

Centre Number			
71			

**Candidate Number** 

General Certificate of Secondary Education 2011–2012

Science: Single Award (Modular)

Road Safety, Radioactivity
and Earth in Space
Module 6
Foundation Tier
[GSC61]
MONDAY 14 NOVEMBER 2011
2.30 pm-3.15 pm



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		

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IOtai	
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1	(a)	Complete	the	following	sentence.
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There are	planets in our Solar System.	[1]
	pianoto in our coiar cyctorii	F.1

**Examiner Only** 

**(b)** The table below gives information about **some** of the planets in our Solar System.

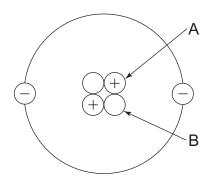
Planet	Diameter/km	Distance from the Sun/ million km	Gravity/N/kg
Venus	12200	108	9
Earth	12800	150	10
Mars	6800	230	4
Jupiter	143 000	780	26
Neptune	49 528	4497	12

Using only this information answer questions (i) and (ii) below.

(i)	Name a planet which is colder than Earth and explain why it colder.	is
(ii)	Name the planet on which our weight would be biggest.	_ [2] _ [1]

(c)	(i)	What does the strength of a planet's gravity depend on?	Examiner Only  Marks Remark
		Tick the correct answer.	
		The planet's distance from the Sun  The number of moons the planet has  The planet's size  [1]	
	(ii)	Name the unit of weight.	
	` ,	Choose from:	
		kilogram : newton : joule	
		Answer [1]	
(d)	Cor	mplete the following sentences.	
	Cho	pose from:	
		comets : water : rock	
		moons : gas	
	Oui	Solar System contains many objects such as asteroids which	
	are	made from It also contains large chunks of ice	
	call	ed [2]	

2 The diagram below shows the structure of an atom.

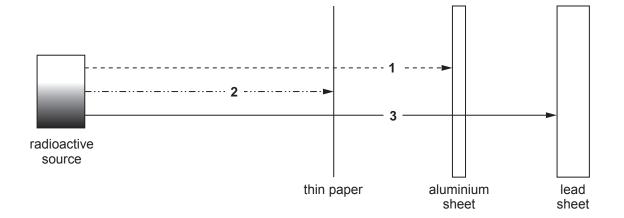


(a) Name the particles labelled A and B.

Choose from:

electron	nucleus	proton	neutron	
Α				
В				[2]

(b) The radioactive source shown below emits three different types of radiation (1, 2 and 3). Each type is stopped by a different material.



Use the diagram to name each type of radiation.

Choose from:

	alpha	beta	gamma
1			
2			
3			

[2]

**Examiner Only** 

**3 (a)** The photograph below shows what can happen when cars drive on icy roads.

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Marks	Remark	



© Dorset Fire and Rescue Service (DFRS)

(i) Explain fully why the driver found it difficult to control the car on the icy road.

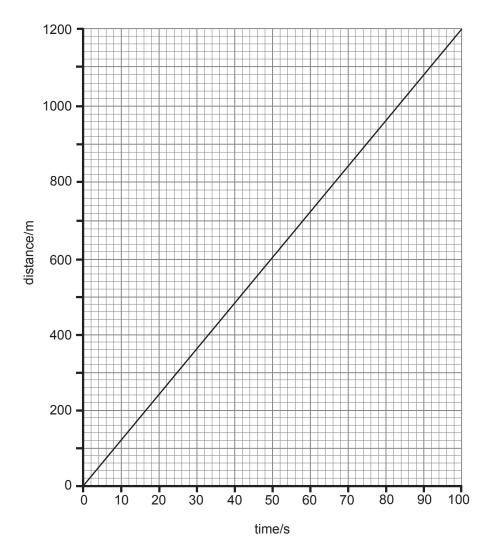
[2]

(ii) The driver was not seriously hurt in the crash. Give two safety features in the car that could have protected the driver during the crash.

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

**(b)** The graph below shows the distance travelled by a car over a certain time.





Use the equation:

$$average \ speed = \frac{total \ distance}{total \ time}$$

to calculate the car's average speed.

Show your working out.

Average speed \_\_\_\_\_ m/s [2]

(c) Complete the table below with a tick (✓) to show which of the following will affect a driver's reaction time.

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Remark		

worn brakes	
tiredness	
wet roads	
alcohol	
worn tyres	

[2]

(d) (i) The table below gives the stopping distances for cars travelling at different speeds. Complete the table.

Speed/mph	Thinking distance/m	Braking distance/m	Stopping distance/m
20	6	6	12
30	9		23
50	15	38	53
70	21	75	

г	0	٦
ı	/	ı

(ii)	What is	meant by	the term	braking	distance?	

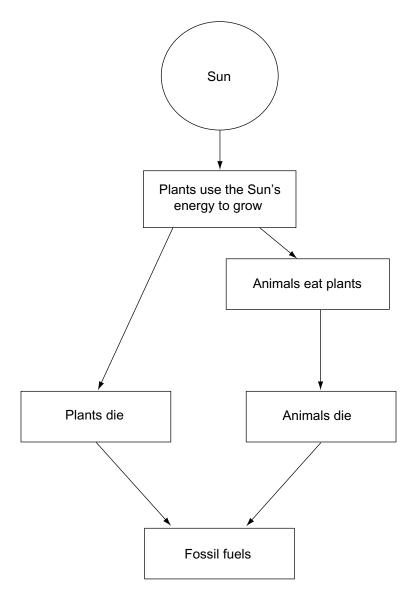
[1]	1
-	-

4	(a)	petr car fuel	two most common fuels used in cars in Northern Ireland are ol and diesel. These fuels are becoming more expensive. Many manufacturers have designed cars whose engines will run on s such as ethanol and biodiesel.  Use the information in the passage above to name one alternative fuel.	/ [1]	er Only Remark	
		(ii)	Why is it important that more alternative fuels are used rather than fossil fuels?			
				[1]		
	(b)	Nar	ne a fossil fuel found in large amounts in Northern Ireland.	[1]		

(c) The diagram below shows how fossil fuels are formed.

Examiner Only

Marks Remark



Explain fully how fossil fuels are formed from the dead plants and animals.

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

(d) Name the fossil fuel that petrol and diesel are made from.

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

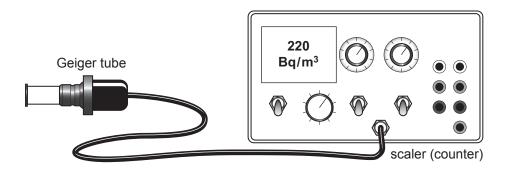
- **5** (a) Below are some statements about radon gas.
  - Radon is a radioactive gas that comes mainly from the ground

**Examiner Only** 

[2]

- Radon can enter houses and build up to dangerous levels
- The average radon level in Northern Ireland is 20 Bg/m<sup>3</sup>
- Once the radon level reaches an **action level**, which is ten times the average, the householder should take steps to reduce it

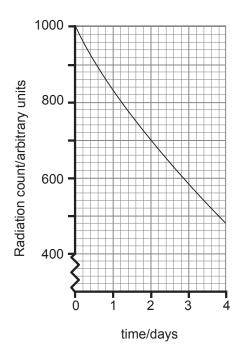
A householder set up a radiation counter to measure the background level of radon in his house.



(i)	Use the information provided to explain fully why this householde should be concerned with this reading.		
	[2]		
(ii)	Explain fully how breathing in radon gas can be harmful to health.		

(b)	The graph below shows how the count rate of radioactive radon
	changes with time.





(i) Use the graph to find the half-life of radon.

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

(ii) After how many days will the radiation count have fallen to 250 arbitrary units?

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

(c) Explain fully why a nucleus may be radioactive.

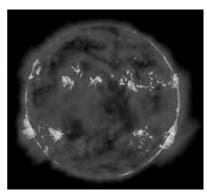
[2

(d) Explain fully why some fresh fruits such as strawberries are treated with radiation.

\_ [2]

**6** The Sun is the nearest star to Earth.

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Marks	Remark		



© NASA http://www.nasa.gov/images/content/105663main\_planet1sunb.jpg

(a)	Describe fully how the Sun was formed.
	[3]
(b)	The Sun is about 25 000 light years from the centre of our galaxy. Explain fully what is meant by the term light year.
	[2]
(c)	Scientists have discovered new planets many light years from Earth. Suggest how scientists search for extra-terrestrial life on these new planets.
	[1]
_	THIS IS THE END OF THE QUESTION PAPER

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