



Centre Number

71

Candidate Number

General Certificate of Secondary Education  
2009–2010

**Science: Single Award (Modular)**

Road Safety, Radioactivity  
and Earth in Space

Module 6

Foundation Tier

[GSC61]



FRIDAY 26 FEBRUARY 2010, MORNING

**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.

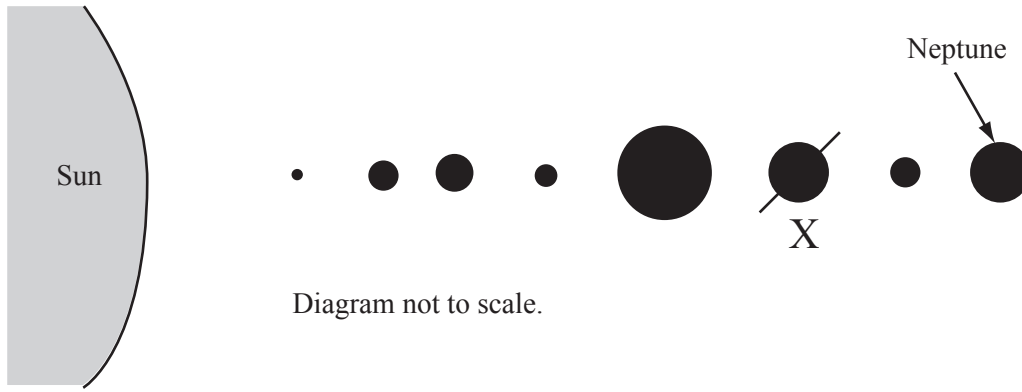
For Examiner's  
use only

Question Number	Marks
1	
2	
3	
4	
5	
6	

Total  
Marks



1 (a) The diagram below shows the Sun and its planets.



(i) Label the planet Earth on the diagram with a letter E. [1]

(ii) Name the planet marked X. [1]

(iii) Neptune is the coldest planet, suggest a reason why it is the coldest. [1]

(iv) Complete the following sentence. The Sun and its eight planets are known as the [1]

(b) Choose words from the list below to answer parts (i) and (ii).

**Milky Way      :      Galaxy      :      Universe**

(i) Name the largest system. [1]

(ii) Our Galaxy is called the [1]

Examiner Only	
Marks	Remark

(c) The picture below shows NASA's Phoenix Lander.

It is travelling to Mars to search for extra-terrestrial life.



© NASA/JPL

Explain what is meant by the term **extra-terrestrial life**.

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

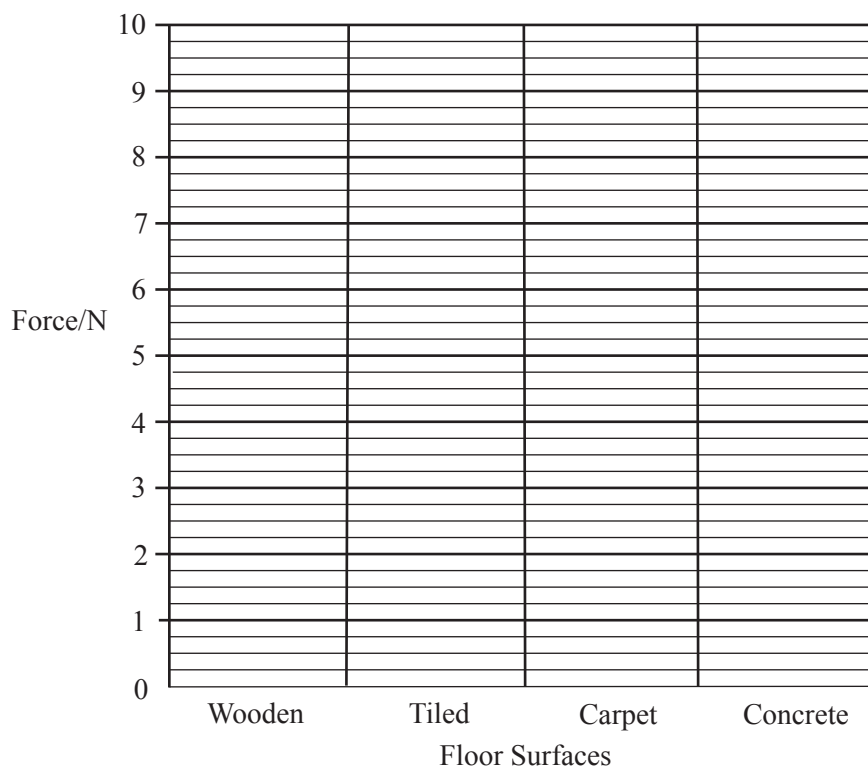
Examiner Only	
Marks	Remark



(b) The results of the investigation are given below.

Floor surfaces	Force/N
Wooden	4
Tiled	3
Carpet	7
Concrete	9

(i) Draw a **bar chart** below using the results given in the table.



[2]

(ii) Which surface has the highest friction?

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

(iii) Give **one** way George could reduce the friction of the tiled floor.

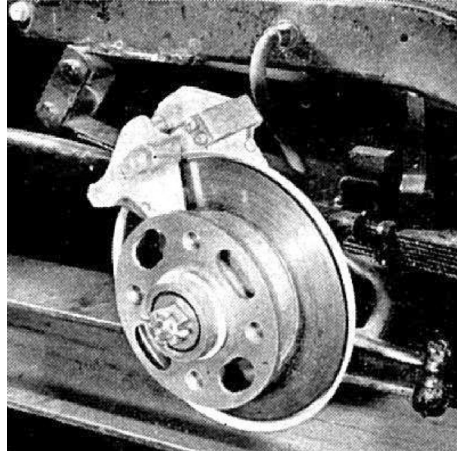
\_\_\_\_\_ [1]

Examiner Only	
Marks	Remark

(c) If the brick were heavier what effect, if any, would it have on the amount of friction?

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

(d) The picture below shows the brakes on a car.



*crosleyautoclub.com/Images/Misc/DiscBrakes.JPG*

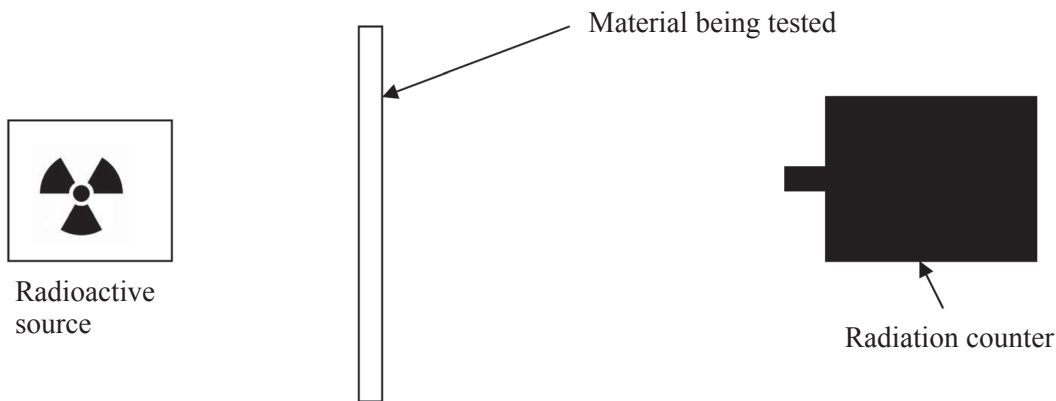
The brakes stop the car using friction. What type of energy is produced by friction?

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

Examiner Only	
Marks	Remark



(b) The following apparatus was set up to test how materials stop radiation.



The following results were obtained.

Material being tested	Radiation count/minute
paper	400
aluminium	392
lead	40

(i) Give **one** thing which must be done to make sure this is a fair test.

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

(ii) Using the results, suggest what type of radiation is given from the source.

**Circle** the correct answer.

**alpha    :    gamma    :    beta** [1]

(iii) Even when the radioactive source was removed, the radiation counter still gave a reading.

What name is given to this type of radiation which is found all around us.

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

Examiner Only	
Marks	Remark



4 (a) Shown below are pictures of new and worn tyres of the same make.

Image of new tyre removed  
due to copyright issues

Image of worn tyre removed  
due to copyright issues

new tyre

worn tyre

The new tyre has a tread depth of 8 mm and by law there must be at least 1.6 mm. The worn tyre shown has only 0.6 mm. Complete the table below with a tick (✓) to show how using the **worn** tyre will affect the following in **wet** conditions.

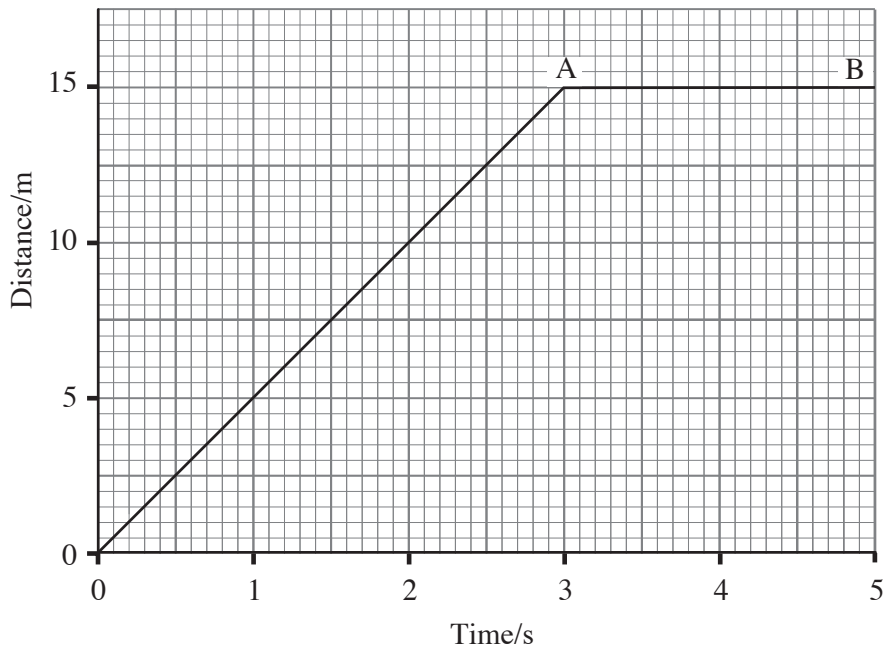
	<b>Decreases</b>	<b>Stays the same</b>	<b>Increases</b>
Braking distance			
Thinking distance			
Stopping distance			

[3]

Examiner Only	
Marks	Remark



- (d) The graph shows how the distance travelled by a car changed with time.



- (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 3 seconds.

Distance = \_\_\_\_\_ m [1]

- (iii) Use the following formula to calculate the speed of the car in the first 3 seconds.

$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

Speed = \_\_\_\_\_ m/s [1]

Examiner Only	
Marks	Remark

5 (a) The photograph below shows a Toyota Prius which is a hybrid car.

Image of Toyota Prius removed due to copyright issues.

(i) What two types of energy source are used by the Toyota Prius?

1. \_\_\_\_\_

2. \_\_\_\_\_

[2]

(ii) Explain fully why the manufacturer claims that this is an environmentally friendly car.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

[3]

Examiner Only	
Marks	Remark

(b) The graph below shows the change in world biodiesel production.

Image of Graph showing a significant increase in world biodiesel production between 1991 and 2003 removed due to copyright issues.

Suggest **two** reasons why there has been such an increase in production of biodiesel.

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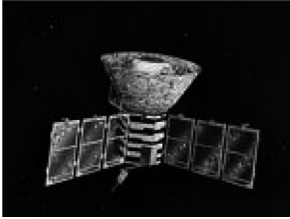

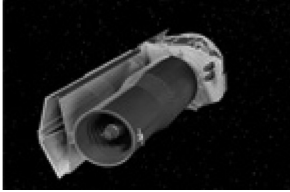
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[2]

Examiner Only	
Marks	Remark

- 6 (a) Given below are the names of some telescopes and the type of radiation they detect.

Name of telescope	Type of radiation detected
 <p>© Jodrell Bank Centre for Astrophysics, University of Manchester Lovell</p>	Radio
 <p>© Max Planck Institute for Extraterrestrial Physics XMM Newton</p>	X-rays
 <p>© NASA COBE</p>	Microwaves
 <p>© NASA/STScI Hubble</p>	Visible light
 <p>© NASA/JPL - Caltech Spitzer</p>	Infrared

Examiner Only	
Marks	Remark

Each telescope is useful in detecting different events because each event produces different radiation as shown in the table below.

Event	Main radiation produced
Nebulae	Infrared
Pulsars	Radio
Stars	Visible light
Big Bang	Microwaves
Neutron stars	X-rays

Use the information given to name a telescope that could be used to:

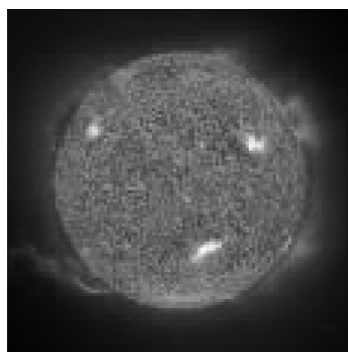
- (i) analyse the radiation from the “Big Bang”.

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

- (ii) look at Pulsars.

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

- (b) The picture below shows our Sun, an example of a star.



© Crown Copyright/ UK Space Agency

Explain fully how our Sun was formed.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_ [3]

Examiner Only	
Marks	Remark

- (c) (i) Proxima Centauri, the nearest star to the Sun is 4.2 light years away. Explain fully what is meant by the term **light year**.

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 [2]

- (ii) Why would a manned space mission to a star 4.2 light years away be impossible? Explain your answer.

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 [2]

Examiner Only	
Marks	Remark



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

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