Rewarding Learning

Centre Number	
71	

Candidate Number

General Certificate of Secondary Education
2013–2014

Science: Single Award

Unit 3 (Physics)

Foundation Tier

[GSS31]

GSS31

FRIDAY 15 NOVEMBER 2013, AFTERNOON

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 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**.

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

Examiner Only	
Marks	Remark

1 **(a)** The pictures below show some electrical appliances.

© iStock / Thinkstock

kettle

© Ryan McVay / Photodisc / Thinkstock

microphone

© iStock / Thinkstock

loudspeaker

© iStock / Thinkstock

television

(i) Which appliance above produces most light energy?

Answer _____ [1]

(ii) Which appliance changes sound energy into electrical energy?

Answer _____ [1]

(b) Complete the following sentence.

Choose from:

carried **destroyed** **created** **changed**

The law of conservation of energy states that energy cannot be _____ or _____ , it can only be _____ from one form to another.

[2]

(c) The table below shows the power of some electrical appliances.

Appliance	Power/watts
kettle	2000
oven	4000
toaster	800
television	200

(i) Which appliance is **not** designed to produce heat?

Answer _____ [1]

(ii) Which appliance has a power rating of 2 kW?

Answer _____ [1]

(d) The oven uses a current of 17 amps. Which fuse should the oven have fitted?

Circle the correct answer.

5 A **15 A** **30 A** **45 A**

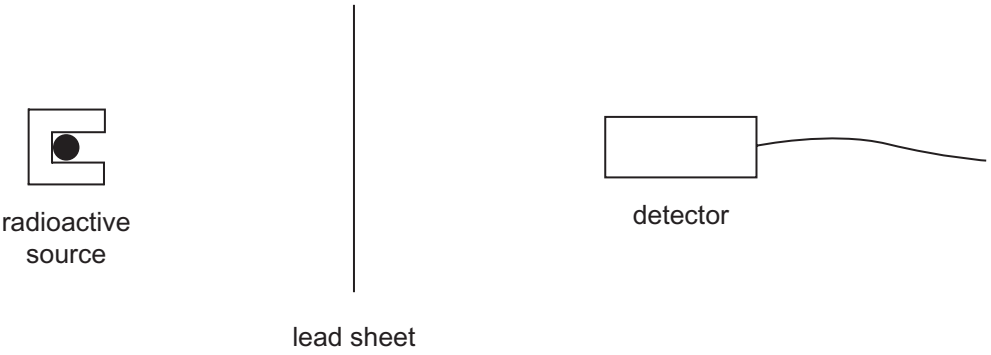
[1]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

2 The equipment below measures the amount of gamma radiation stopped by different thicknesses of lead.



(a) State **two** things that have to be kept the same to make the test fair.

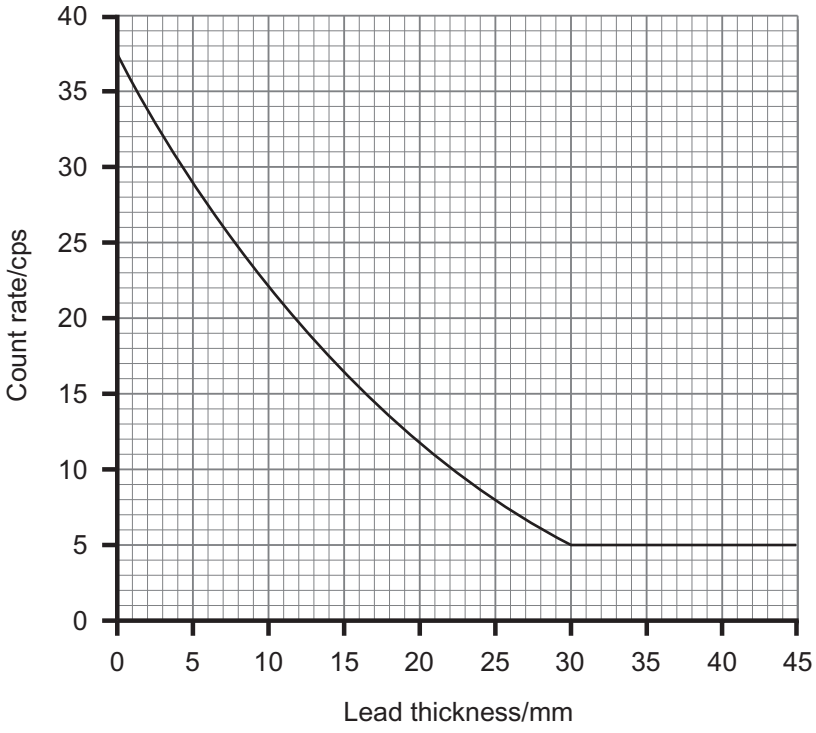
1. _____

_____

2. _____

_____ [2]

(b) The results of the experiment are shown in the graph below.



(i) Complete the following sentence to describe fully the conclusion that can be made from these results.

As the thickness of lead increases _____

_____

_____ [2]

(ii) Complete the sentence below.

Choose from:

surround **underground** **background**

The count rate never falls to zero because of the radiation that is always around us. This is called _____ radiation. [1]

(iii) What is the minimum (smallest) thickness of lead needed to stop all the gamma radiation from this source?

Answer _____ mm [1]

(c) Give **one** use for gamma radiation.

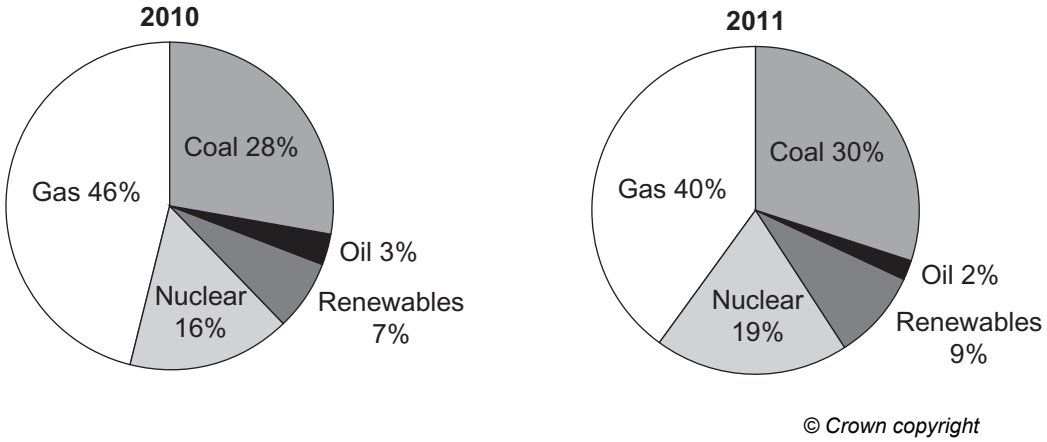
_____ [1]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

3 The pie charts below show the energy sources used to produce the UK's electricity in 2010 and 2011.



(a) (i) Name **one** fossil fuel that was used less in 2011 than in 2010.

Answer _____ [1]

(ii) Calculate by how much the percentage use of this fossil fuel has fallen.

Answer _____% [1]

(b) The percentage of renewable energy sources used has increased between 2010 to 2011.

(i) What is meant by the term 'renewable'?

_____ [1]

(ii) Give **one** example of a renewable energy source.

_____ [1]

(c) Below are the number of units shown by an electricity meter 3 months ago and today.

6 4 3 9 0	6 5 3 6 5
3 months ago	**today**

(i) Calculate the number of units used in these 3 months.

Answer _____ [1]

(ii) Use the equation:

cost = number of units used × cost per unit

to calculate the cost of using electricity over these 3 months.
Each unit of electricity costs 20p.

(Show your working out.)

Answer _____ [2]

(iii) Suggest **two** ways that any household can reduce the amount of electricity used.

1. _____

_____

2. _____

_____ [2]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

4 **(a)** The table below gives advice on how a person can prevent damage due to ultraviolet (UV) radiation.

UV Index	Safe time in Sun/mins	Protection
1–2	120	Hat
3–4	90	Hat + sunglasses
5–6	60	Hat, sunglasses and factor 10 sunscreen
7–9	40	Hat, sunglasses, factor 20 sunscreen and T-shirt
10+	30	Hat, sunglasses, factor 30 sunscreen, T-shirt and shady area

(i) Name the condition caused by too much exposure to UV radiation.

_____ [1]

(ii) During her summer holidays, Jane is leaving an area of UV Index 8 and travelling to an area of UV Index 12. From the table give **two** extra things she should do to help prevent damage due to UV radiation.

1. _____

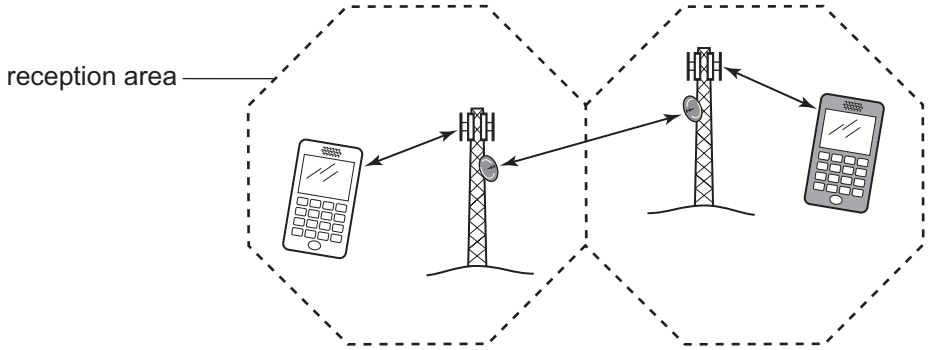
_____

2. _____

_____ [2]

Examiner Only	
Marks	Remark

(b) The diagram below shows how mobile phones transmit signals from one phone to another.



(i) Name the type of electromagnetic wave used to carry mobile phone signals.

_____ [1]

(ii) What name is given to the reception area around a phone mast?

_____ [1]

(c) Below are some electromagnetic waves and their uses.
Using lines match each wave with its use.

Wave	Use
	Pictures of broken bones
Radio waves	
	Preserving food
X-rays	
	Television broadcasting

[2]

(d) Give **one** feature that is the same and **one** feature that is different between electromagnetic waves.

Same _____

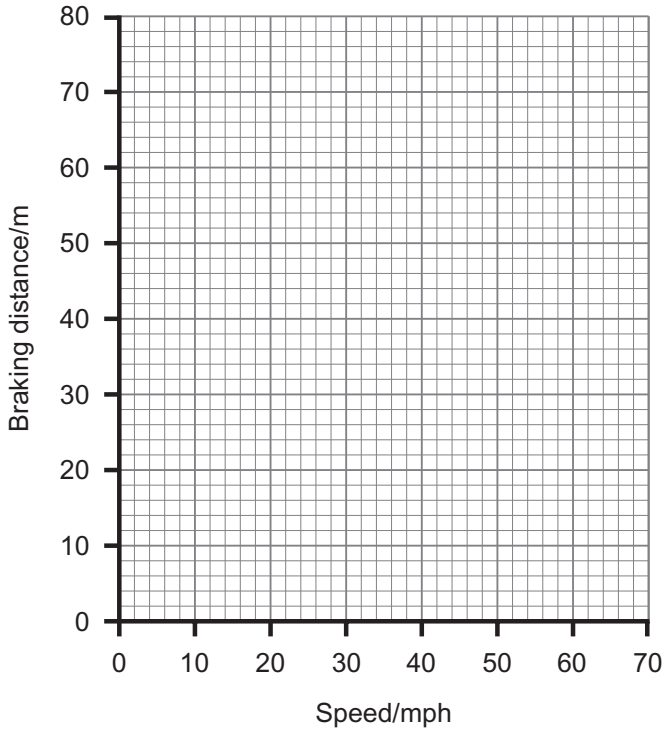
Different _____ [2]

Examiner Only	
Marks	Remark

5 **(a)** The table below shows the braking distance for a car at different speeds.

Speed/mph	Braking distance/m
0	0
20	6
30	14
50	38
70	75

(i) Plot and draw a line graph for these results.



[3]

(ii) State the trend shown by these results.

_____

_____ [1]

(iii) These results are for a dry road. On the same grid above, sketch the line you would expect if the road was wet. [1]

(b) The table shows the increased risk that drivers will crash as their Blood Alcohol Content (BAC) rises.

BAC/ mg/100 ml	Increased risk of having a crash
40	1.4
80	3.8
120	14.7
160	32.2

The legal limit for a driver's BAC is 80 mg/100 ml. Using the information and your knowledge, describe and explain fully the effect that alcohol has on driving and why many road safety campaigners suggest that the current limit is too high.

_____

_____

_____

_____

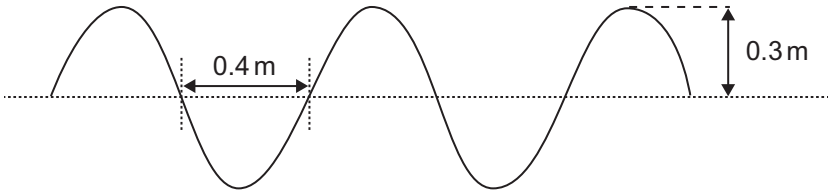
_____ [3]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

6 The diagram below represents a sound wave.



(a) What is the wavelength of this sound wave?

Answer _____ m [1]

(b) **(i)** Use the equation:

speed = wavelength × frequency

to describe how wavelength changes as frequency increases.

(Assume speed remains the same.)

_____ [1]

(ii) State the units of frequency.

Answer _____ [1]

(c) The device below is used to measure distance.

© Victor De Schwanberg / Science Photo Library

To find the length of a hall the device measures the time taken for an ultrasound wave to travel to a wall and back.

(i) Describe fully why we cannot hear the sound produced by this measuring device.

_____

_____

_____ [2]

(ii) A signal takes 0.4 s to travel from one wall of a hall to the opposite wall and back. The speed of sound in air is 330 m/s.

Use the equation:

distance = speed × time

to calculate the length of the hall.

(Show your working out.)

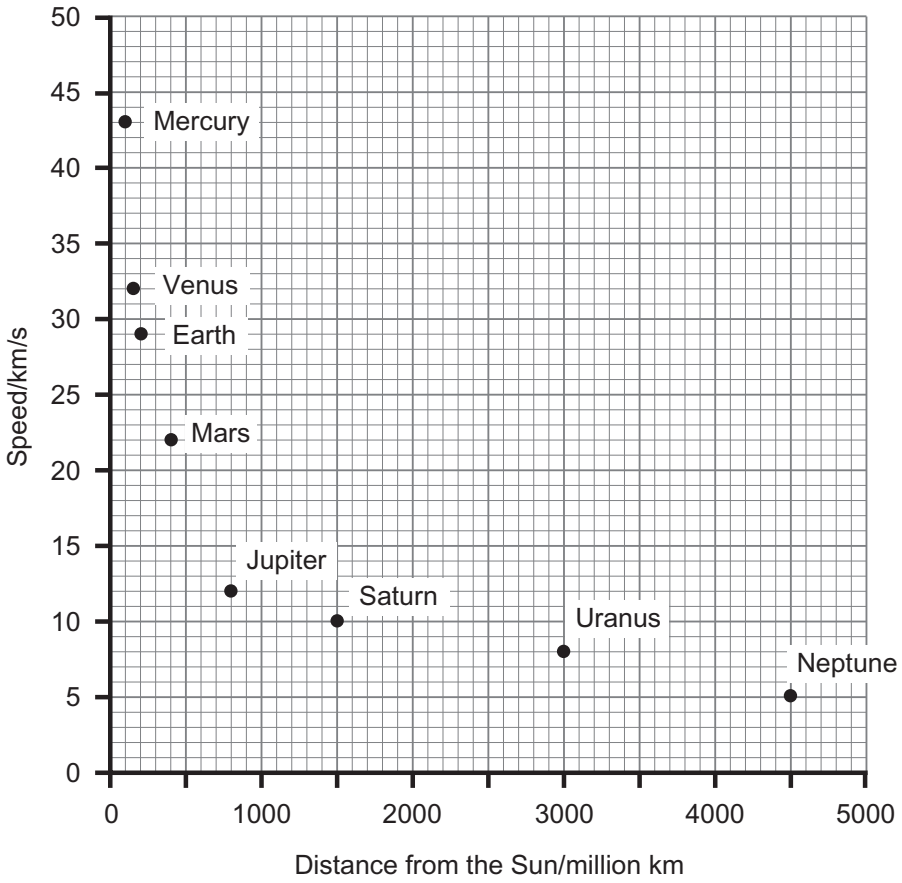
Answer _____ m [3]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

7 **(a)** The graph below shows how the (orbital) speed of a planet relates to its approximate distance from the Sun.



(i) Use the graph to find how far Venus is from the Sun.

Answer _____ million km [1]

(ii) Using information from the graph, compare the speed and distance from the Sun of Mercury and Neptune.

_____

_____

_____

_____ [3]

(b) This information describes the Heliocentric model of the Solar System.

Give **two** differences between this model and the Geocentric model.

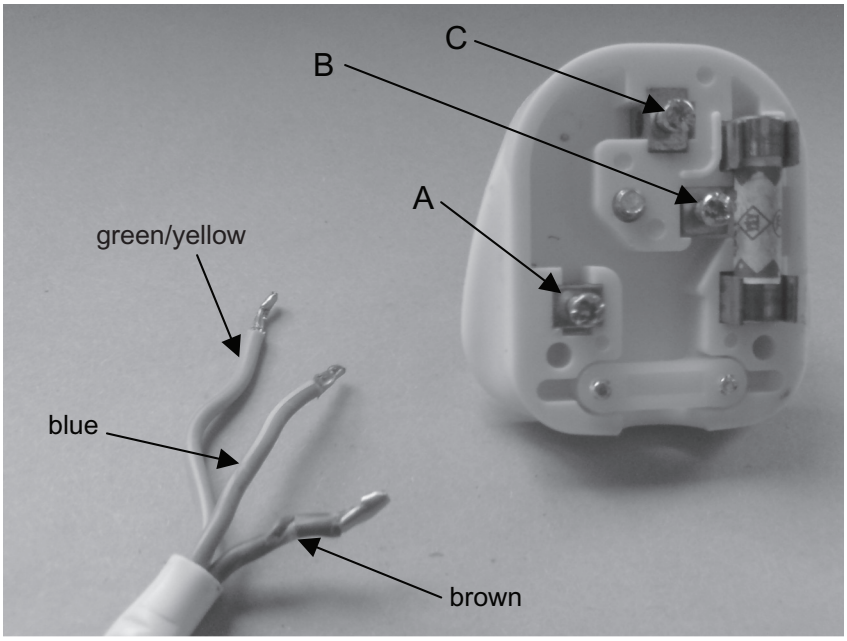
1. _____

2. _____ [2]

Examiner Only	
Marks	Remark

8 The picture below shows a 3-pin plug about to be wired.

The colours of each wire and the plug pins are labelled.



Source: Principal Examiner

Describe fully how the plug should be wired correctly, naming and explaining one safety feature found in the plug.

Your answer should:

- use the labels provided
- name the labelled parts.

Examiner Only	
Marks	Remark

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

Examiner Only	
Marks	Remark

[6]

THIS IS THE END OF THE QUESTION PAPER

Sources:
Kettle_142270279_iStockphoto_Thinkstock.com
Microphone_AA020750_Photodisc_Thinkstock.com
Loudspeaker_115719603_iStockphoto_Thinkstock.com
Television_106382140_iStockphoto_Thinkstock.com

113974