



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 21 MAY 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 table below gives some information about the planets in our Solar System.

| Planet  | Distance from the Sun (million km) | Surface temperature (°C) | Gravity (N/kg) |
|---------|------------------------------------|--------------------------|----------------|
| Mercury | 58                                 | 430                      | 4              |
|         | 108                                | 470                      | 9              |
| Earth   | 150                                | 22                       | 10             |
|         | 228                                | -23                      | 4              |
| Jupiter | 778                                | -150                     | 26             |
| Saturn  | 1427                               | -180                     | 11             |
| Uranus  | 2870                               | -210                     | 12             |
| Neptune | 4497                               | -220                     | 12             |

(i) Complete the table by naming the two missing planets. [2]

(ii) Suggest why the Earth is warmer than Saturn.

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

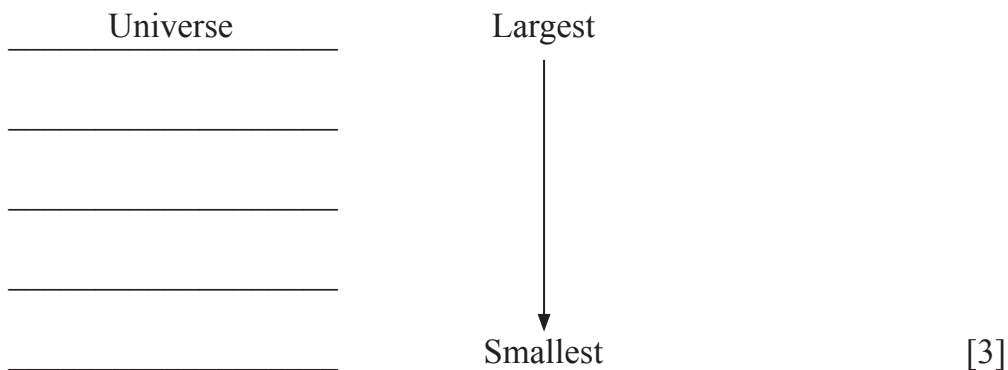
(iii) On which of the planets would our weight be greatest?

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

(b) Given below are a list of names used in astronomy (the study of space).

**Earth : Galaxy : Solar System : Sun : Universe**

Put them in order of size from largest to smallest. The first is done for you.



| Examiner Only |        |
|---------------|--------|
| Marks         | Remark |
|               |        |

(c) The photograph below shows the Ares IX rocket. These rockets may be used to set up bases on the moon by 2020.



© NASA [http://www.nasa.gov/mission\\_pages/constellation/multimedia/aresIX\\_on\\_pad.html](http://www.nasa.gov/mission_pages/constellation/multimedia/aresIX_on_pad.html)

Scientists have recently searched for water on the moon. Explain why finding water would help in setting up a base on the moon.

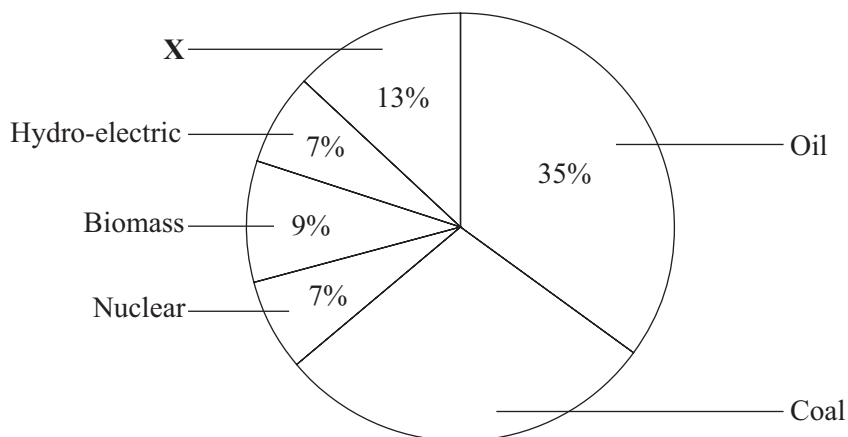
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[2]

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|---------------|--------|
| Marks         | Remark |
|               |        |

2 The pie chart below shows the World energy resources.



Use this information and your knowledge to answer the following questions.

(a) (i) Calculate the percentage of the energy resources which come from coal.

Show your working out.

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

(ii) State the two fossil fuels named in the pie chart.

1. \_\_\_\_\_
2. \_\_\_\_\_ [2]

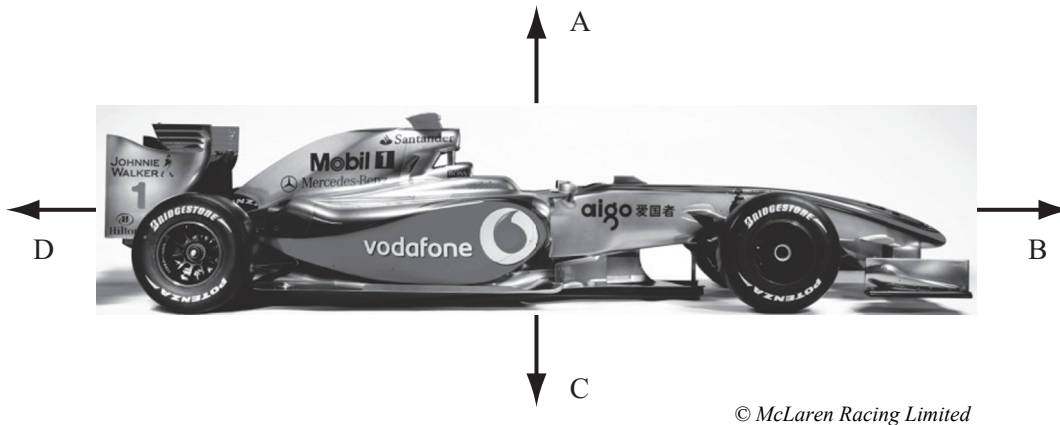
(iii) The X in the diagram represents another fossil fuel. Suggest what it is.

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

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|---------------|--------|
| Marks         | Remark |
|               |        |



- 3 (a) The picture below shows the forces acting on a racing car moving to the right.



- (i) Which arrow (A, B, C or D) shows the direction in which friction will act?

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

- (ii) Give two ways in which the friction on a race track is reduced.

1. \_\_\_\_\_  
 2. \_\_\_\_\_ [2]

- (b) After a long race the driver's reactions may be slower because of tiredness. Complete the table below using a tick (✓) to show the effect this will have.

|                   | Decrease | No change | Increase |
|-------------------|----------|-----------|----------|
| Reaction time     |          |           |          |
| Thinking distance |          |           |          |
| Braking distance  |          |           |          |

[3]

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|---------------|--------|
| Marks         | Remark |
|               |        |

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**(Questions continue overleaf)**

4 Euro NCAP provides cars with a safety star rating.

★ = safe

☆ = not safe

| Model        | Front and side impact rating | Pedestrian test rating | Child protection rating |
|--------------|------------------------------|------------------------|-------------------------|
| Seat Altea   | ★★★★★                        | ★★★☆☆                  | ★★★★★☆☆                 |
| Kia Picanto  | ★★★★☆☆                       | ★☆☆☆☆                  | ★★★★★☆☆                 |
| Fiat Panda   | ★★★★☆☆                       | ★☆☆☆☆                  | ★★★☆☆☆☆                 |
| Hyundai Getz | ★★★★★☆☆                      | ★☆☆☆☆                  | ★★★★★☆☆                 |

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

(i) Explain why the Seat Altea is the safest car for a driver.

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

(ii) Overall which is the safest car in the test?

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

(b) State two safety features found in a car which are designed to protect the passenger if a crash occurs.

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

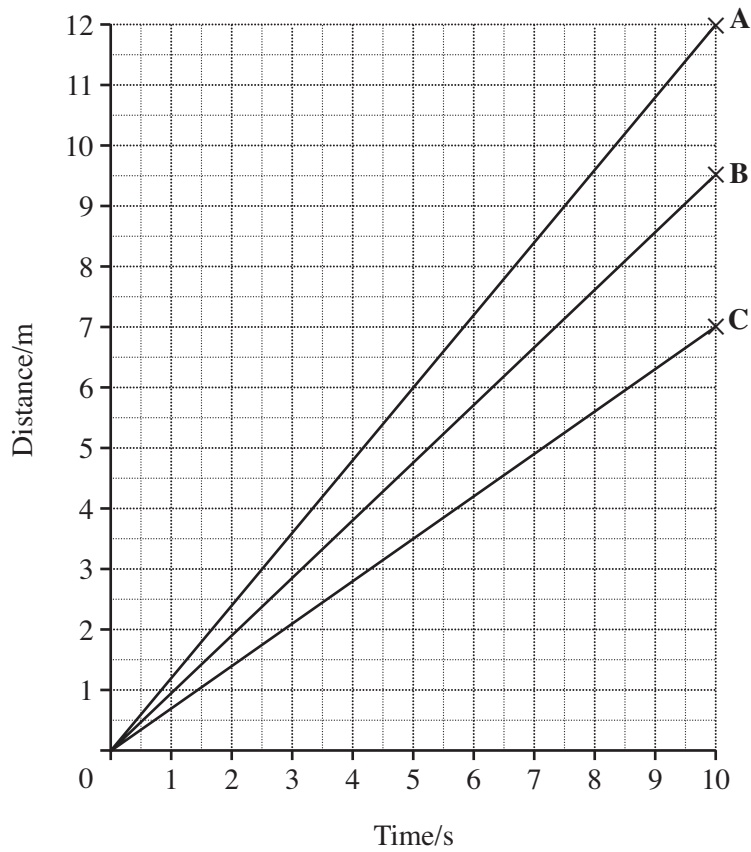
2. \_\_\_\_\_ [2]

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|---------------|--------|
| Marks         | Remark |
|               |        |





5 (a) Distance-time graphs for three cars are shown below.



Which car (A, B or C) is moving at the greatest speed? Use the graphs to explain your answer.

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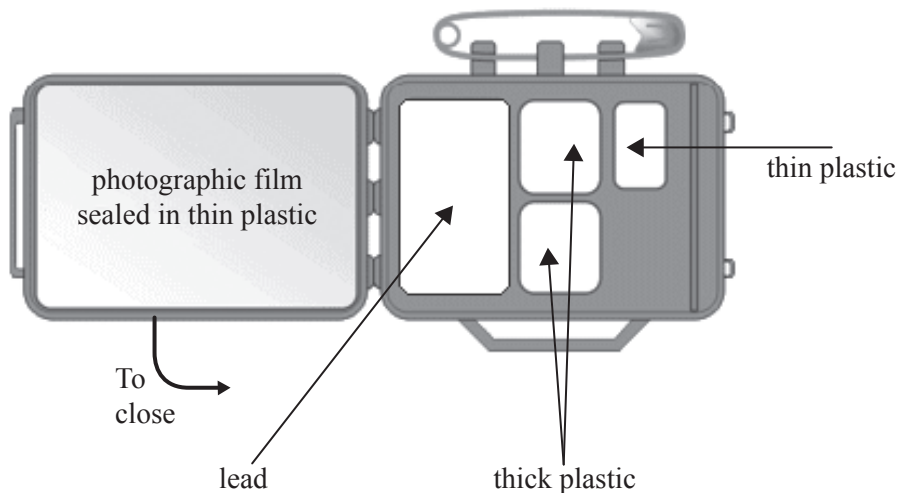
[2]

| Examiner Only |        |
|---------------|--------|
| Marks         | Remark |
|               |        |



- 6 (a) Nuclear power station workers have to wear film badges to indicate their absorbed dose of radiation.

**Film badge (opened to show internal parts).**



© BBC <http://www.bbc.co.uk/schools/gcsebitesize/science/aqa/radiation/radiocativerev5.shtml>

When the film is developed it will turn black where it has been exposed to radiation.

If the worker is exposed to **beta** radiation, shade the parts which would show up black on the diagram below.



© BBC <http://www.bbc.co.uk/schools/gcsebitesize/science/aqa/radiation/radiocativerev5.shtml>

[2]

- (b) Explain fully why people who work in nuclear power stations may be worried about exposure to radiation.

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[2]

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|---------------|--------|
| Marks         | Remark |
|               |        |

(c) (i) What is meant by the term background radiation?

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

(ii) Suggest **one** source that might produce background radiation.

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

(d) Explain fully why some nuclei may be radioactive.

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

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

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|---------------|--------|
| Marks         | Remark |
|               |        |





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