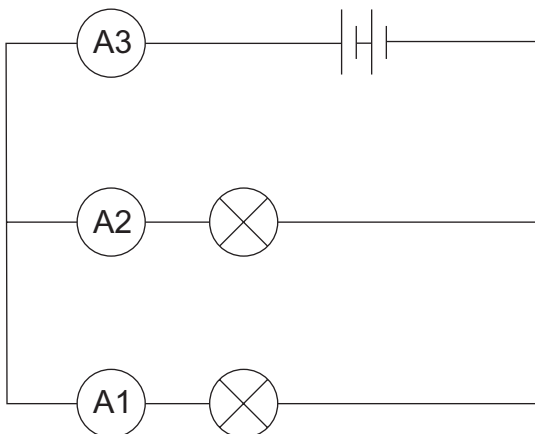
They are staying the same distance apart

They are moving away from each other

[1]

Examiner Only	
Marks	Remark

2 (a) The diagram below shows an electrical circuit.



(i) What word is used to describe how the bulbs are placed in this circuit?

\_\_\_\_\_ [1]

(ii) Ammeter A1 has a reading of 4 amps. What will be the reading on:

● ammeter A2? \_\_\_\_\_ A

● ammeter A3? \_\_\_\_\_ A [2]

(b) Write down **two** changes that take place when more batteries are added to the circuit above.

1. \_\_\_\_\_

2. \_\_\_\_\_ [2]

(c) A microwave oven uses 750 W of power and is connected to a voltage of 250 V.

Use the equation:

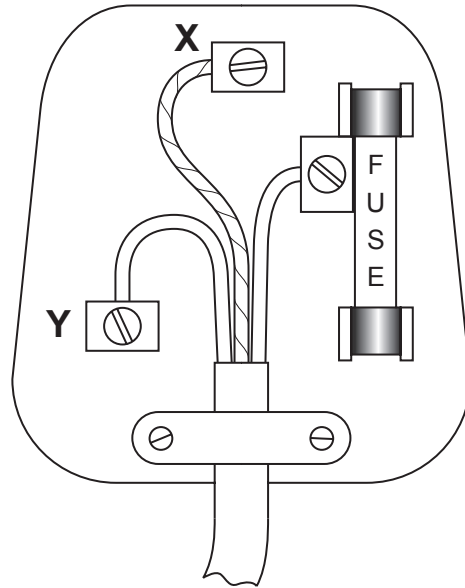
$$\text{current} = \frac{\text{power}}{\text{voltage}}$$

to calculate the current.  
(Show your working out.)

\_\_\_\_\_ A [2]

Examiner Only	
Marks	Remark

(d) The diagram below shows a three-pin plug.



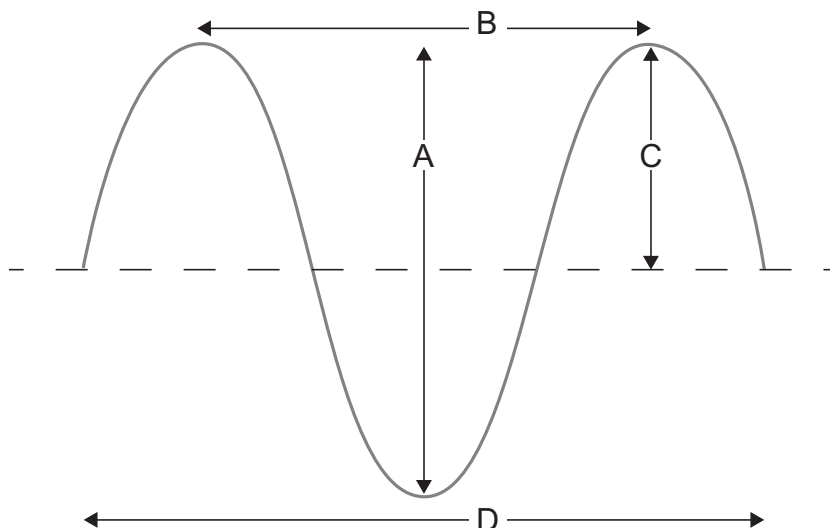
Complete the table below.

Terminal	Name of terminal	Colour of wire connected to terminal
X		yellow and green
Y	neutral	

[2]

Examiner Only	
Marks	Remark

3 (a) The diagram below shows a wave.



Which line (A, B, C or D) shows the:

1. wavelength? \_\_\_\_\_

2. amplitude? \_\_\_\_\_

[2]

(b) Complete the following sentences.

Choose from:

**frequency**

**audible**

**ultrasound**

**X-rays**

**energy**

Humans can hear sound with a \_\_\_\_\_ between

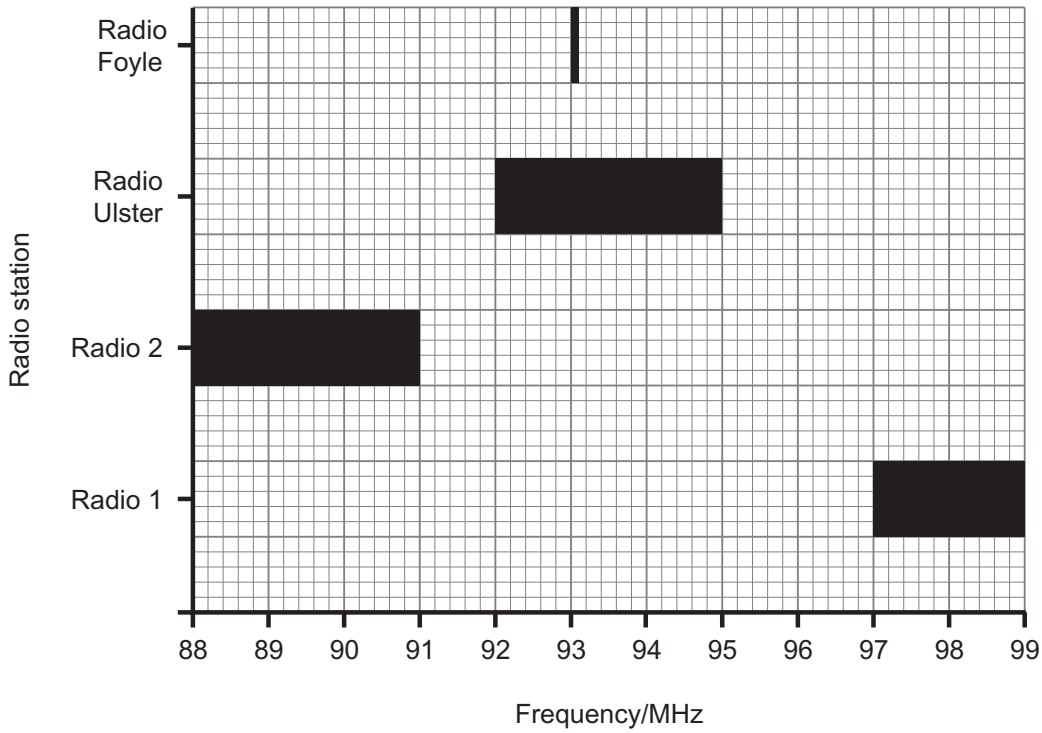
20 Hz and 20 kHz. This is called the \_\_\_\_\_ range.

Unborn babies are scanned using \_\_\_\_\_ .

[3]

Examiner Only	
Marks	Remark

(c) Shown below are the frequencies of four radio stations.



(i) Radio waves are part of the electromagnetic spectrum. What type of waves are radio waves?

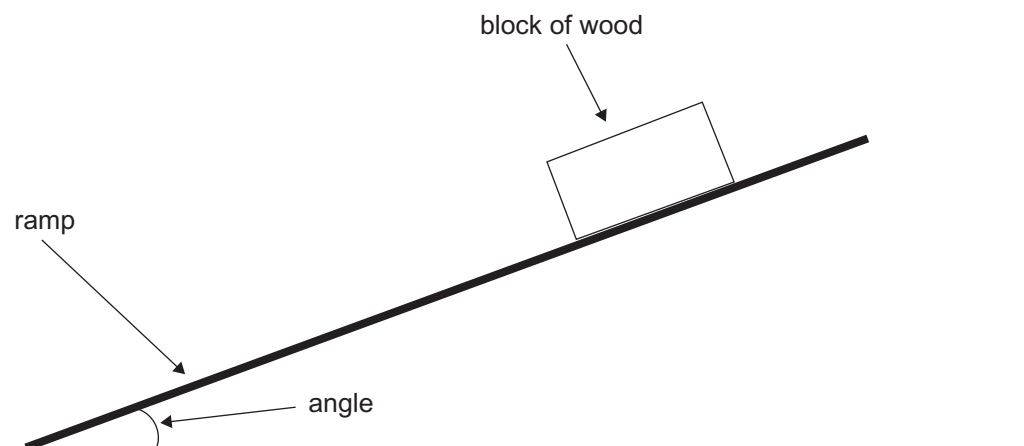
\_\_\_\_\_ [1]

(ii) What is the frequency range used by Radio Ulster?

\_\_\_\_\_ MHz [1]

Examiner Only	
Marks	Remark

- 4 (a) The apparatus below was used to investigate friction. The angle was increased until the block started to slide.



The ramp was covered with four different surfaces.

The results are shown in the table below.

Surface	Angle
sandpaper	34°
polystyrene	30°
plastic	18°
cork	24°

- (i) State **one** thing that must be done to make the results valid (fair test).

\_\_\_\_\_ [1]

- (ii) How could the investigation be made more reliable?

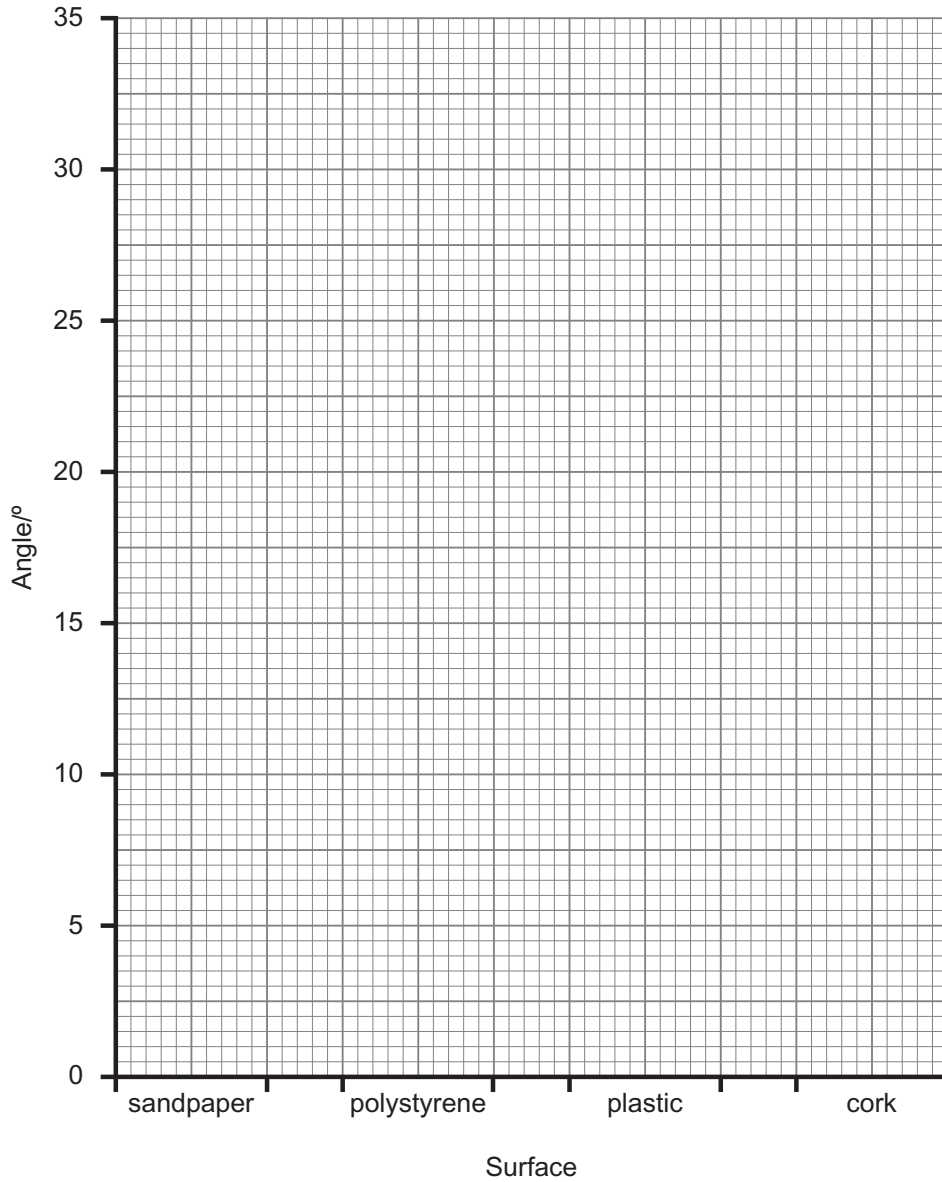
\_\_\_\_\_  
\_\_\_\_\_ [1]

Examiner Only

Marks Remark



(iii) On the grid below draw a **bar graph** of these results.



[2]

(iv) Which surface has the most friction?

\_\_\_\_\_ [1]

(v) If the wooden block was heavier, what effect, if any, would it have on the amount of friction?

\_\_\_\_\_ [1]

(b) Complete the sentence below.

Friction is a \_\_\_\_\_ which tries to \_\_\_\_\_ moving objects.

[2]

Examiner Only	
Marks	Remark

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- 5 Look at the table below. It shows how the percentage of children wearing seat belts in a car has changed from 1995 to 2012.

Age group	Year				
	1995	2000	2005	2010	2012
Under 1 year	96	97	98	98	100
1–4	65	82	92	96	97
5–9	49	68	82	94	94
10–13	47	65	82	93	95
<b>All children</b>	<b>59</b>	<b>74</b>	<b>86</b>	<b>93</b>	<b>96</b>

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- (a) Describe **two** trends that can be seen in this data.

1. \_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_ [2]

- (b) The government are still advertising the need for children to wear seat belts. Use the information in the table to suggest why advertising is still necessary.

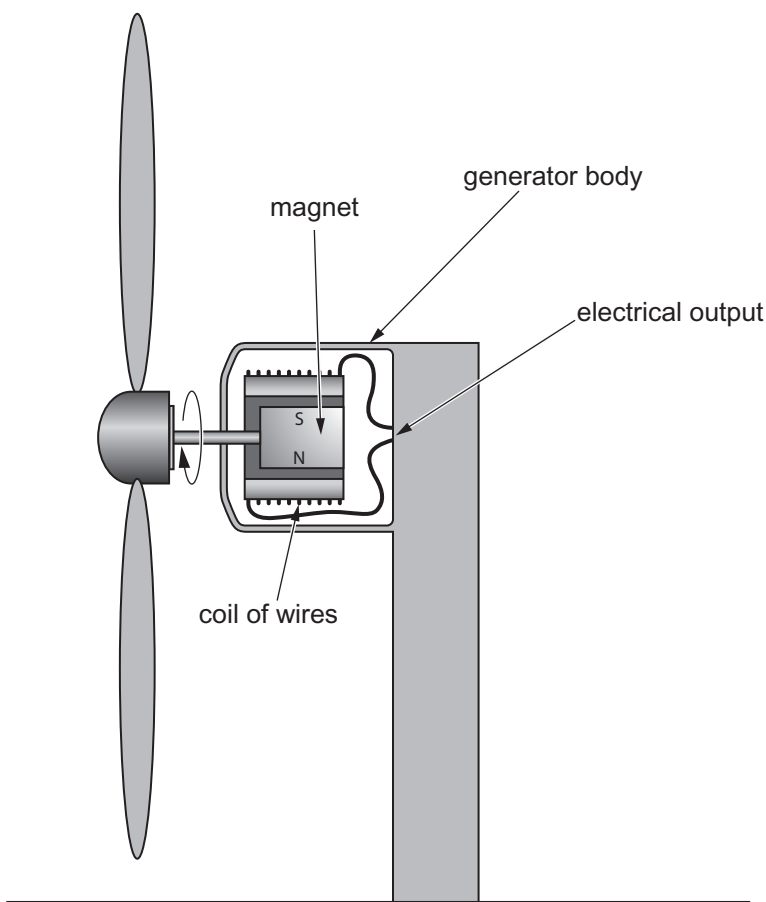
\_\_\_\_\_

\_\_\_\_\_ [1]

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Marks Remark

- 6 The diagram below shows a cross-section through a wind turbine. When the blade spins a current is produced.



© CCEA GCSE Single Award in Science Foundation Tier by A McFarland, C Murphy & J Napier, published by Hodder Education 2009

- (a) What happens to the amount of current produced if:

1. a weaker magnet is used.

\_\_\_\_\_

2. more coils of wire are used.

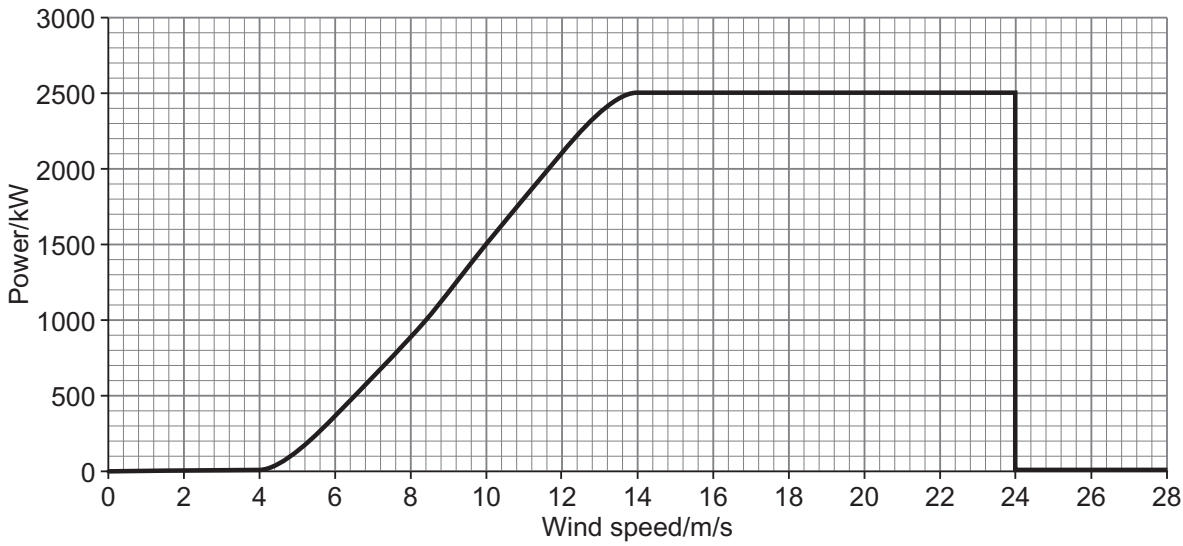
\_\_\_\_\_ [2]

Examiner Only

Marks	Remark

(b) The graph below shows how the wind speed affects the amount of power produced.

Examiner Only	
Marks	Remark



(i) Describe fully how the power produced by the turbine changes with wind speed.

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[3]

(ii) Why is the turbine designed to stop at high wind speeds?

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[1]

(c) Explain fully why the government has built more wind turbines in the past ten years.

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[2]

(d) Write down **one** reason why some people do not want wind turbines near their home.

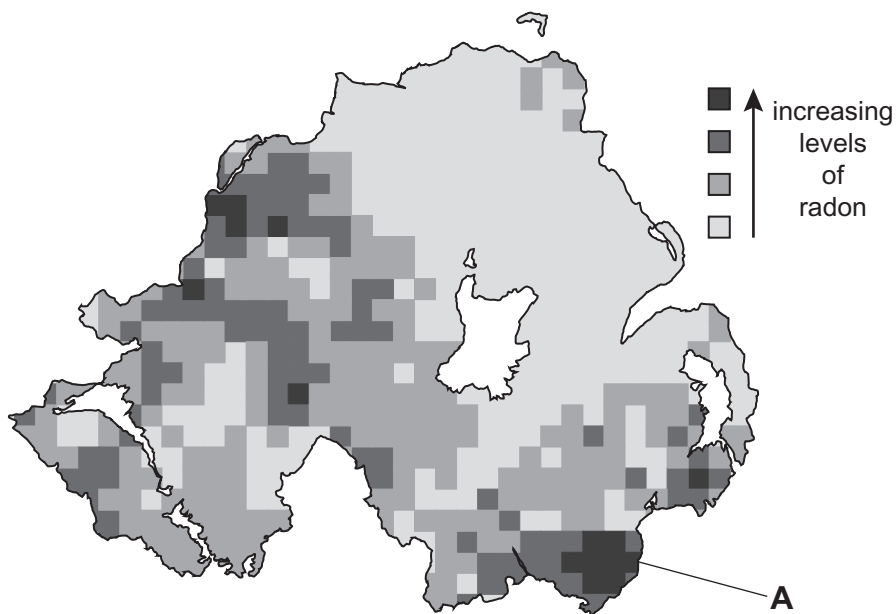
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[1]

- 7 (a) The diagram below shows the amount of radon gas found naturally in Northern Ireland.



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- (i) Radon gas is a source of background radiation. What is meant by the term background radiation?

\_\_\_\_\_

\_\_\_\_\_ [1]

- (ii) Explain fully why someone living in area **A** could be concerned about their health.

\_\_\_\_\_

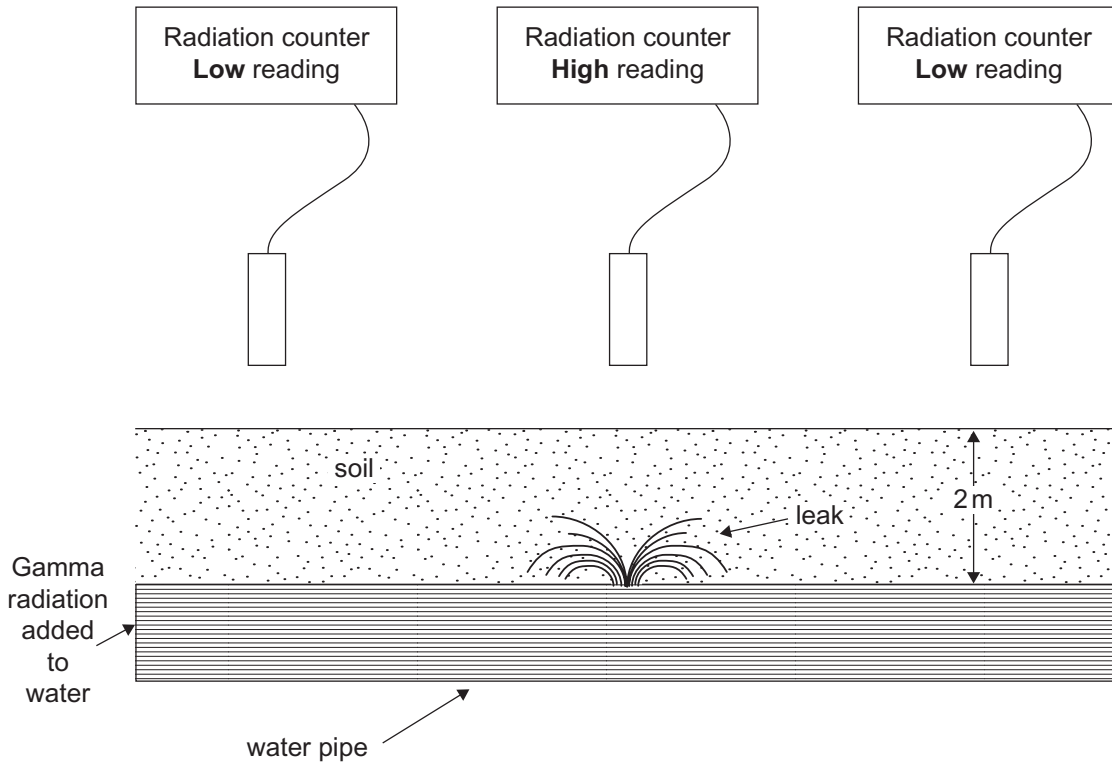
\_\_\_\_\_

\_\_\_\_\_ [2]

Examiner Only

Marks	Remark

(b) Gamma radiation can be used to check for leaks in water pipes.



Explain fully why gamma radiation is the best source to use.

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[2]

Examiner Only	
Marks	Remark

- 8 The table below shows information about three types of bulb. Each bulb produces the **same** light power output.

	Energy saving bulb	Filament bulb	LED spotlight
	 © CCEA	 © CCEA	 © CCEA
Power input/W	11	60	7
Cost to run for 1000 hours	£1.87	£10.20	£1.19
Average life/hours	10 000	1000	20 000
Cost to buy	£3.50	£0.90	£10.00

- (a) Which bulb is the most efficient?

\_\_\_\_\_ [1]

- (b) Which bulb, including the cost to buy, would be the cheapest to run for 1000 hours?

\_\_\_\_\_ [1]

- (c) The energy saving bulb uses 11 J of energy per second and has an efficiency of 0.6. What is its light energy output per second?

Use the equation:

$$\text{light energy output} = \text{efficiency} \times \text{energy input}$$

(Show your working out.)

Answer \_\_\_\_\_ J [2]



(d) Calculate how much energy this bulb wastes per second.

Answer \_\_\_\_\_ J [1]

(e) The efficiency of a filament bulb is much less than the efficiency of an energy saving bulb. Explain fully why the government has recommended that the use of filament bulbs should be stopped.

\_\_\_\_\_  
\_\_\_\_\_ [1]

Examiner Only	
Marks	Remark





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