Rewarding Learning

Centre Number	
71	

Candidate Number

General Certificate of Secondary Education
2013–2014

Science: Single Award

Unit 3 (Physics)

Foundation Tier

[GSS31]

ML

MONDAY 19 MAY 2014, AFTERNOON

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(b)**.

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

Examiner Only	
Marks	Remark

1 Shown below are devices that change electrical energy into other types of energy.

Iron

MP3 Player

Torch

Drill

(a) Use lines to match each device with the main type of energy it produces.

Device	Energy type
Iron	Sound
MP3 Player	Heat
Torch	Movement
Drill	Light

[3]

Examiner Only	
Marks	Remark

(b) The drill has a power rating of 805 W and is connected to the 230 V mains.

(i) Use the equation:

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

to calculate the amount of current flowing to the drill.

(Show your working out.)

Answer _____ [2]

(ii) What size of fuse should be fitted in the plug of the drill?

Put a circle around the correct answer.

1 **3** **5** **13** **30**

[1]

(iii) A fuse is a safety feature of a 3-pin plug. Write down the name of **one** other safety feature of a 3-pin plug.

_____ [1]

(iv) Write down the name of the unit of current.

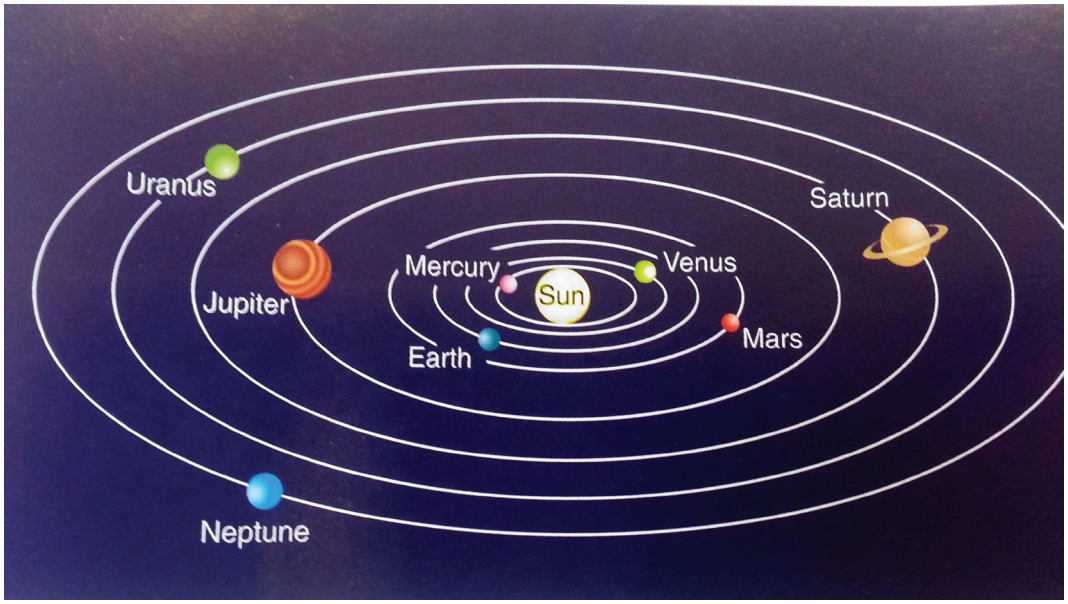
Choose from:

volt **watt** **amp** **joule**

Answer _____ [1]

Examiner Only	
Marks	Remark

2 The diagram below shows our Solar System.



(a) (i) Which planet do you think will be coldest? Explain your answer.

Planet _____

Explanation _____

_____ [2]

(ii) Write down the name of this model of the Solar System.

Put a circle around the correct answer.

geocentric **concentric** **heliocentric**

[1]

(b) The table below gives information about four planets in our Solar System.

Planet	Diameter/ km	Gravity/ N/kg	Number of moons
Jupiter	142 800	26	67
Uranus	51 118	11	27
Neptune	49 528	12	13
Mars	6790	4	2

Use the table to answer the questions below.

(i) Describe the relationship between planet diameter and number of moons.

_____

_____ [1]

(ii) Using the information in the table, a student made this suggestion.

"The bigger the diameter of a planet, the more gravity it will have."

Was the student correct? Explain your answer.

_____

_____ [1]

(c) NASA has said that humans will land on Mars by 2025.
A major concern is the long distance to Mars. Explain fully why this might be a problem.

_____

_____

_____ [2]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

3 **(a)** The table below gives some factors which might affect thinking and braking distances. Fill in the missing answers.

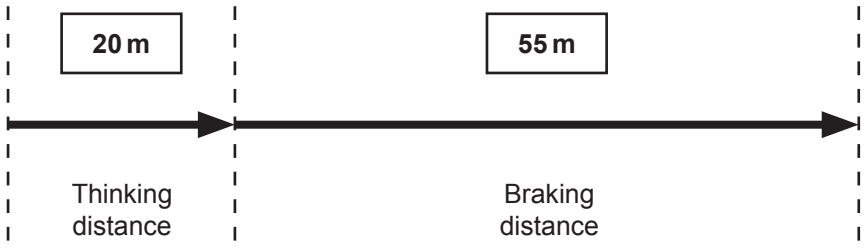
Choose from:

increased : **no effect** : **decreased**

Factor	Thinking distance	Braking distance
Wet road surface		
Faster speed		
Bald tyres	no effect	increased
New brakes		

[3]

(b) The information shown below is for a car travelling at 25 m/s.



Calculate the stopping distance for this car.

Answer _____ m [1]

(c) The police researched the effect that speed cameras had on speeding vehicles. Their results are shown in the table below.

	% vehicles exceeding the speed limit	
Speed limit/mph	**Before cameras were used**	**After cameras were used**
30	40	8
40	26	4
50	38	0.4
60	15	6
70	16	2

(i) Look at the results.
What do they show has happened after the speed cameras were used?

_____

_____ [1]

(ii) At which speed limit did speed cameras produce the biggest change in the percentage of speeding vehicles?

Answer _____ mph [1]

(iii) Speed cameras are a traffic calming measure. Write down the name of **one** other traffic calming measure.

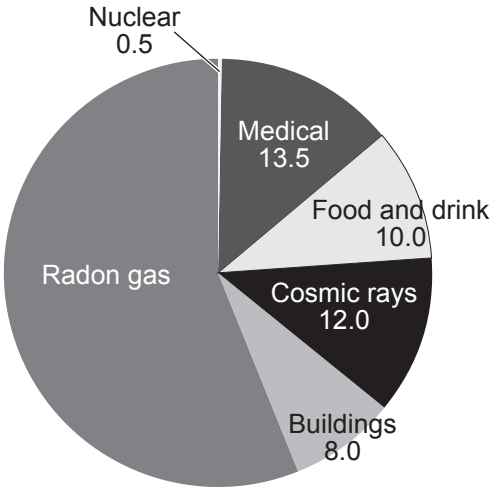
_____ [1]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

4 The pie chart below shows the percentage of each source of radiation that a person is exposed to in one year.



(a) (i) Calculate the percentage of radiation a person gets from radon gas.

(Show your working out.)

Answer _____ % [2]

(ii) What collective name is given to these sources of radiation?

Choose from:

foreground **underground** **background**

_____ [1]

(b) Radiation can be used to keep food fresh for longer.

(i) Explain fully how radiation makes fresh food last longer.

_____

_____

_____ [2]

(ii) If fresh food lasts longer it is said to have a longer shelf life. How does a longer shelf life help shopkeepers?

_____

_____ [1]

(c) The picture below shows a patient about to undergo radiotherapy. This involves a brain tumour (cancer) being targeted with radiation.

© Stevie Grand/Science Photo Library

Explain fully, in terms of the penetrating power of radiation, why gamma is used rather than alpha or beta.

_____

_____

_____

_____

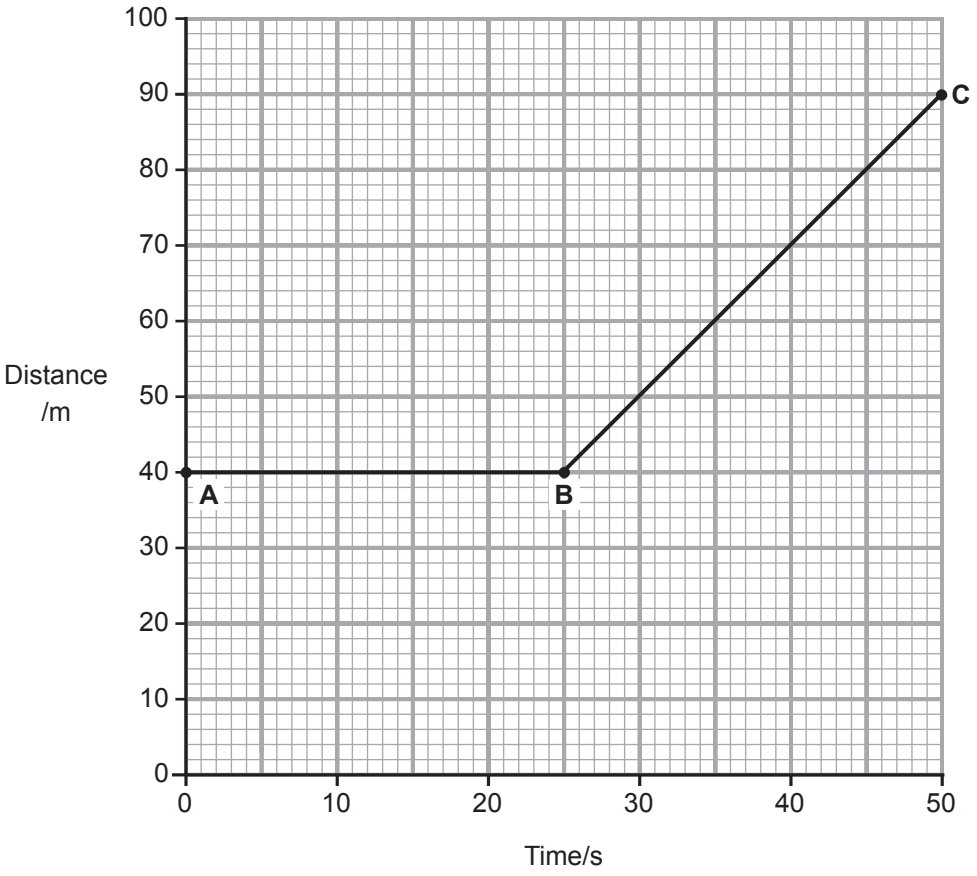
_____ [3]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

5 **(a)** The distance–time graph for part of a train journey is shown below.



(i) Describe the motion of the train from:

A to **B** _____

B to **C** _____ [2]

Examiner Only	
Marks	Remark

(ii) Use the equation:

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

to calculate the average speed of the train between **A** and **C**.

(Show your working out.)

Answer _____ m/s [2]

(b) Patrick investigated the average speeds of five racing cars (**A**, **B**, **C**, **D** and **E**) over a two lap race.

The results are shown in the table below.

Car	1st lap time/s	2nd lap time/s
A	40	55
B	50	50
C	55	55
D	55	45
E	40	75

If all the cars start at the same time, which **two** will finish together?

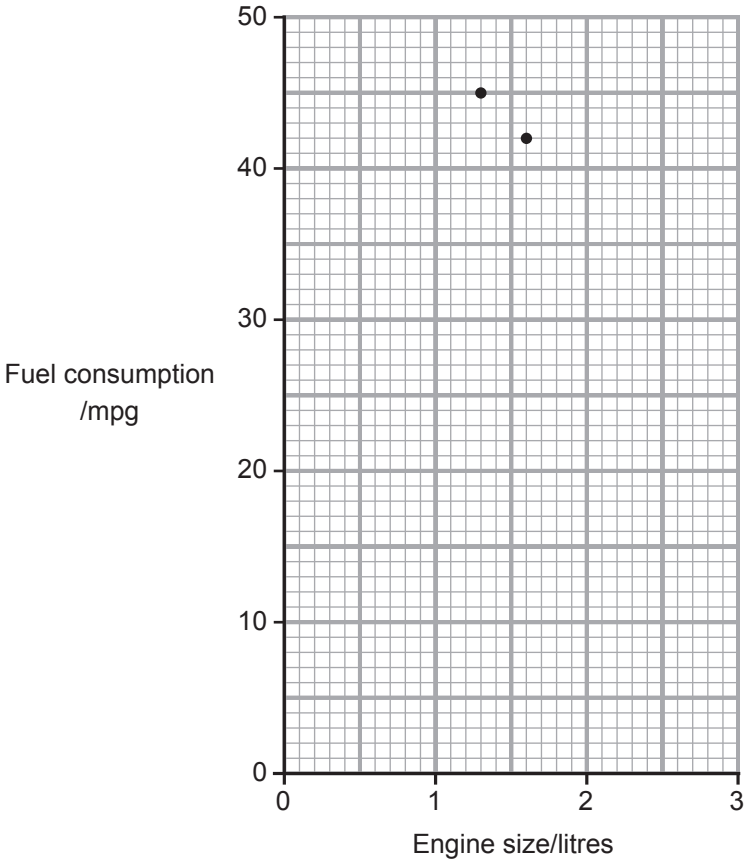
_____ and _____ [1]

Examiner Only	
Marks	Remark

6 **(a)** The table below gives information about five different makes of car.

Make	Engine size/ litres	Fuel consumption/ mpg
Aster	1.3	45
Lazio	1.6	42
Torino	1.8	39
Viva	2.0	37
Megro	2.5	32

(i) Use this information to complete the graph below, including a line of best fit.



[2]

(ii) Use your graph to find the fuel consumption of a 1.0 litre engine.

Answer _____ mpg [1]

(b) Car manufacturers are trying to make cars more efficient.

(i) Write down **one** way car manufacturers are making cars more efficient.

_____

_____ [1]

(ii) Petrol and diesel are made from oil, a finite fossil fuel. Explain the word 'finite' and why it is important to have more efficient cars.

_____

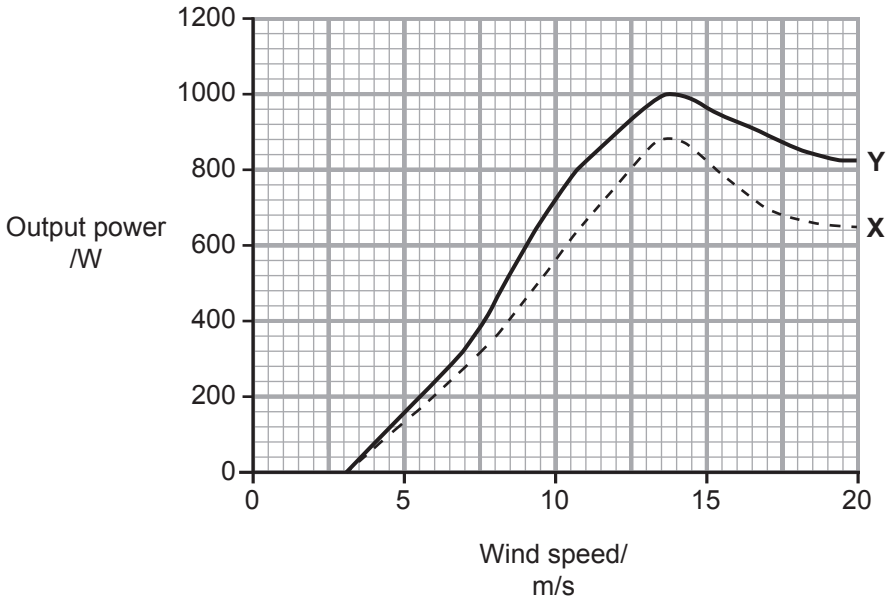
_____

_____ [2]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

7 **(a)** The graph below shows the performance of two types of wind turbine (**X** and **Y**).



(i) Calculate the difference between the maximum power produced by the two turbines.

(Show your working out.)

Answer _____ W [2]

(ii) Describe in detail how the output power of turbine **X** changes as the wind speed increases.

_____

_____

_____

_____

_____ [3]

(b) (i) Wind energy is classed as renewable. What does the word 'renewable' mean?

_____

_____ [1]

(ii) Write down **one** environmental advantage and **one** disadvantage of using wind energy.

Advantage _____

_____

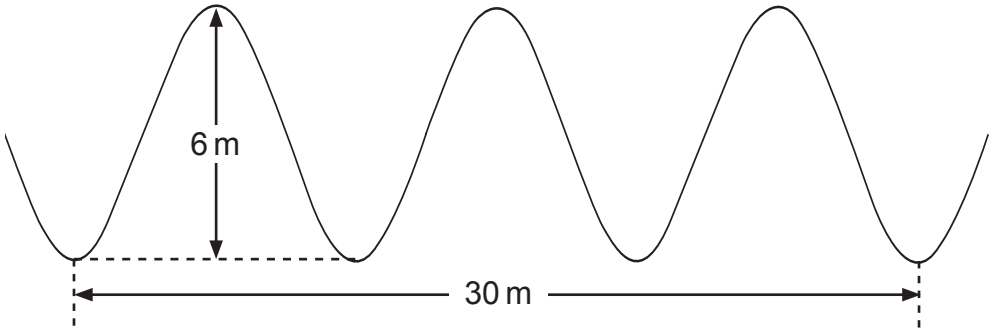
Disadvantage _____

_____ [2]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

8 **(a)** The diagram below shows some sea waves.



Use the information in the diagram to answer the questions below.

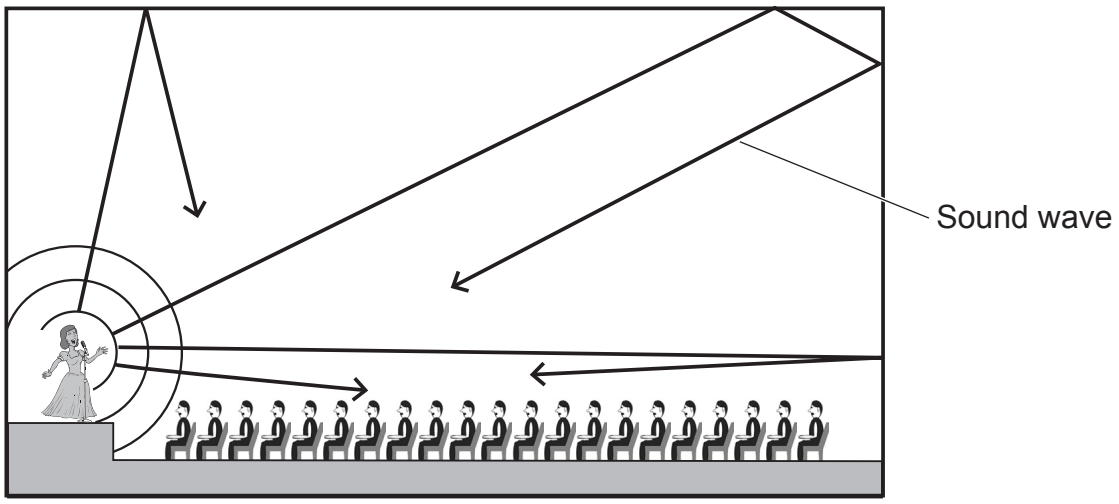
(i) What is the amplitude of these waves?

Answer _____ m [1]

(ii) What is the wavelength of these waves?

Answer _____ m [1]

(b) The diagram below shows the sound waves in a badly designed concert hall. Some of the audience complain that the sound they hear is not very clear.



Explain fully why some people may not hear the sound clearly.

Your answer should include:
- the cause of the problem
- what the audience will hear and why
- what can be done to correct the problem

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

[6]

(c) Explain fully what ultrasound is.

[2]

THIS IS THE END OF THE QUESTION PAPER

Examiner Only	
Marks	Remark

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