



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

Candidate Number

### 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.

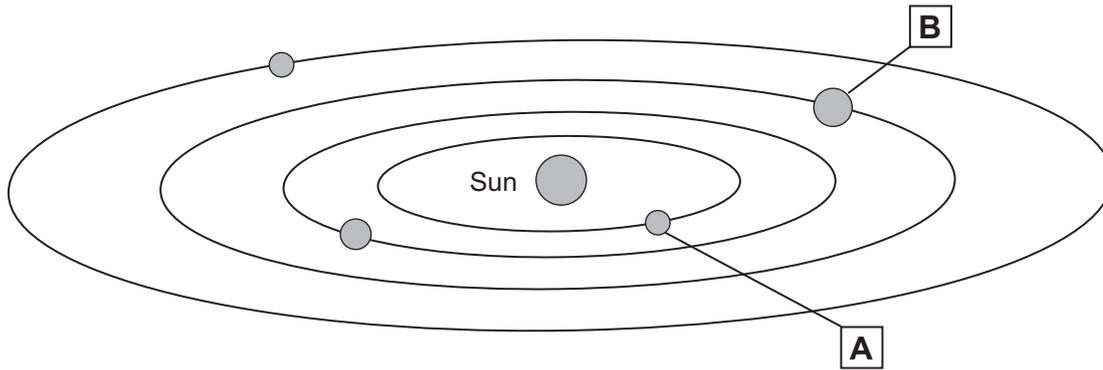
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

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"/>

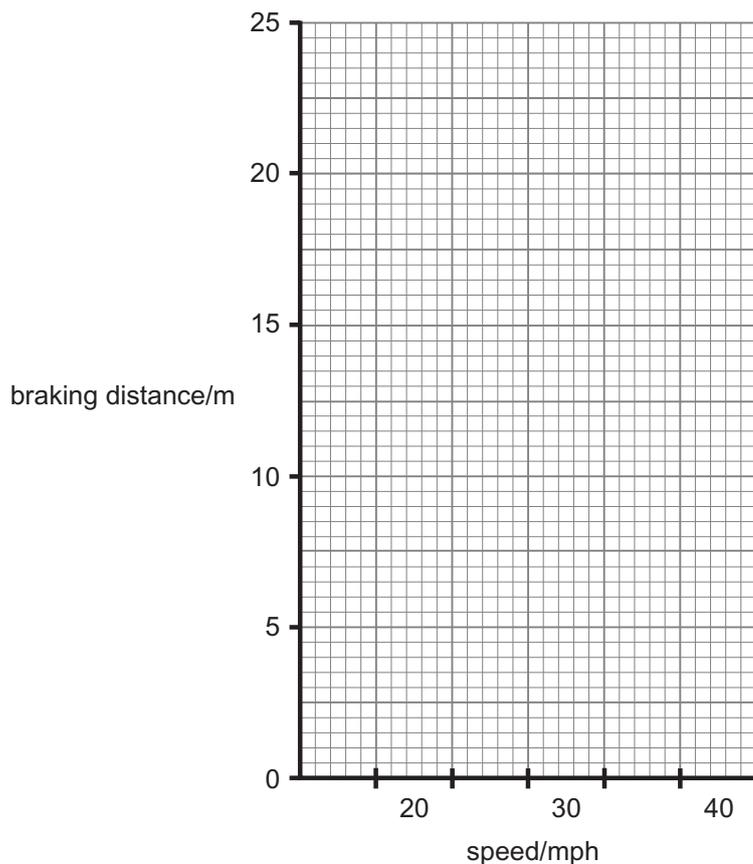
[1]

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]

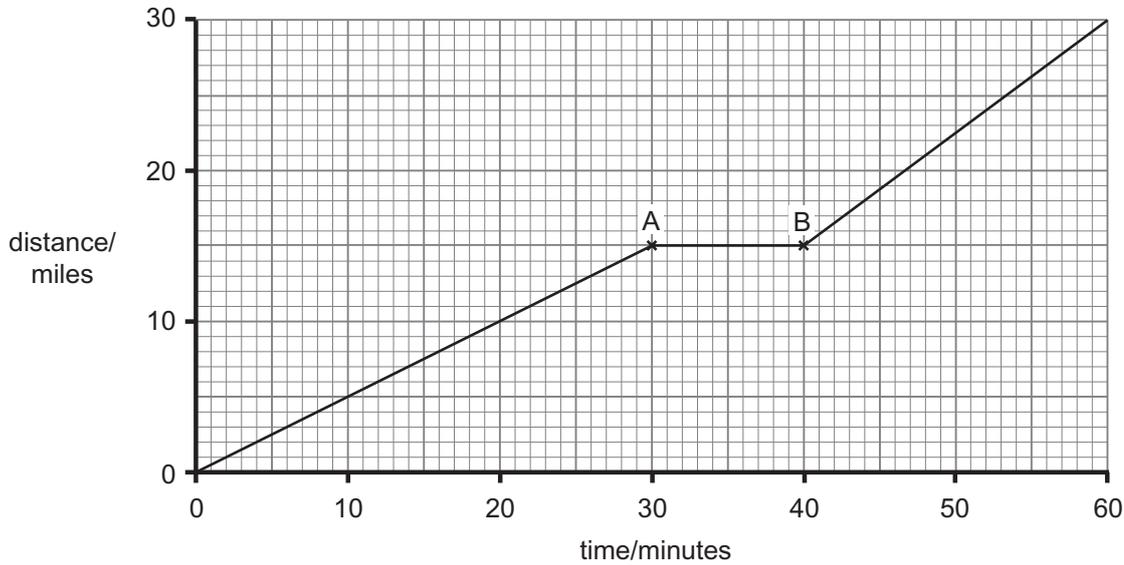
Examiner Only	
Marks	Remark

(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:

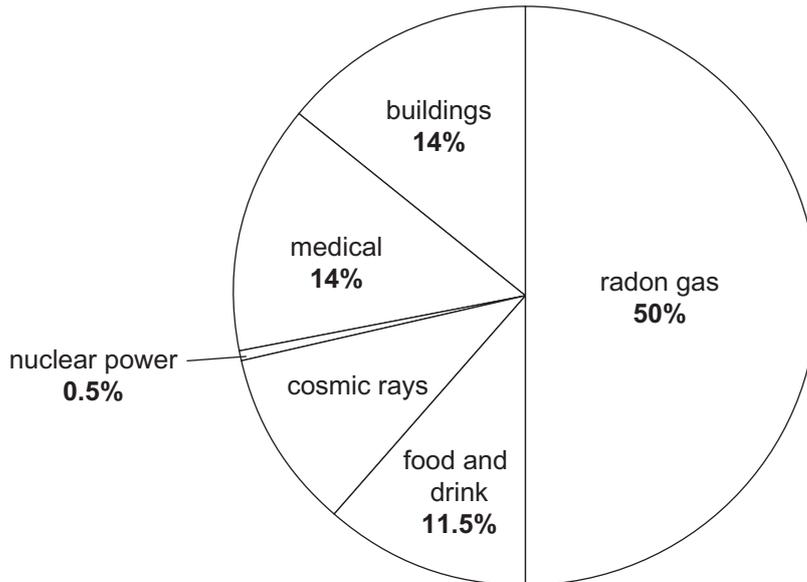
**Stopped** : **Steady speed** : **Accelerating**  
 \_\_\_\_\_ [1]

(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**

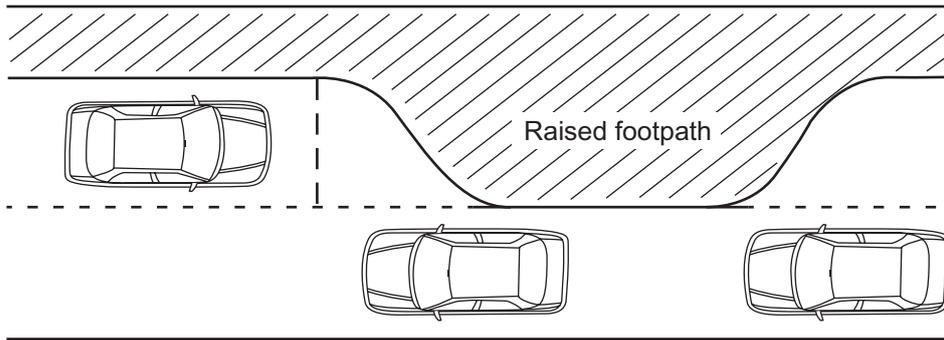
**gamma**

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.

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[2]

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

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[1]

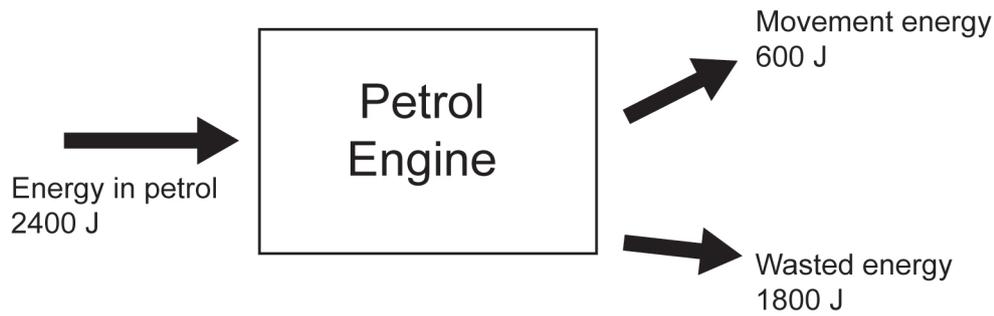
- (d) State **one** way in which a pedestrian can reduce the risk of being knocked down by a car.

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[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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