Centre Number

Candidate Number

cea

Rewarding Learning

General Certificate of Secondary Education
2016–2017

Science: Single Award

Unit 3 (Physics)

Foundation Tier

ML

[GSS31]

FRIDAY 24 FEBRUARY 2017, 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 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	

10957.02 **ML**

1 **(a)** Look at the diagram below. It shows how a television uses 1000 J of electrical energy.

700 J

1000 J

useful energy

electrical energy

waste energy

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(i) Calculate the amount of energy that is wasted by this television.

Answer _____ J   [1]

(ii) Write down the names of **two** types of useful energy produced by a television.

Choose from:

electrical   **sound**   **heat**   **light**   **movement**

_____ and _____   [2]

(iii) Write down the name of **one** type of waste energy produced by a television.

Put a circle round the correct answer.

electrical   **sound**   **heat**   **light**   **movement**

[1]

(b) Write down **two** ways that electricity bills in a house could be reduced.

1. _____

_____

2. _____

_____ [2]

2 **(a)** The diagram below shows a wave produced on a slinky spring.

Direction of wave movement

Hand movement

(i) Fill in the missing words in the sentences below.

Choose from:

hertz   **energy**   **vibrations**   **frequency**   **vacuum**

Waves are produced by ——————————————.

Waves carry ———————————— from one place

to another.   [2]

(ii) What is the type of wave shown in the diagram above?

Choose from:

longitudinal   **transverse**   **converse**

Answer ———————————— [1]

(b) The diagram below shows a sound wave. Each square on the grid is one centimetre.
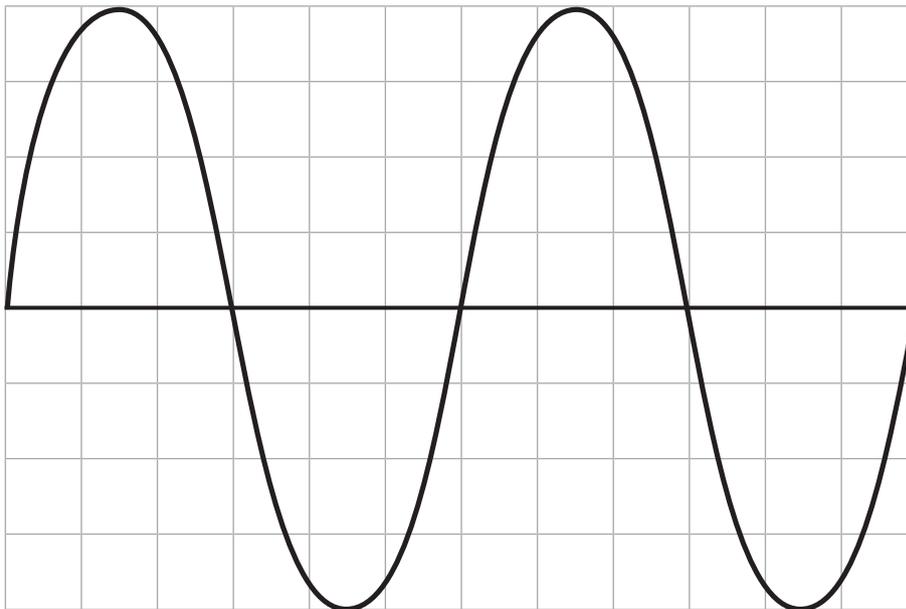
1 square = 1 cm

   (i) What is the amplitude of this wave?

      Choose from:

           4   **6**   **8**

                      Answer ＿＿＿＿＿＿ cm [1]

  (ii) What is the wavelength of this wave?

      Choose from:

           3   **6**   **12**

                      Answer ＿＿＿＿＿＿ cm [1]

(c) Look at the table below. It shows the noise levels in a concert at different distances from the loudspeakers.

Distance/m	Noise level/dB
1	120
2	
4	108
8	102
16	96
32	90

(i) What is the noise level at 2 metres?
Write your answer in the table above. [1]

(ii) Noise levels above 100 dB cause loss of hearing.
What is the shortest distance that you should stand from these loudspeakers so that you don't get a hearing loss? Use the table to help you answer this question.

Answer ———————— m [1]

(iii) Loud sounds cause hearing loss. Give **one** other factor that could cause hearing loss.

——————————————————————————— [1]

(iv) Reflected sound waves cause a big problem in concert halls.
What are reflected sound waves called?

——————————————————————————— [1]

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(Questions continue overleaf)

3 Look at the diagram below. It shows a metre stick being used to investigate the reactions of student **Y**.

student **X**

student **Y**
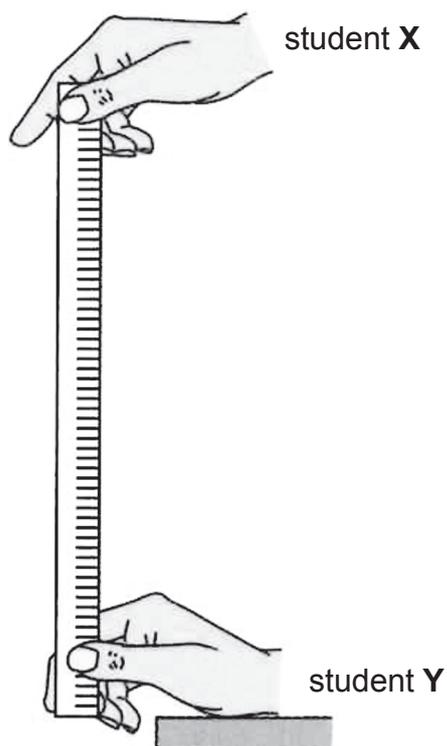
© CCEA GCSE Single Award in Science Foundation Tier by Alyn G McFarland, Colin Murphy and James Napier. Published by Hodder Education, 2009. (ISBN: 9780340974728) "Reproduced by permission of Hodder Education".

(a) Describe how the metre stick is used to check the reactions of student **Y**.

_____

_____

_____ [2]

(b) Look at the table below. It shows the results for three other students who carried out this investigation.

Student	Distance ruler drops/cm			
	1st attempt	2nd attempt	3rd attempt	Average
A	16	11	9	12
B	20	11	8	13
C	15	14	10	13

(i) Why did each student repeat the test and average the results?

Put a circle round the correct answer.

to make the experiment fair

to make the results reliable

to make the results more accurate

[1]

(ii) Finish writing the sentence below so that it describes a conclusion that can be made from these results.

As the number of attempts increases _____

_____ [1]

(iii) Which student (**A**, **B** or **C**) has the fastest average reactions? Explain your choice.

_____

_____

_____ [2]

(c) The stopping distance of a vehicle can be calculated as shown below.

stopping distance = thinking distance + braking distance

Some people have faster reactions than others and this affects their stopping distance when driving.

(i) Describe and explain the effect that faster reactions have on stopping distance.

_____

_____

_____ [2]

(ii) Write down **one** factor that slows a person's reactions.

_____ [1]

BLANK PAGE

(Questions continue overleaf)

4 (a) Look at the table below. It gives information about six of the planets in our Solar System.

Planet	Distance from the Sun /million km	Surface temperature /°C	Gravity/ N/kg
Earth	150	22	10
	228	−23	4
Jupiter	778	−150	26
Saturn	1427	−180	11
	2870	−210	12
Neptune	4497	−220	12

(i) Complete the table by adding the names of two planets in the correct order. [2]

(ii) Finish writing the sentence below so that it describes a trend shown by this information.

As the distance _____

_____ [1]

(iii) Use the equation:

weight = mass × gravity

to calculate the weight of a 75 kg person on Saturn.

(Show your working out.)

Answer _____ N [2]

(b) Our Solar System has one star and eight planets.
Write down **two** differences between a star and a planet.
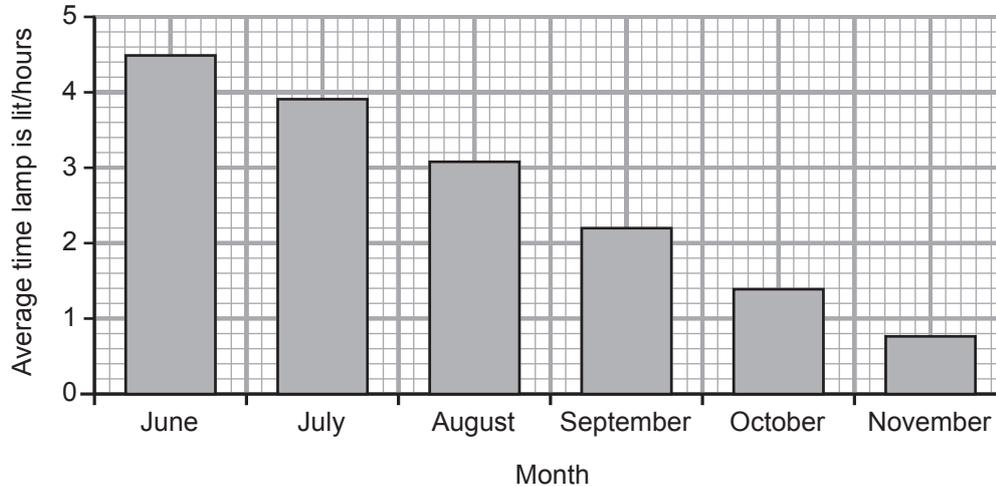
1. _____

2. _____ [2]

5 Shown below is a solar powered lamp.

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These lamps use sunlight to charge a battery. Then at night this battery gives electricity to light the lamp.

A pupil investigated how long, on average, the lamp stayed lit each night. She did this for six months of the year. The results are shown below.

(a) Describe and explain the results of this investigation.

_____

_____

_____

_____ [3]

(b) Solar and wind power are renewable energy sources.

(i) What does the word 'renewable' mean?

_____

_____ [1]

(ii) Write down **one** environmental advantage of using wind power.

_____ [1]

(iii) Write down **one** environmental disadvantage of using wind power.

_____ [1]

(iv) Write down the name of **one** other renewable energy source.

_____ [1]

Examiner Only	
Marks	**Remark**

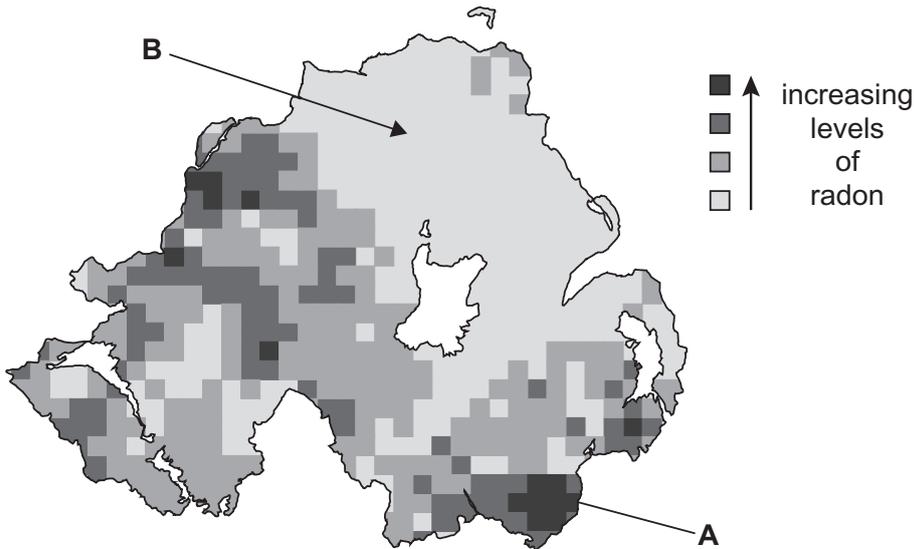**[Turn over**

6   (a) Look at the diagram below. It shows the amount of radon gas that occurs naturally in Northern Ireland.

increasing
levels
of
radon

Based on Crown Copyright and reproduced with permission of Land & Property Services under delegated authority from the Controller of Her Majesty's Stationery Office, © Crown Copyright and database right 2014, EMOU 206.2
Radon Affected Area classification: Public Health England © Crown copyright and British Geological Survey © NERC 2015

The table below gives information on percentage (%) increased risk of death from lung cancer due to radon.

Radon level/ Bq/m^3	Increased risk of death by lung cancer/%
0	0
100	0
200	0.6
300	1.0
400	1.4
500	1.8
600	2.2
700	2.6
800	3.0

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(i) Use the information above to explain fully why it would be safer to live in area **B** than area **A**.

_____

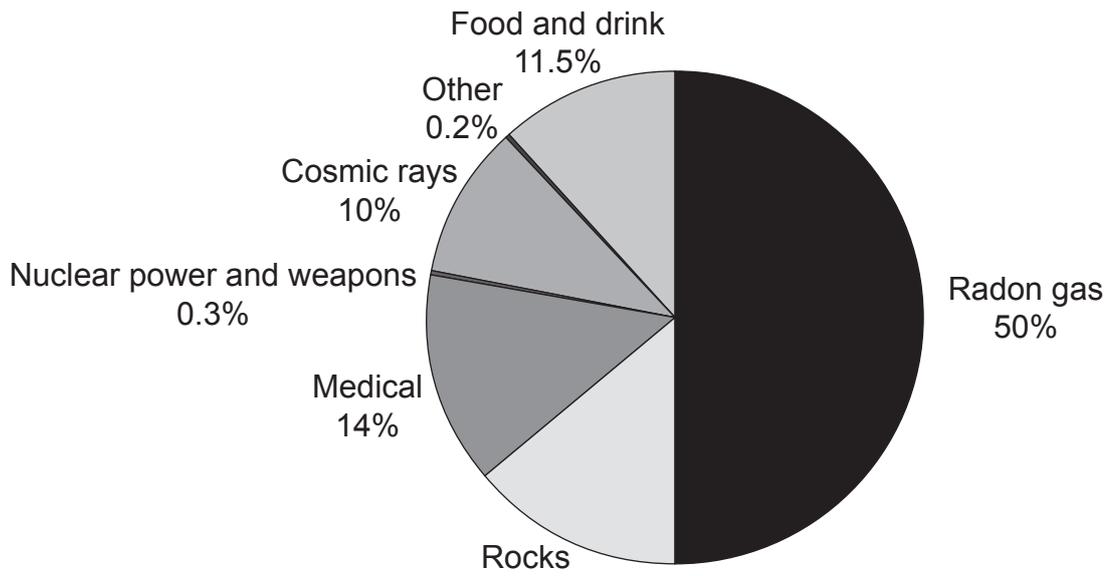_____

_____ [2]

Radon levels within a home **must not** be higher than 200 Bq/m^3.

(ii) Use information from the table to say why you think this level is set at 200 Bq/m^3.

_____

_____ [1]

(b) The pie chart below shows typical sources of background radiation.

Food and drink
11.5%

Other
0.2%

Cosmic rays
10%

Nuclear power and weapons
0.3%

Medical
14%

Rocks

Radon gas
50%

(i) What does the term 'background radiation' mean?

_____

_____ [1]

(ii) Calculate the percentage of background radiation that is from rocks.

(Show your working out.)

Answer _____ %   [2]

(iii) Write down **one** possible cause of radiation from medical sources.

_____

_____ [1]

17

[Turn over

7 The distance–time graph below is for a pizza delivery bike.
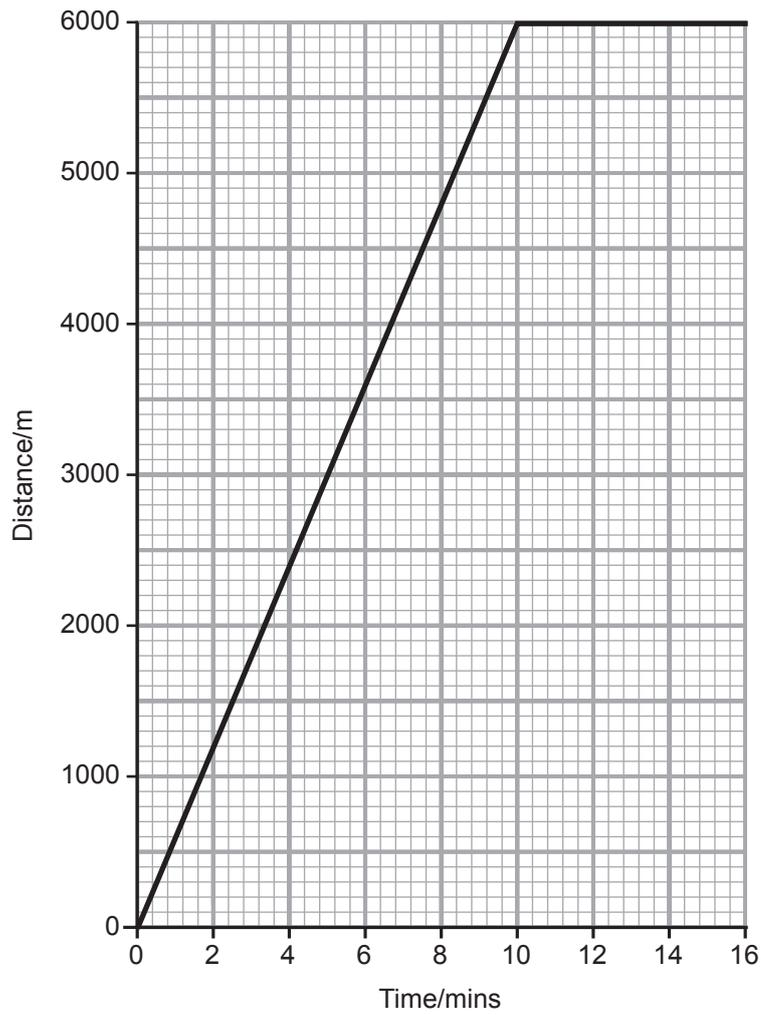
(a) Describe fully the motion of the bike.

_____

_____

_____ [2]

(b) Look at the table below. It shows the distance travelled and time taken for the journey of another bike.

Time/mins	Distance/m
0	0
4	2000
7	3500
10	5000
11	5500
14	5500
16	5500

(i) Use these values to draw the distance–time graph for this bike. Do this on the grid opposite. [3]

(ii) How can you tell from the graph which bike was faster?

_____

_____ [1]

10957.02 **ML**

[Turn over

8 **(a)** Fossil fuels are the most common fuels used to make electricity.

Describe how fossil fuels were formed. Then describe how fossil fuels are now used to make electricity.

Your answer should include:
- the names of three fossil fuels;
- how fossil fuels were formed;
- what happens inside a fossil fuel power station.

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

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____ [6]

(b) Three-pin plugs are used to supply electricity to appliances.

Source: Principal Examiner

What is the name of the part labelled **X** in the diagram?
Explain how it works.

_____

_____

_____

_____ [3]

THIS IS THE END OF THE QUESTION PAPER