Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2017–2018

Science: Single Award

Unit 3 (Physics)
Foundation Tier

GSS31

[GSS31]

FRIDAY 9 NOVEMBER 2018, 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.

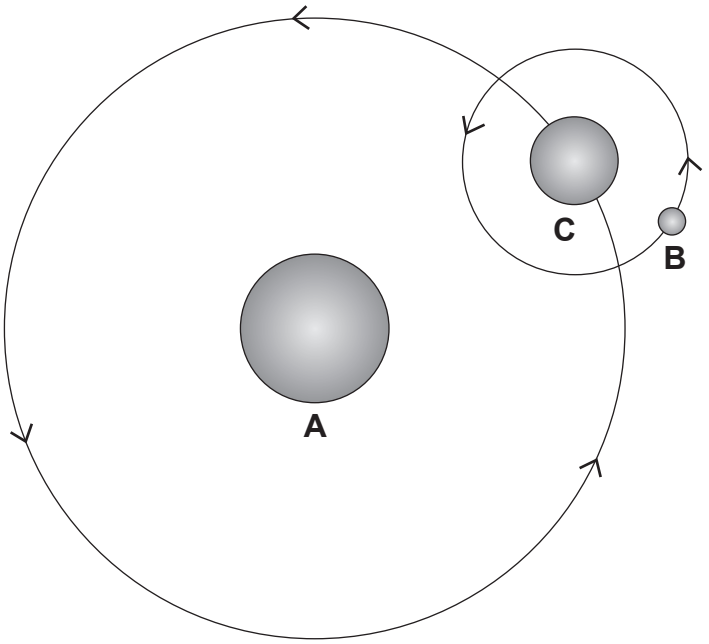
INFORMATION FOR CANDIDATES

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(a)**.

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

Examiner Only	
Marks	Remark

1 The diagram below shows the Sun and the orbits of both the Earth and Moon.



Source: Principal Examiner

(a) Which letter (**A**, **B** or **C**) represents:

(i) the Sun?

Answer _____ [1]

(ii) the Moon?

Answer _____ [1]

(b) The photograph below shows an astronaut on the Moon.

© NASA / Detlev van Ravenswaay / Science Photo Library

(i) The astronaut has a mass of 80 kg and the gravity on the Moon is 1.6 N/kg.

Use the equation:

weight = mass × gravity

to calculate his weight on the Moon.

(Show your working out.)

Answer _____ N [2]

(ii) Gravity on Earth is 10 N/kg. How would his weight on Earth compare with his weight on the Moon?

Circle the correct answer.

less **same** **more**

[1]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

2 **(a)** The diagram below shows the electromagnetic spectrum.

Gamma rays	X-rays	Ultraviolet	Visible light	Infrared	Microwaves	Radio waves

(i) Give **one** feature these waves have in common.

_____

_____ [1]

(ii) Give **one** feature that is different for these waves.

_____

_____ [1]

(b) Suggest **one** use for each of the following electromagnetic waves.

(i) X-rays

_____

_____ [1]

(ii) Ultraviolet

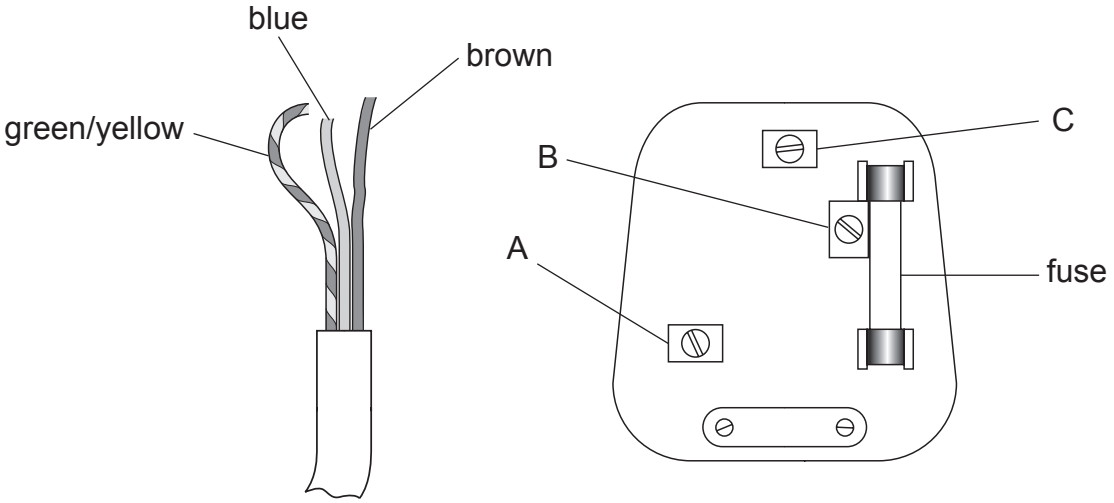
_____

_____ [1]

BLANK PAGE

(Questions continue overleaf)

3 The diagram below shows a piece of electrical cable and a three-pin plug.



Source: Principal Examiner

(a) Complete the table below to give the position and colour of each wire when connected to the plug.

Name	Position	Colour
Neutral		Blue
Live	B	
Earth		

[2]

(b) Most hairdryers are double insulated. Name the wire that is **not** needed in a double insulated hairdryer.

_____ [1]

(c) The fuse in the plug is a safety device.

(i) Explain fully how a fuse works.

_____

_____

_____ [2]

Examiner Only

Marks	Remark

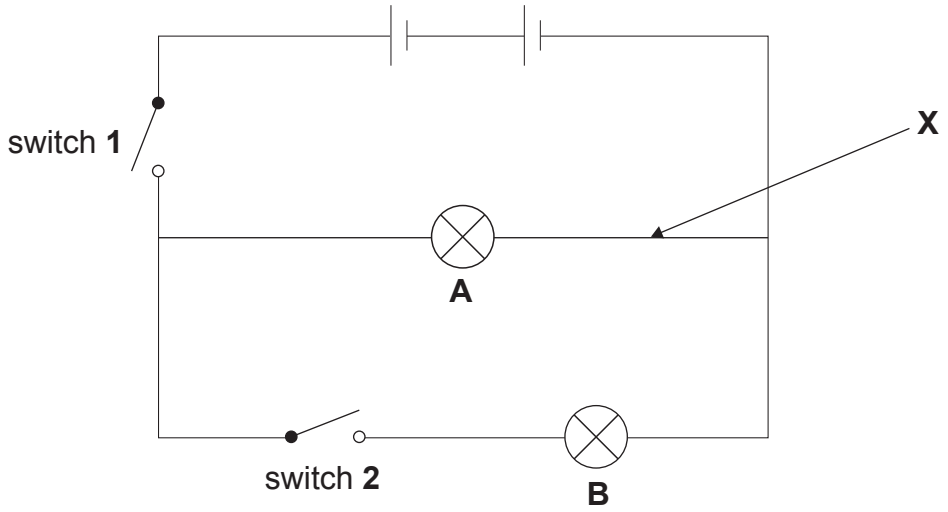
(ii) A hairdryer uses a current of 3.2 A. What size of fuse should be fitted in the plug?

Choose from:

5 A **3 A** **2 A** **13 A**

Answer _____ [1]

(d) The diagram below shows a simple electrical circuit containing two identical bulbs.



Source: Principal Examiner

(i) What term describes how the bulbs are connected in this circuit?

Circle the correct answer.

series **short** **parallel**

[1]

(ii) Which switch or switches need to be closed to light bulb **A** only?

_____ [1]

(iii) Another identical bulb is connected at position **X**. What effect, if any, will this have on the brightness of bulbs **A** and **B**?

Bulb **A** _____

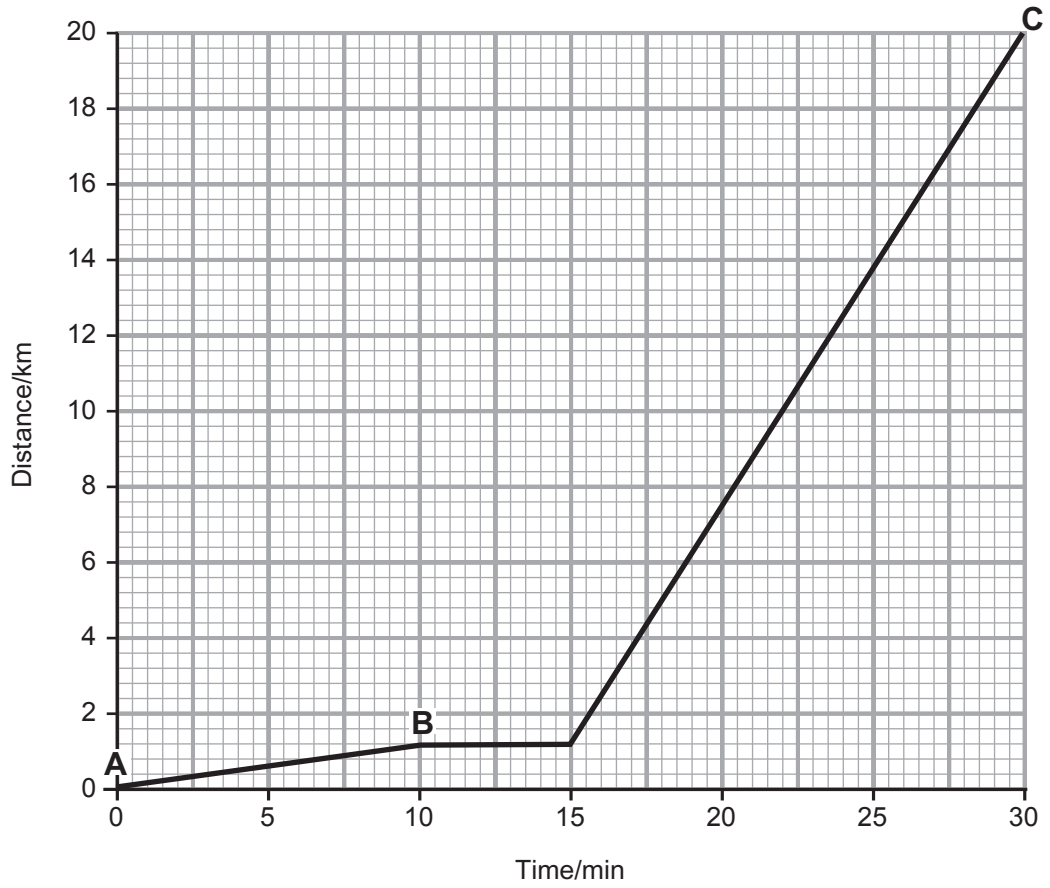
Bulb **B** _____ [2]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

4 The distance-time graph below shows a student's journey to school.



Source: Principal Examiner

(a) Use the graph to complete the following sentences describing the student's journey.

"This morning I walked 1.2 km from my house (**A**) to the bus stop (**B**)

which took _____ minutes.

Then I stopped and waited _____ minutes before the bus arrived.

The bus took 15 minutes to travel the next _____ km to school (**C**)." [3]

(b) Use the equation:

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

to calculate the average speed for the whole journey (**A** to **C**).

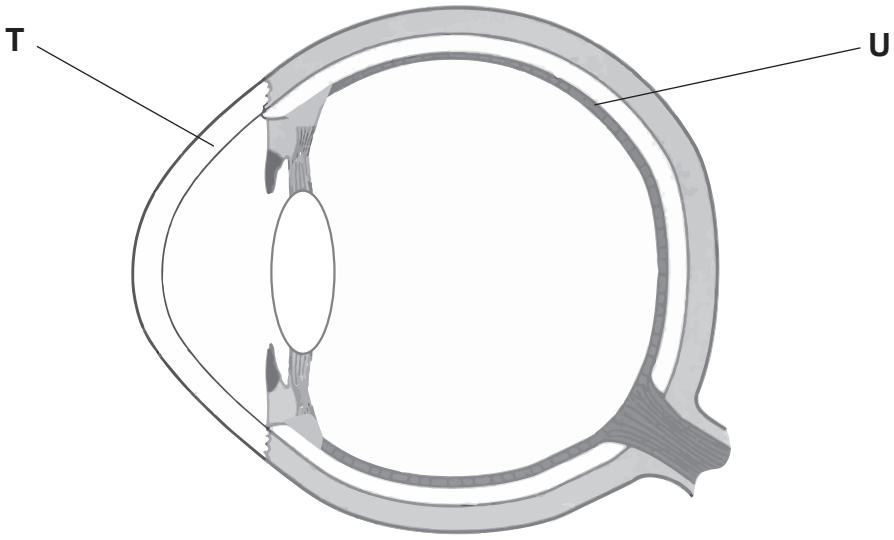
(Show your working out.)

Answer _____ km/min [2]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

5 The diagram below represents the human eye.



(a) Name the parts of the eye labelled **T** and **U**.

T _____ [1]

U _____ [1]

(b) Light entering the eye is refracted. What is meant by the term refraction?

Circle the correct answer.

bouncing **bending** **twisting**

[1]

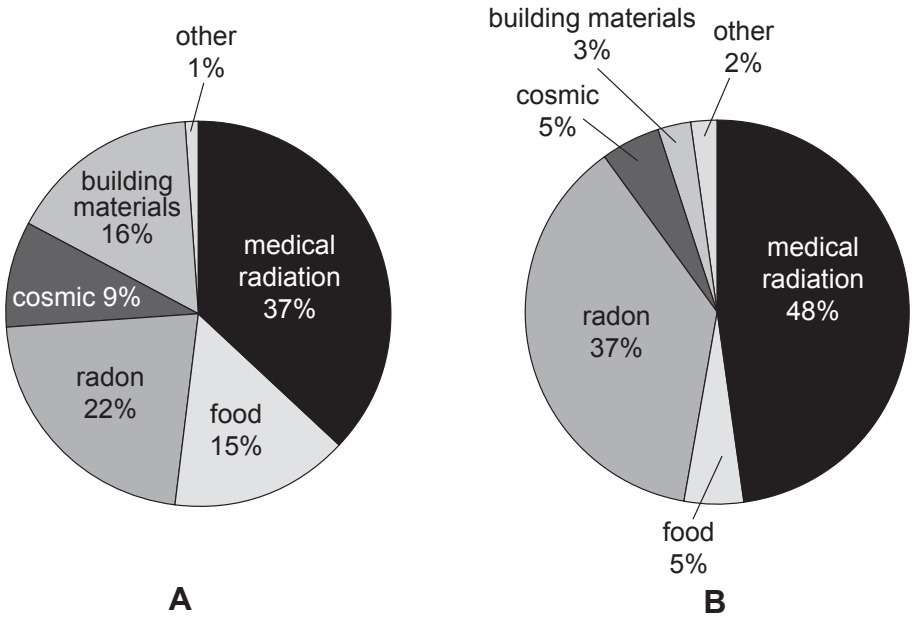
(c) Helen is short sighted. She cannot see _____

objects clearly. This can be corrected by wearing glasses

with a _____ lens. [2]

Examiner Only	
Marks	Remark

6 The pie charts below show sources of background radiation in two countries **A** and **B**.



(a) State **one** difference in the sources of background radiation for country **A** compared to country **B**.

_____

_____ [1]

(b) Background radiation comes from natural and man-made sources.

Name the largest **natural** source of background radiation shown in the pie charts.

_____ [1]

(c) Suggest **one** cause of cosmic radiation.

_____ [1]

(d) Complete the following sentence about radioactive atoms.

Choose from:

electrons **protons** **neutrons** **nuclei**

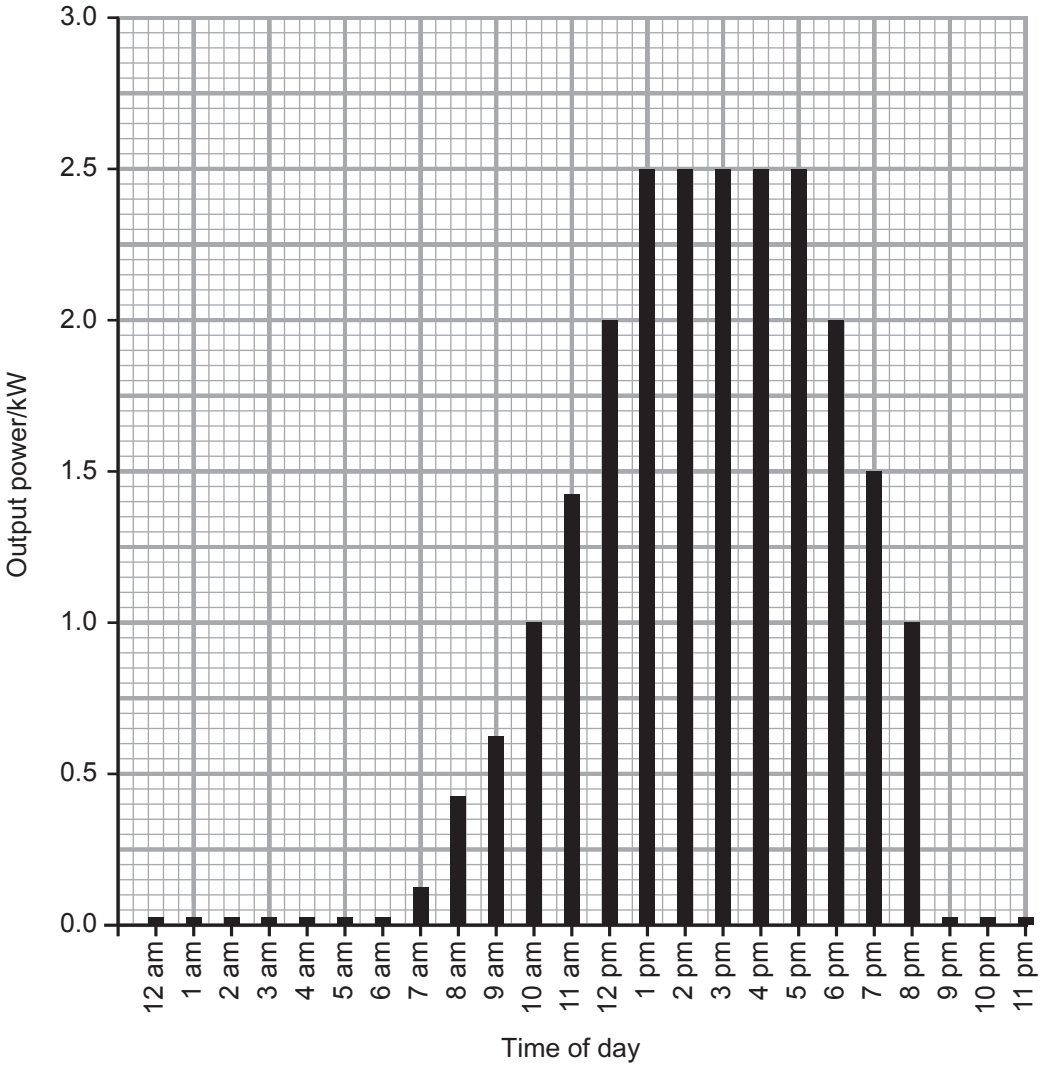
Atoms that emit alpha radiation have unstable _____

because they have too many _____ or too many

_____. [2]

Examiner Only	
Marks	Remark

7 The graph below shows the output power from solar panels on the roof of a house on a clear summer day.



Source: Principal Examiner

(a) Describe fully the trend shown by this information between 6 am and 5 pm.

_____

_____

_____

_____ [2]

(b) Describe **two** ways in which this graph would look different, between 6 am and 5 pm, in winter.

1. _____

2. _____ [2]

(c) Between 12 am and 5 am the solar panels still produce power. Suggest **one** source of light that allows the solar panels to produce this power.

_____ [1]

(d) Solar energy is a renewable energy source.

(i) What is meant by the term renewable?

_____

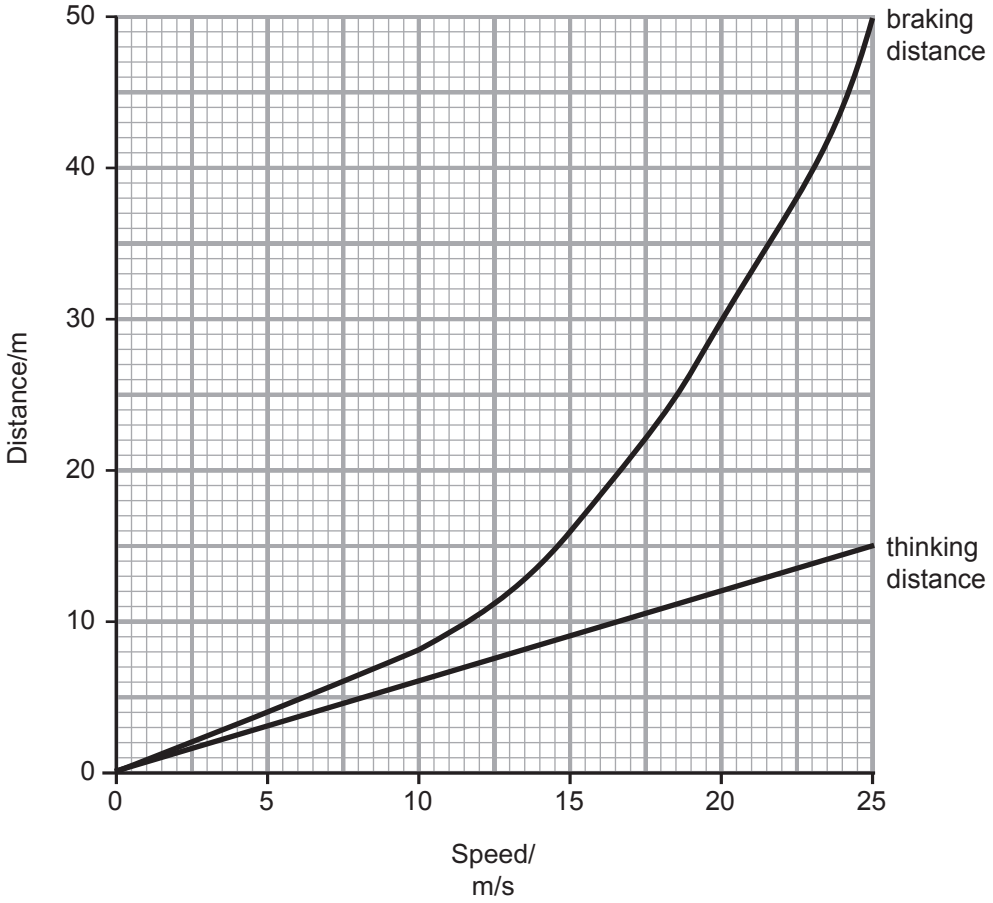
_____ [1]

(ii) Name **one** other renewable energy source.

_____ [1]

Examiner Only	
Marks	Remark

8 The graph below shows how the speed of a vehicle affects thinking and braking distances.



Source: Principal Examiner

(a) Describe fully the conclusion that can be made from this information.

_____

_____

_____

_____ [2]

(b) (i) Use the graph to calculate the **stopping** distance at a speed of 25 m/s.

Answer _____ m [1]

(ii) Describe how **stopping** distance is affected by speed.

_____

_____ [1]

Examiner Only

Marks	Remark

(c) Friction also affects braking distance.

(i) Describe fully what is meant by the term friction.

_____

_____

_____ [2]

(ii) State and explain the effect rain will have on braking distance.

_____

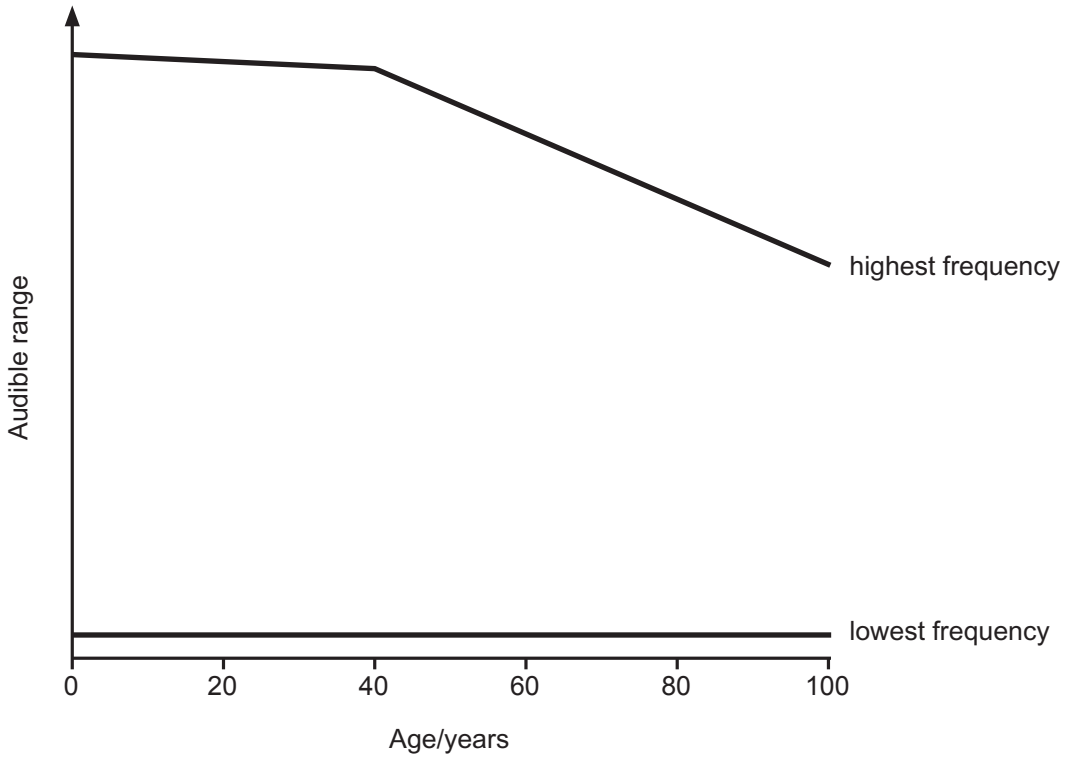
_____

_____ [2]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

9 **(a)** There are many different frequencies of sound but humans can only hear those within the audible range. Age and other factors can affect this range. The graph below shows the effect of age.



Source: Principal Examiner

Using the graph and your knowledge, describe fully how the audible range is affected by age.

Your answer should include:

- what is meant by the term frequency
- the normal audible range
- **one** other factor that affects this range.

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

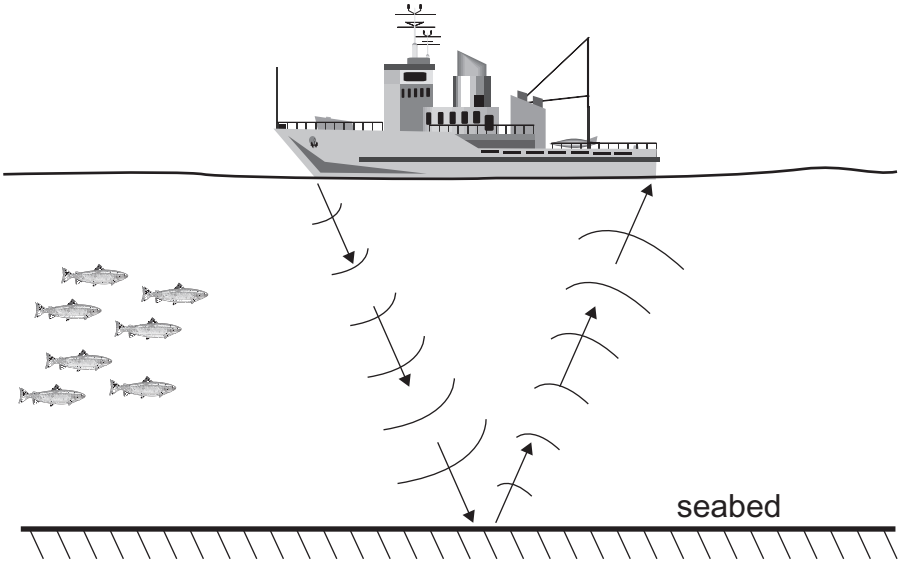
Examiner Only	
Marks	Remark

[6]

(Questions continue overleaf)

Examiner Only	
Marks	Remark

(b) The diagram below shows a ship using ultrasound to measure the depth of the sea.



Ultrasound travels at a speed of 1500 m/s in water.

(i) What is meant by the term ultrasound?

_____ [1]

(ii) The ship sends out an ultrasound pulse which returns 4 s later.

Use the equation:

distance = speed × time

to calculate the depth of the sea.

(Show your working out.)

Answer _____ m [3]

(iii) Explain how the captain will know when a shoal of fish swims under the ship.

_____

_____ [1]

THIS IS THE END OF THE QUESTION PAPER