

Centre Number		
71		

General Certificate of Secondary Education 2010–2011

Science: Single Award (Modular)

Road Safety, Radioactivity and Earth in Space Module 6 Foundation Tier [GSC61]



FRIDAY 12 NOVEMBER 2010, AFTERNOON

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.

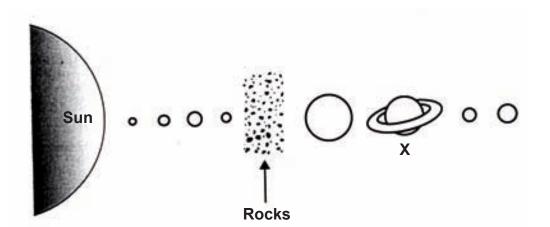
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

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

l Total I	
Total	
I Marks	
ivialito	



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



(i) Comp	lete th	e sentence
----------	---------	------------

The Sun and its planets are called the ______[1]

(ii) On the diagram above label the Earth with the letter E. [1]

(iii) Name the planet marked X.

______[1]

(iv) What is the name given to the **rocks** shown in the diagram above?

Tick (\checkmark) the correct answer.

Comets

Asteroids

Stars

[1]

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Choose from:

planet : star : galaxy : moon : universe

- (i) A _____ is a large body which makes its own energy. [1]
- (ii) A _____ is a body which orbits a star. [1]
- (iii) A _____ is a body which orbits a planet. [1]
- (c) The photograph below shows the Allen telescopes.



© Dr Seth Shostak/SETI Institute

(i) These telescopes are being used to search for extra-terrestrial life. What is meant by the term **extra-terrestrial life**?

______[1]

(ii) Suggest why each telescope is facing a slightly different direction.

______[1]

2	(a)) Most of the electricity in Northern Ireland is produced from fossil fuels.		
		Tick (✓) two correct statements below about for	ssil fuels.	
		They take less than a hundred years to make.		
		They will last forever.		
		They will run out.		
		They are made from dead plants and animals.		

[2]

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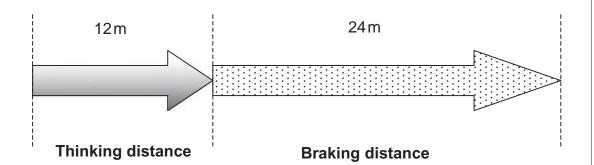
(b) Lignite is a fossil fuel which is found in Northern Ireland. The photograph below shows a site near Ballymoney from which it is hoped to mine lignite.



© S Roulston http://www.geographyinaction.co.uk/Issues/Lignite.htm

	Suggest one advantage and one disadvantage of lignite minin for people who live in the local community.	g Exam Marks
	Advantage	
	Disadvantage	
ii)	Name two other fossil fuels.	
	1	
	2	[2]
exa	cently alternatives to fossil fuels are being used in cars. Name c ample of an alternative fuel for cars and explain why we should be	one
exa		one
exa	ample of an alternative fuel for cars and explain why we should ling more of it.	one
exa	ample of an alternative fuel for cars and explain why we should ling more of it.	one De
exa	ample of an alternative fuel for cars and explain why we should ling more of it.	one De
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exa	ample of an alternative fuel for cars and explain why we should ling more of it.	one De

3 (a) The diagram below shows the thinking and braking distances for a car travelling at 40 miles per hour.



(i) Calculate the stopping distance for this car.

stopping distance _____ m [1]

- (ii) The Highway Code states these distances are for perfect conditions. If the road is wet, what will be the effect, if any, on:
 - 1. the braking distance?

_____[1]

2. the size of the force of friction between the tyres and the road?

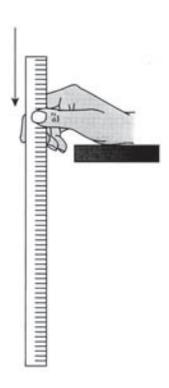
_____[1]

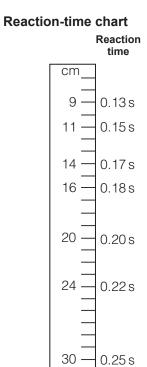
3. the thinking distance?

_____[1]

(b) Quick reactions are very important whilst driving.
You can find how fast your reactions are by releasing and catching a ruler and then using the reaction time chart.

Examiner Only		
Marks	Remark	





(i) John did the test and caught the ruler at 16 cm.
Use the reaction-time chart to find his reaction time.

S [1]

(ii) Using this apparatus how would you get a more reliable reaction time for John?

_____[1]

(c) The table below shows the frictional force for a smooth and patterned tyre on different road conditions.

Examiner Only			
Marks	Remark		

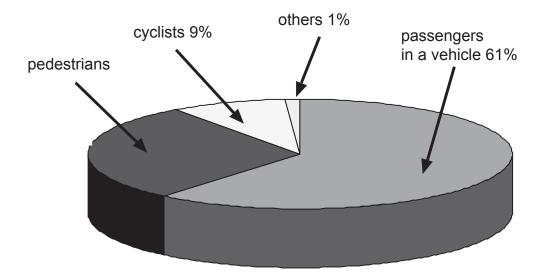
Type of tyre	Road conditions	Frictional force/N
Smooth	dry	0.9
	wet	0.1
Patterned	dry	0.7
	wet	0.4

Use the information in the table to exp should use smooth tyres in dry conditi	, ,
	[2]

ine	information below was recently printed in a newspaper.			ner Only
If a	car hits a pedestrian		Marks	Remark
•	at 30 mph, they have a 20% chance of being killed			
•	at 35 mph, they have a 50% chance of being killed			
•	at 40 mph, they have a 90% chance of being killed.			
(i)	Complete the following sentence to give a trend shown by this information.			
	In an accident, the higher the speed			
		[1]		
(ii)	State one way in which speed limits can be enforced.			
		[1]		

(b) The pie chart below shows the types of road accident that involved children.

Examiner Only				
Marks	Remark			



From the pie chart calculate the percentage of accidents which involved pedestrians.

Show your working out.

Λ.	0/	FO1
Answer	%	1/1

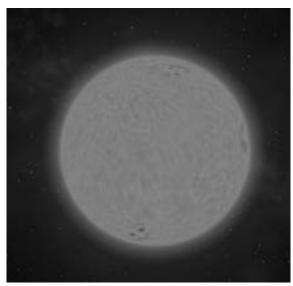
(c) State **two** ways in which pedestrians can reduce the risk of being knocked down by cars.

1. _____

2. _____[2]

5 The photograph below shows a star called Proxima Centauri.

Examiner Only					
Marks	Remark				



upload.wikimedia.org/.../19/Proxima_Centari.jpg

A student gave the following account of how a star is formed. However, it contains some mistakes.

"A star forms when a cloud of gas, mainly nitrogen, is pushed together by the force of gravity. As the cloud collapses the centre heats up and becomes a Protostar. Eventually it becomes a fully fledged star when nuclear fission takes place."

(a) Complete the table below to identify the three words mistakenly used and give each correction.

Wrong word	Correct word		

[3]

(b) Proxima Centauri is 4.2 light years from Earth. If a spaceship could move at the speed of light how long would it take the spaceship to travel from Earth to Proxima Centauri and back again?

_ [1]

6 (a) A teacher performed an experiment to see how beta radiation passed through different thicknesses of aluminium.

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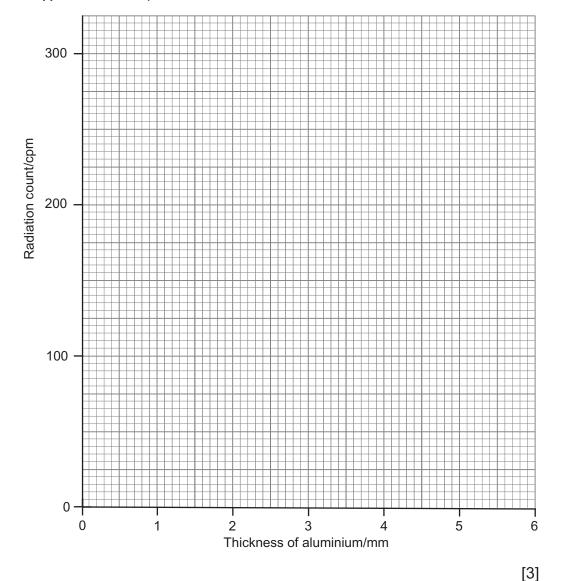


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His results are shown in the table below and include background radiation.

Thickness of aluminium/mm	1.0	2.0	3.0	4.0	5.0	6.0
Radiation count/	310	190	130	90	70	70

(i) Plot these points and draw a smooth curve on the axes below.



12

	(ii)	Use the information to sugg	est a value for background	radiation.
			Answer	cpm [1]
	(iii)	Suggest two sources of bac		
		2		[2]
(b)		e machine shown below is us ich are 3 mm thick by detecting	•	
ı		beta source		3mm sheet
_		detecto		
	(i)	Use the information and you beta radiation is more suital controlling the thickness of	ble than alpha or gamma ra	adiation in

Examiner Only

_ [3]

(ii) Radioactive phosphorus has a half-life of about 20 days. Explain why phosphorus would not be a suitable beta source in this machine.

[1]

THIS IS THE END OF THE QUESTION PAPER

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