Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2012–2013

Science: Single Award

Unit 3 (Physics)

Foundation Tier

[GSS31]

GSS31

THURSDAY 23 MAY 2013, MORNING

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 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	
Total Marks	

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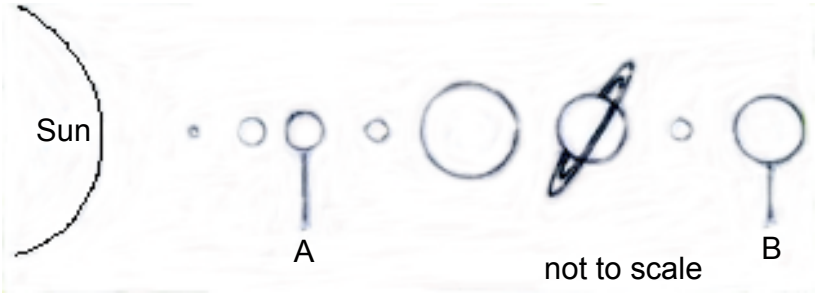
Examiner Only	
Marks	Remark

1 **(a)** The diagram below shows the Sun and its eight planets.



(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.

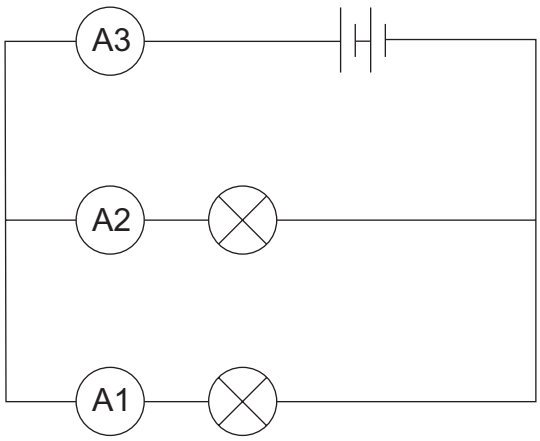
They are not moving ☐

Staying the same distance apart ☐

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 arranged 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) Give **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.

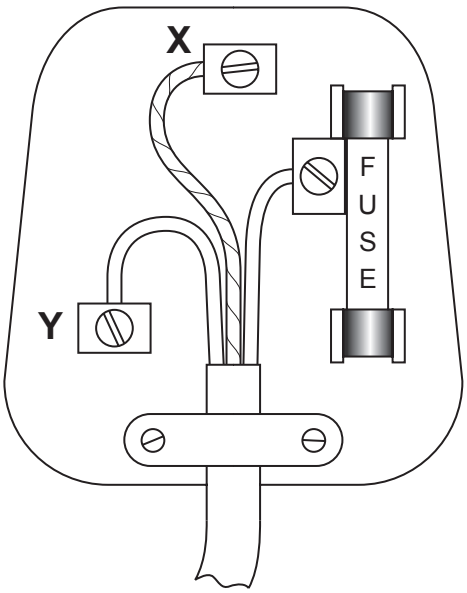
Use the equation:

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

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

_____ A [2]

(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	

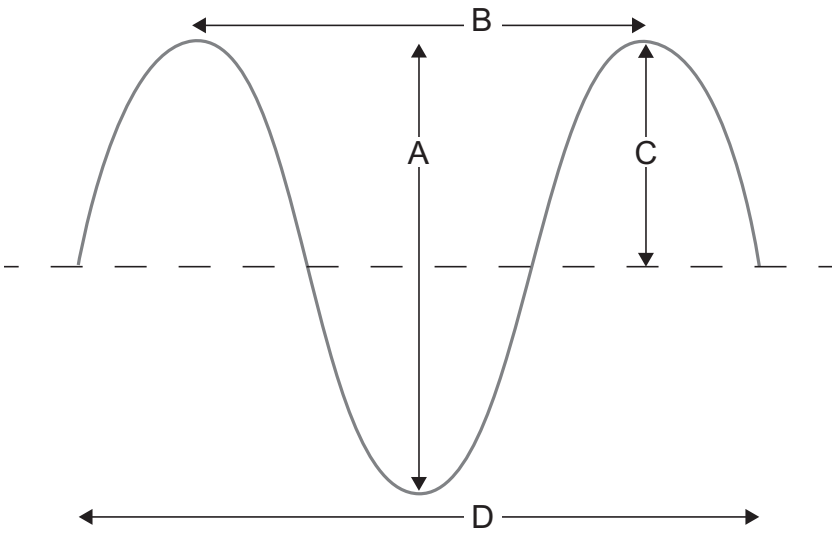
[2]

Examiner Only

Marks	Remark

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**

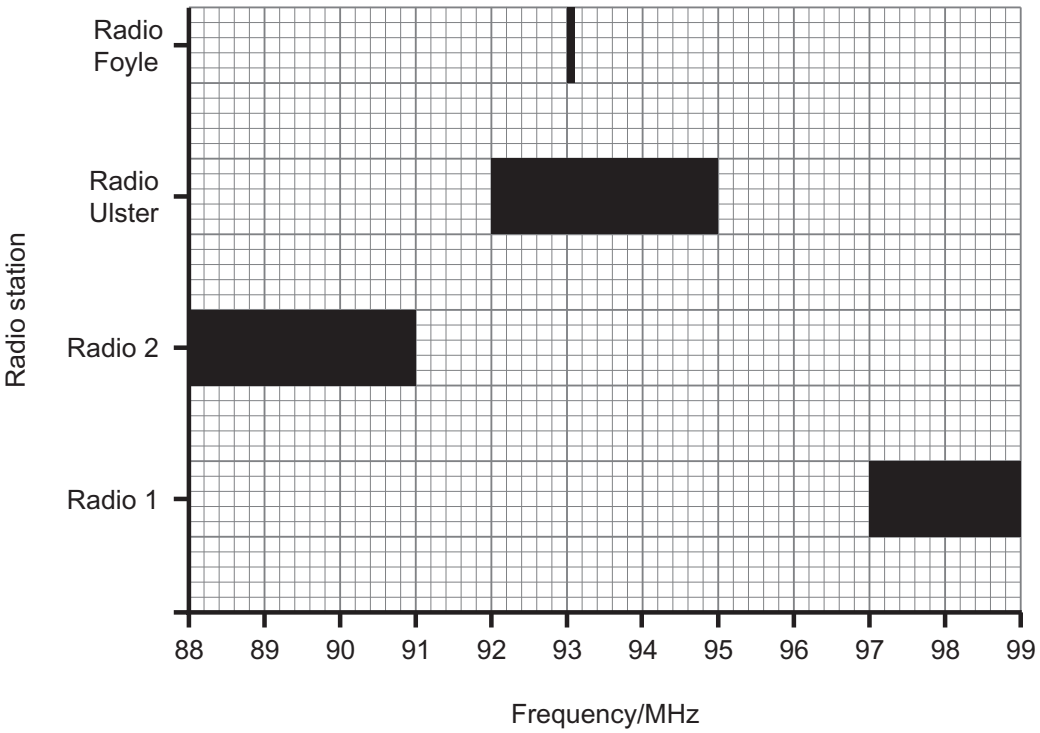
Humans can hear sound with a _____ between

20 Hz and 20 kHz. This is called the _____ range.

Unborn babies are scanned using _____ .

[3]

(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?

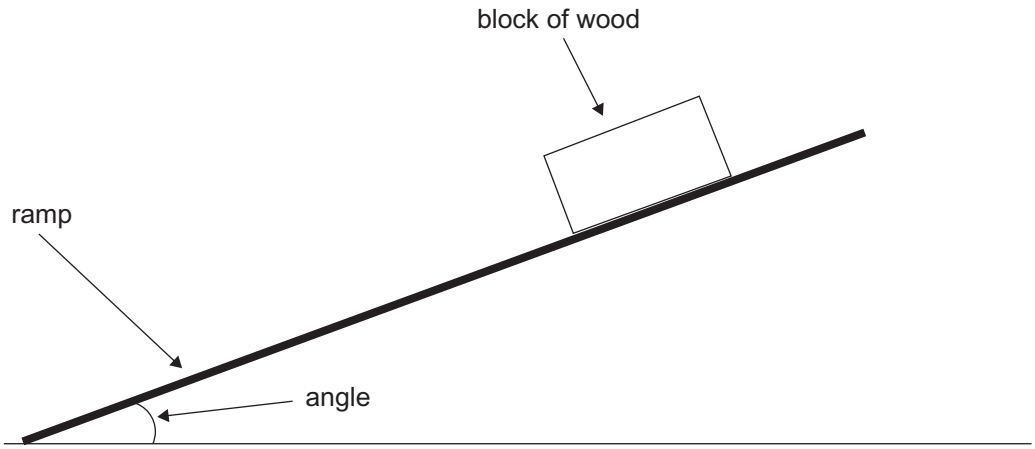
_____ MHz [1]

Examiner Only

Marks	Remark

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?

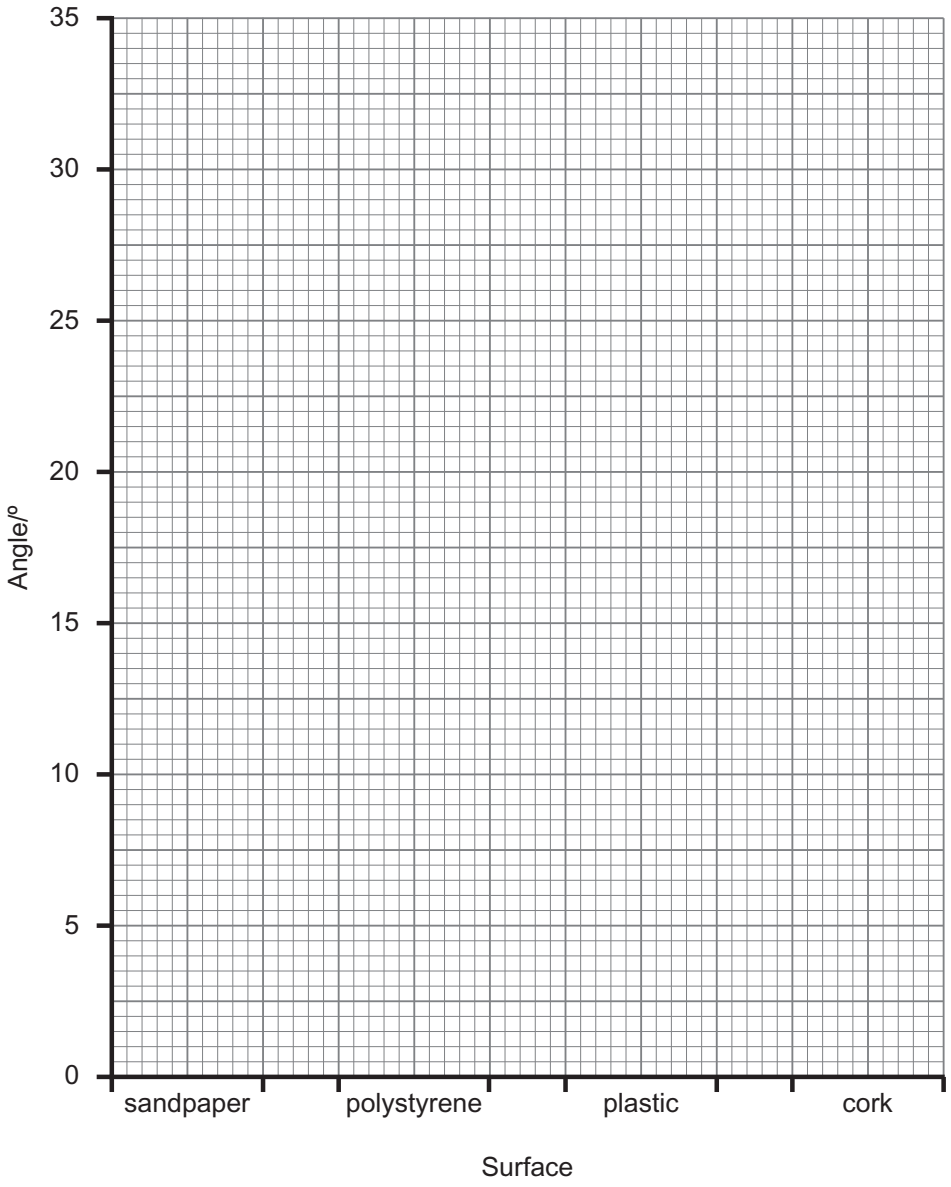
_____

_____ [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]

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

	Year				
Age group	**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
All children	**59**	**74**	**86**	**93**	**96**

(a) State **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 this is necessary.

_____

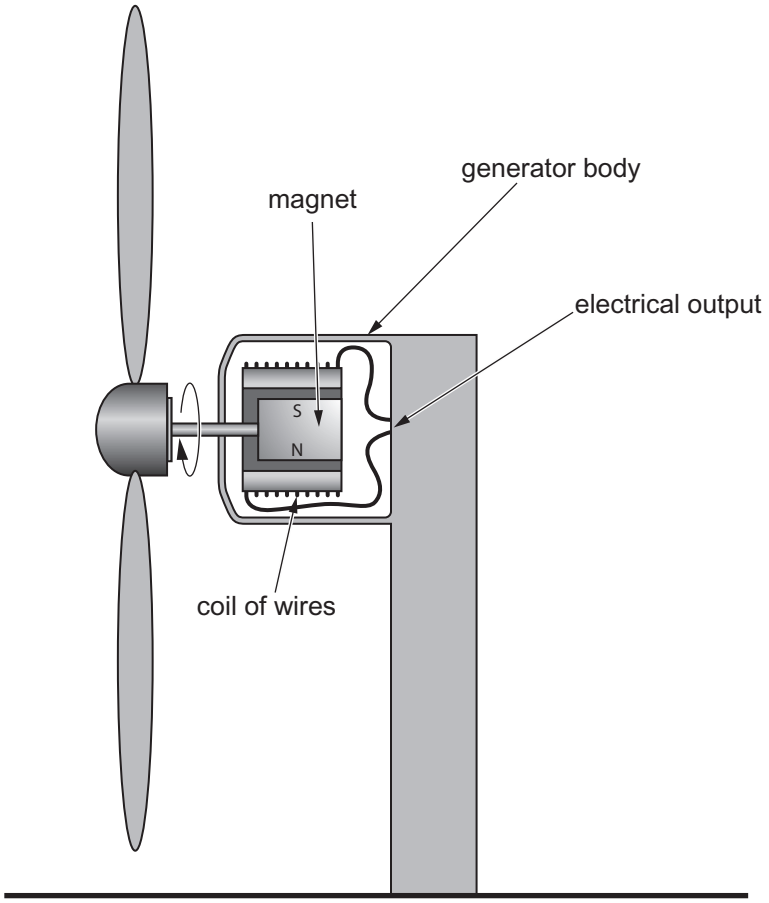
_____ [1]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

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



(a) Suggest the effect on the amount of current produced if:

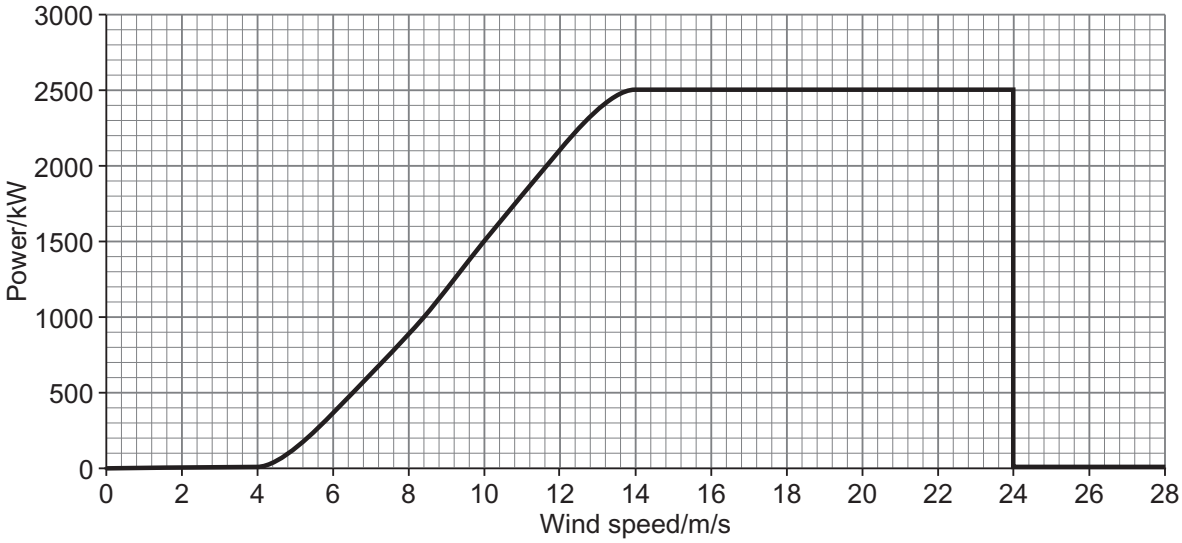
1. a weaker magnet is used.

_____

2. more coils of wire are used.

_____ [2]

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



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

_____

_____

_____

_____ [3]

(ii) Suggest why the turbine is designed to stop at high wind speeds.

_____

_____ [1]

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

_____

_____

_____ [2]

(d) Suggest **one** reason why some people object to wind turbines near their home.

_____

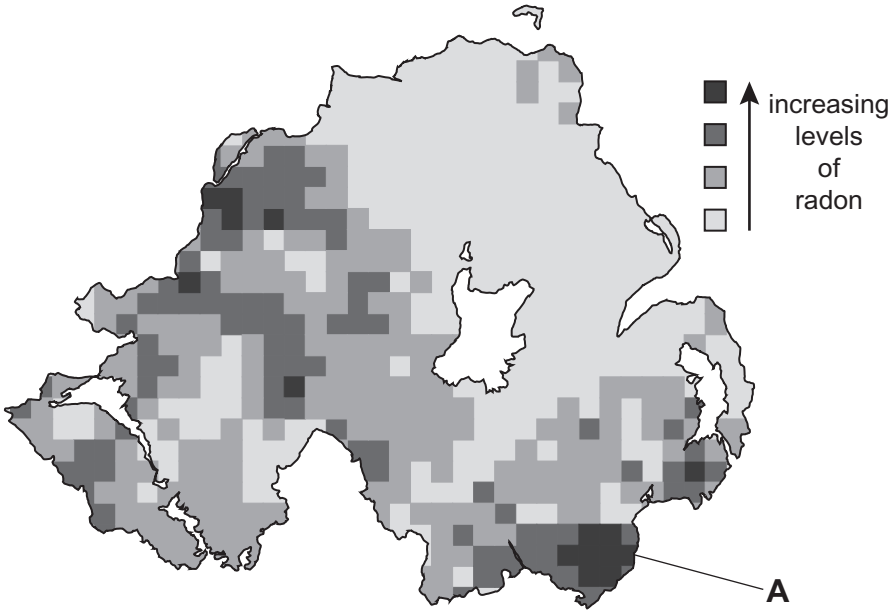
_____ [1]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

7 **(a)** The diagram below shows the amount of radon gas which occurs naturally in Northern Ireland.



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

_____

_____ [1]

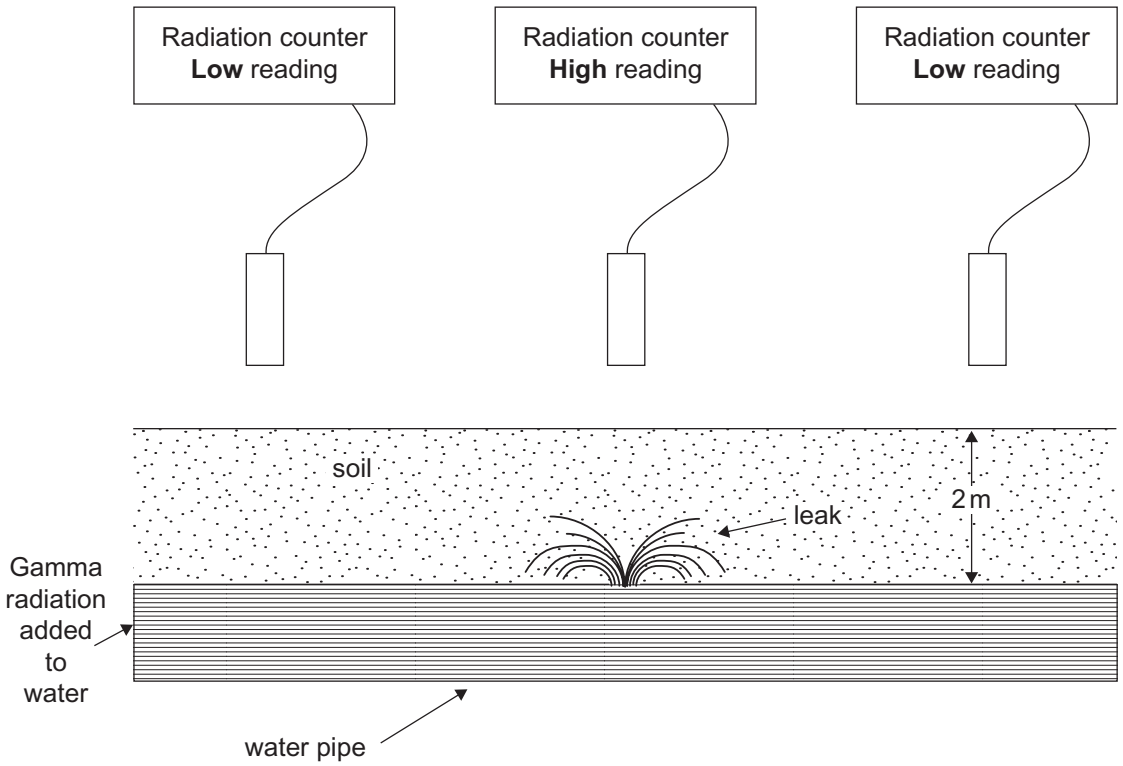
(ii) Explain fully why someone living in area **A** could be concerned about their health.

_____

_____

_____ [2]

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



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

_____

_____

_____

_____

_____ [2]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

8 The information 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:

light energy output = efficiency × 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

Examiner Only	
Marks	Remark

9 Long sight is a common eye defect. Explain fully the **cause**, the **effect** and the **correction** of long sight. Your answer should refer to the parts of the eye involved and the passage of light through the eye.

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

[6]

THIS IS THE END OF THE QUESTION PAPER