



Rewarding Learning

General Certificate of Secondary Education  
2011–2012

**Science: Single Award (Modular)**

Road Safety, Radioactivity  
and Earth in Space

Module 6

Foundation Tier

[GSC61]

WEDNESDAY 29 FEBRUARY 2012

11.00 am–11.45 am



Centre Number

71	
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Candidate Number

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**TIME**

45 minutes.

**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 six** questions.

**INFORMATION FOR CANDIDATES**

The total mark for this paper is 45.

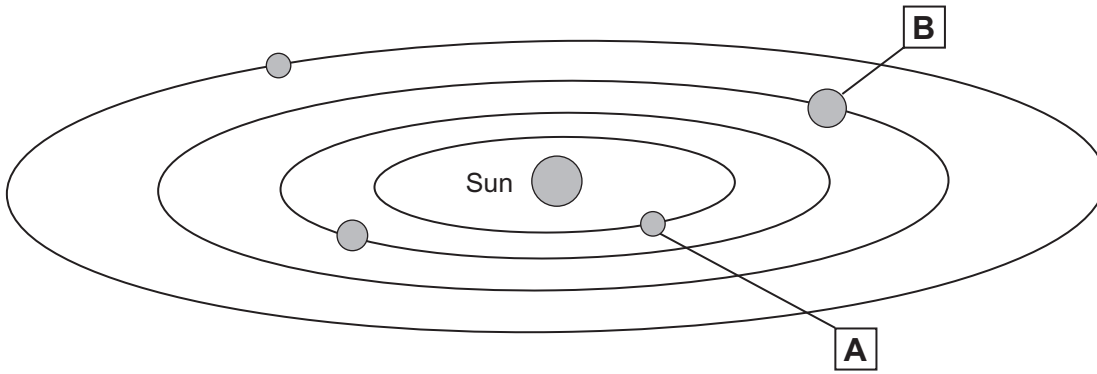
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

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

<b>Total Marks</b>	
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1 The diagram below shows the Sun and its four closest planets.



(a) Name the planets labelled **A** and **B**.

Planet **A** \_\_\_\_\_

Planet **B** \_\_\_\_\_ [2]

(b) Below are some terms used in the study of space and their descriptions. Using lines, link each term with its correct description.

Term	Description
Galaxy	A huge collection of stars
Star	Orbits around a planet
Universe	Produces its own energy
	Contains everything which exists

[3]

Examiner Only	
Marks	Remark

(c) The Sun, Earth and Moon are all part of the Solar System.  
Tick (✓) the box for the two that are closest.

Sun and Earth	<input type="checkbox"/>
Earth and Moon	<input type="checkbox"/>
Sun and Moon	<input type="checkbox"/>

[1]

(d) Which of the following statements is correct? Tick (✓) the box.

The Sun orbits the Earth	<input type="checkbox"/>
The Sun orbits the Moon	<input type="checkbox"/>
The Moon orbits the Earth	<input type="checkbox"/>
The planets orbit the Earth	<input type="checkbox"/>

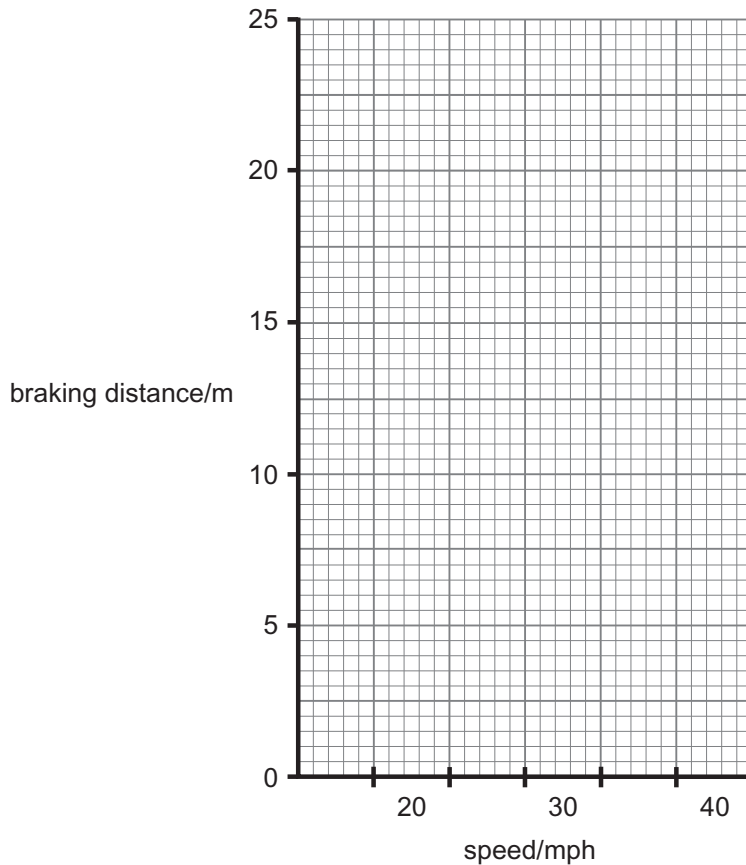
[1]

Examiner Only	
Marks	Remark

2 The table below shows how the braking distance changes with the speed of a car on a **dry** road.

Speed/mph	Braking distance/m
20	6
30	14
40	24

(a) (i) Draw a **bar chart** for these results.



[2]

(ii) Complete the sentence below.

As speed increases the braking distance \_\_\_\_\_.

[1]

(b) What is meant by the term 'thinking distance'?

\_\_\_\_\_

\_\_\_\_\_ [1]

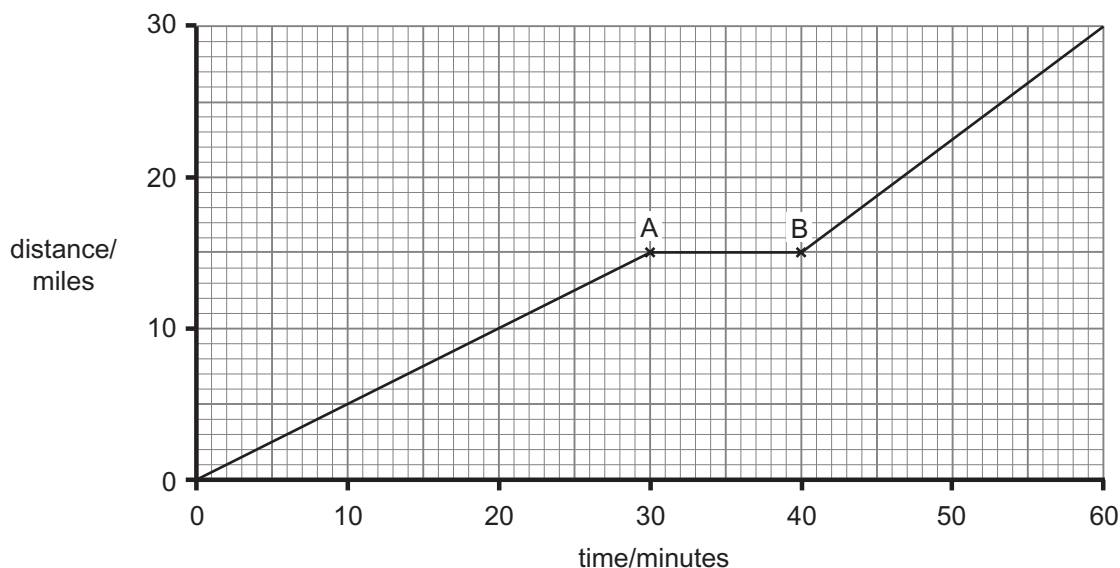
Examiner Only	
Marks	Remark

(c) State how each of the following will change on a **wet** road.

Braking distance \_\_\_\_\_

Thinking distance \_\_\_\_\_ [2]

(d) The graph below is a distance–time graph for a car.



(i) Describe the motion of the car from A to B.

Choose from:

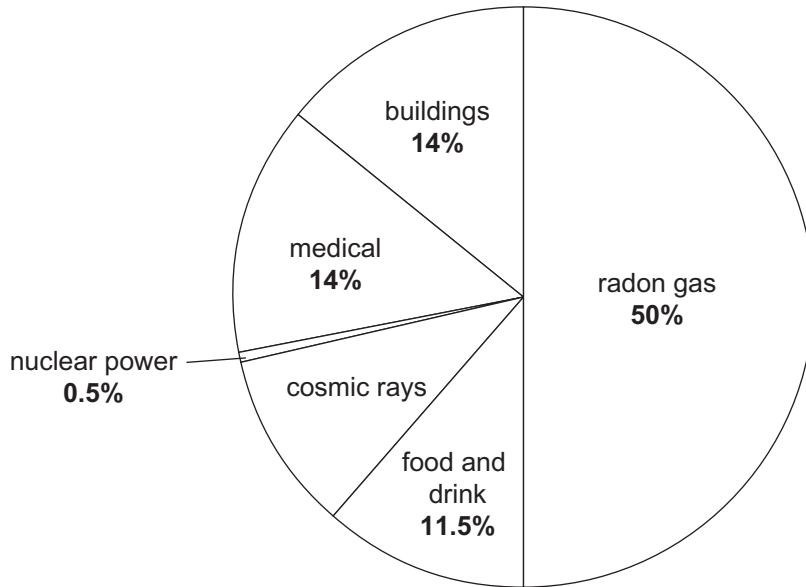
**Stopped** : **Steady speed** : **Accelerating**  
 \_\_\_\_\_ [1]

(ii) Use the graph to find the distance the car travels in the first 20 minutes.

Distance \_\_\_\_\_ miles [1]

Examiner Only	
Marks	Remark

3 The pie chart below shows sources of radiation that are always around us.



(a) Calculate the percentage of radiation that comes from cosmic rays.  
(Show your working out.)

\_\_\_\_\_ % [2]

(b) Complete the following sentence.

Choose from:

**background      foreground      surround**

The small amount of radiation always around us is called

\_\_\_\_\_ radiation. [1]

Examiner Only	
Marks	Remark

(c) (i) Use the pie chart to name one natural source of radiation.

\_\_\_\_\_ [1]

(ii) Name a disease caused by too much radiation.

\_\_\_\_\_ [1]

(d) Complete the table about types of radiation.

Choose from:

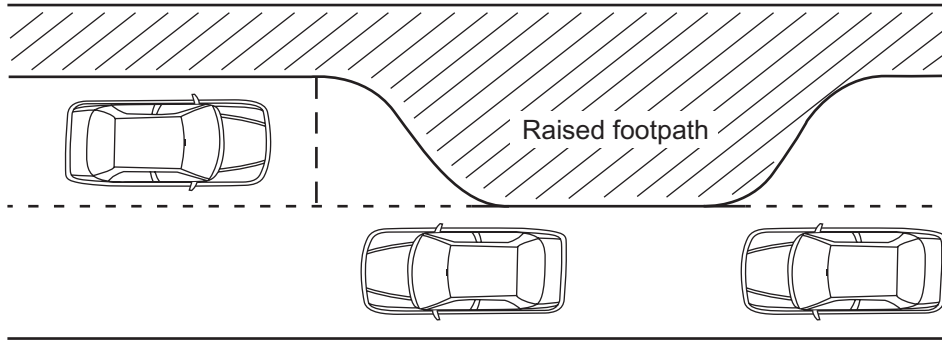
alpha                  beta                  gamma

Type of radiation	Material needed to stop it
	aluminium sheet
	thick lead sheet
	thin paper

[2]

Examiner Only	
Marks	Remark

4 (a) The diagram below shows a road narrowing scheme.



(i) Explain fully why road narrowing schemes are used in housing estates.

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[2]

(ii) Speed bumps are another feature of roads in housing estates. Suggest how speed bumps might affect emergency service response time.

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[1]

Examiner Only	
Marks	Remark



(b) The photograph below shows the air bags in a car after an accident.



© TRL Ltd / Science Photo Library

Explain fully how an air bag prevents serious injury to the driver during an accident.

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[2]

Examiner Only	
Marks	Remark

(c) The table below shows the Euro NCAP safety ratings for four cars A, B, C and D.

★ = safe  
☆ = not safe

	Car A	Car B	Car C	Car D
Front and side impact rating	★★★★☆☆	★★★★☆☆	★★★★☆☆	★★★★★★
Pedestrian test rating	★★★★☆	★☆☆☆☆	★★☆☆☆	★★☆☆☆
Child protection rating	★★★★☆☆	★★★★☆☆	★★☆☆☆☆	★★☆☆☆☆

Use the information in the table to answer parts (i) and (ii).

(i) Which is the safest car for a family with young children to travel in? Explain your answer.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ [2]

(ii) Which car is the most dangerous for pedestrians in an accident?

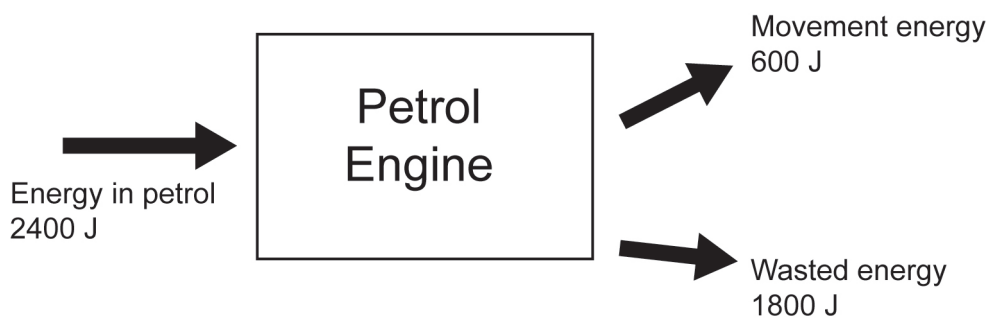
\_\_\_\_\_ [1]

(d) State **one** way in which a pedestrian can reduce the risk of being knocked down by a car.

\_\_\_\_\_ [1]

Examiner Only	
Marks	Remark

5 The diagram below shows the energy transfer in a petrol engine.



(a) Name a type of energy wasted by a car engine.

\_\_\_\_\_ [1]

(b) (i) Use the equation:

$$\text{efficiency} = \frac{\text{useful energy output}}{\text{total energy input}}$$

to calculate the efficiency of the petrol engine.

(Show your working out.)

Efficiency \_\_\_\_\_ [2]

(ii) Explain fully how more efficient engines can reduce global warming.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_ [2]

Examiner Only	
Marks	Remark



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**THIS IS THE END OF THE QUESTION PAPER**

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