

**GENERAL CERTIFICATE OF SECONDARY EDUCATION
TWENTY FIRST CENTURY SCIENCE
PHYSICS A**

A331/01

Unit 1: Modules P1 P2 P3 (Foundation Tier)

**Wednesday 20 January 2010
Morning**

Duration: 40 minutes

Candidates answer on the Question Paper
A calculator may be used for this paper

OCR Supplied Materials:
None

Other Materials Required:

- Pencil
- Ruler (cm/mm)



Candidate Forename		Candidate Surname	
--------------------	--	-------------------	--

Centre Number						Candidate Number				
---------------	--	--	--	--	--	------------------	--	--	--	--

MODIFIED LANGUAGE

INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **42**.
- This document consists of **16** pages. Any blank pages are indicated.

Answer **all** the questions.

1 Scientists have made many measurements of things in space.

(a) Put the following in order of **size**.

- A the Earth
- B the Milky Way
- C the Sun

smallest

--	--	--

 largest

[1]

(b) Put the following in order of **age**.

- A the Earth
- B the Universe
- C the Sun

oldest

--	--	--

 youngest

[1]

[Total: 2]

2 Complete the following sentences about the Sun.

Use words from this list.

- cloud of gas galaxy planet star white dwarf**

The Sun is a in the Milky Way, which is a

The Sun started its life as a [3]

[Total: 3]

3 Read the article. Four statements are labelled with a letter.

Planets Found Around Other Stars?

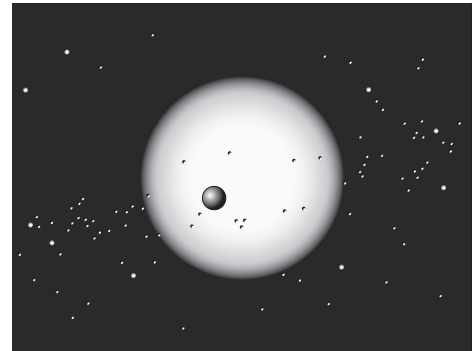
Some astronomers claim to have found evidence for planets around nearby stars.

A – They found small changes in the brightness of some stars and very small wobbles in the position of the stars.

B – They think these are caused by planets orbiting these stars.

C – Some of the results have been published in peer reviewed scientific journals, but only a very few have been repeated by other astronomers.

D – A newspaper article says this means there is life on worlds orbiting other stars.



(a) (i) Write down the letter of one statement from the article that is data about stars.

answer [1]

(ii) Write down the letter of one statement from the article that is an explanation.

answer [1]

(iii) Write down the letter of one statement from the article that shows imagination.

answer [1]

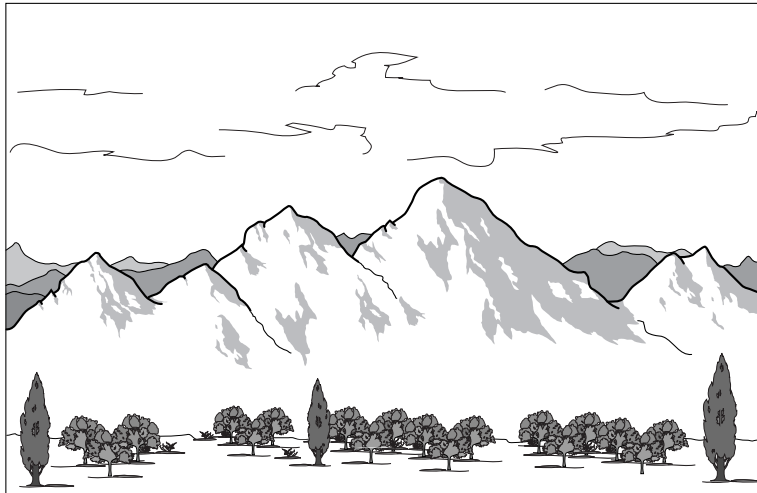
(b) Very few of the astronomers' results have been repeated.

This does not support the astronomers' claim.

Explain why.

.....
.....
..... [1]

[Total: 4]



Scientists think that mountains must be forming all the time.

(a) Some of the statements below are used to explain this.

- A Mountains are part of the Earth's crust.
- B Erosion causes mountains to be worn down.
- C The Earth is older than its oldest rocks.
- D The continents would be flat if no new mountains are formed.
- E Mountains exist today.
- F Mountains are only formed on drifting continents.

Three of the statements, when taken together, explain why mountains must be forming all the time.

Write down the letters of these three statements.

..... and and

[3]

(b) The explanation can only be correct if one of the following statements is also correct.

Put a tick (✓) in the box next to the correct statement.

The rock processes seen today can explain changes in the past.

Wegener's theory of continental drift explained the jigsaw-fit of South America and Africa.

Asteroids colliding with the Earth in the past can explain how mountains form.

Mountains are over 1 km high.

[1]

[Total: 4]

5 Ultraviolet radiation can be hazardous.

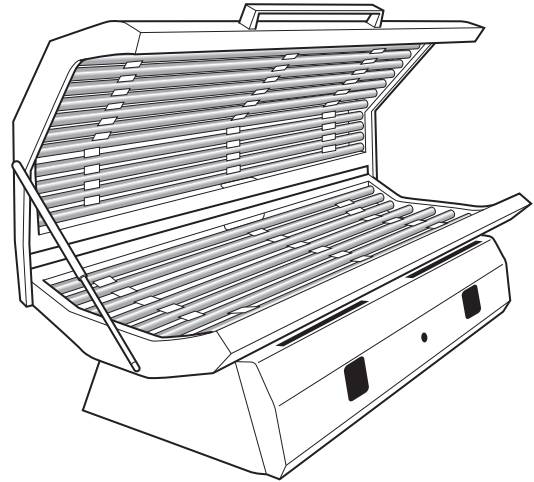
(a) Read the article.

Boy of 13 burned by sunbed

A boy of 13 has severe burn blisters on his face after he used a tanning salon's ultraviolet sunbed three times in a day for a total of 21 minutes.

He repeatedly slipped into an unstaffed, coin-operated booth because he thought it would disguise his acne. The maximum safe tanning time at the salon is 6 minutes.

His mum said: "His lips swelled up and he couldn't swallow. He is quite vain. I am afraid he will develop cancer when he is older."



(i) What correlation is suggested by the article?

Put a tick (✓) in the box next to the best answer.

Young people don't work in tanning salons.

The longer the exposure to ultraviolet radiation the greater the chance of burns.

The younger you are the more likely you are to get cancer.

The more sun beds are used the less chance of burns.

[1]

(ii) Explain how the ultraviolet radiation caused the burns.

Your answer should include:

- what happens to the radiation
- the effect of the radiation.

.....

.....

.....

[2]

(iii) Why is the boy's mum right to be concerned about cancer?

Put a tick (✓) in the box next to the correct answer.

Ultraviolet is an ionising radiation.

Ultraviolet can help treat acne.

Ultraviolet causes people to get a tan.

Ultraviolet is used in clubs.

[1]

(iv) A letter to the newspaper said

*'This just shows how dangerous sunbeds are.
We should ban all sunbeds'.*

This is not a good scientific conclusion.

Which of the following are the best explanations of why it is not good science?

Put ticks (✓) in the boxes next to the **two** best answers.

It was written for a newspaper.

There is only one example.

We don't know the qualifications of the person who wrote the letter.

The boy did not use the sunbed in the same way as other sunbed users.

[2]

(b) Ultraviolet radiation is part of the electromagnetic spectrum.

radio waves	microwaves	E	visible light	ultraviolet	X-rays	gamma rays
-------------	------------	----------	---------------	-------------	--------	------------

(i) Draw an arrow, in the dotted box, to show the direction of **increasing** energy of the photons. [1]

(ii) What part of the electromagnetic spectrum is **E**?

.....

[1]

(c) The Sun produces a lot of ultraviolet radiation.

The Earth's atmosphere blocks most of this ultraviolet radiation.

Which gas in the atmosphere absorbs most of the ultraviolet radiation?

Put a **ring** around the best answer.

carbon dioxide

methane

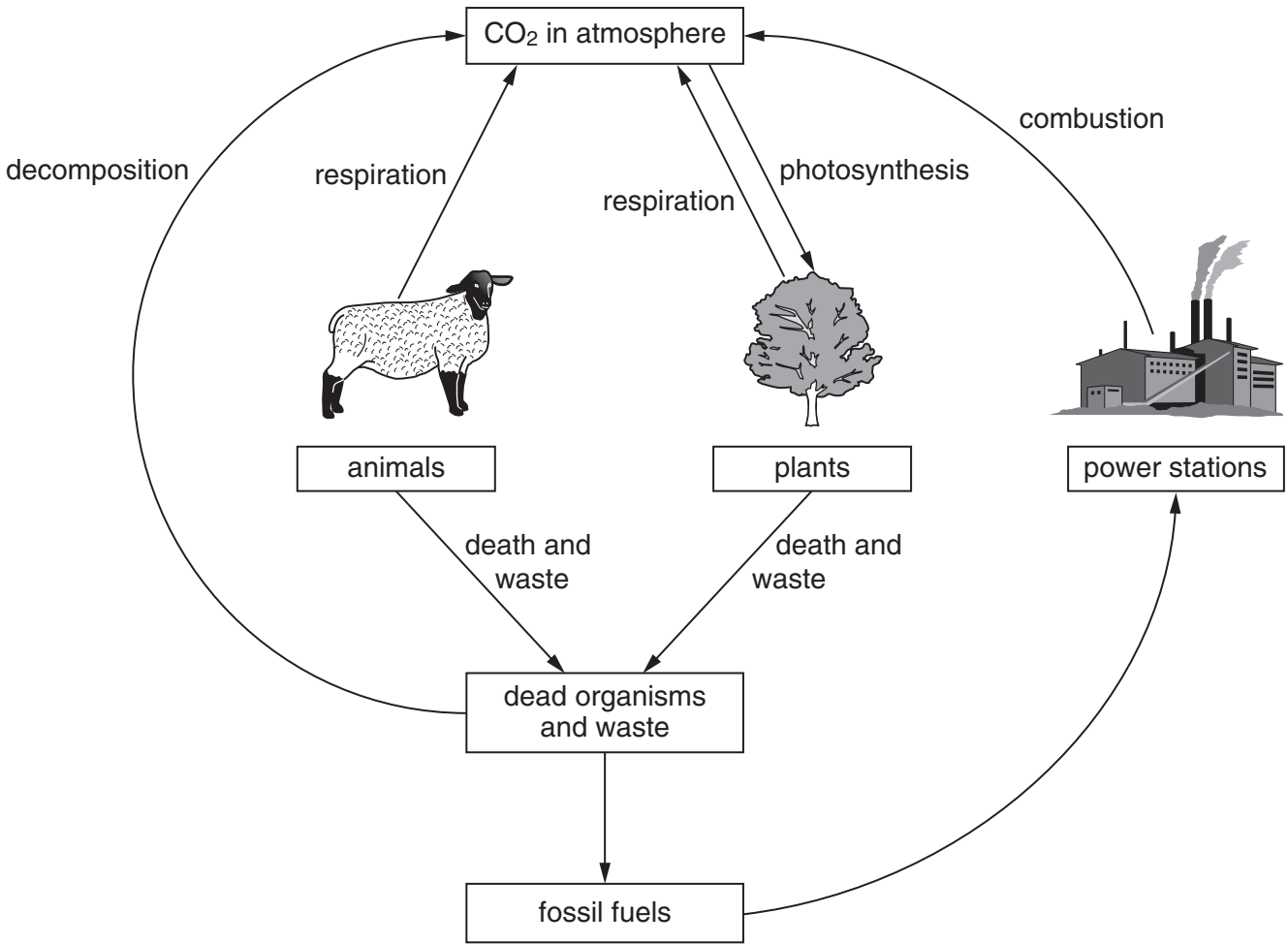
argon

ozone

[1]

[Total: 9]

6 Look at the diagram of the carbon cycle.



(a) Use the carbon cycle to help explain how burning forests affects the amount of carbon dioxide in the atmosphere.

.....

.....

.....

..... [3]

(b) Carbon dioxide in the atmosphere contributes to global warming.

Suggest **two** ways of reducing the risk of global warming, other than not burning forests.

.....

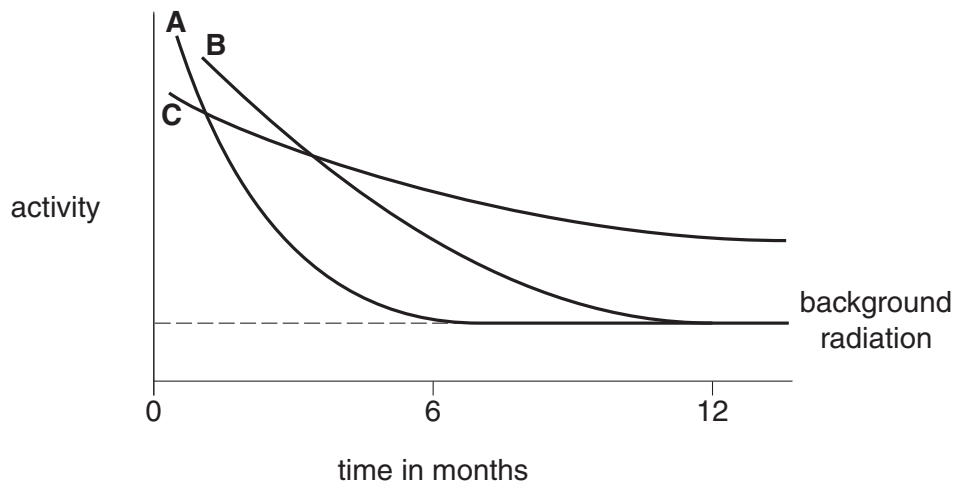
.....

.....

..... [2]

7 Different radioactive sources are used in hospitals for different purposes.

(a) The graph shows the activity over time of three different radioactive sources.



(i) Which radioactive source, **A**, **B** or **C**, has the shortest half-life?

answer [1]

(ii) Which radioactive source, **A**, **B** or **C**, has the most activity after 12 months?

answer [1]

(iii) Which radioactive source, **A**, **B** or **C**, is likely to be a long-term storage problem?

answer [1]

(b) Here is some information about people who have contact with radioactive sources in the hospital.

doctor	decides on use of sources
radiographer	prepares and uses sources
nurse	helps patients treated with sources
porter	moves patients around the hospital

(i) Who is likely to receive the largest dose over a year if not specifically protected?

..... [1]

(ii) A **patient** can be treated for cancer using one of the radioactive sources.

Suggest benefits **and** risks of the treatment to the patient.

.....
.....
.....
..... [3]

(c) Sue and Tim are discussing a new treatment using radioactive sources.

Sue
 I think it is a good idea. The new treatment will be very safe. The Government has said only trained doctors will be able to use it. It will help improve many people's lives and think how happy their families will be.



Tim
 The treatment is very expensive and not everybody who needs it will be able to have it. It uses radiation which kills living cells and it cannot be completely safe. I don't think we should use it.



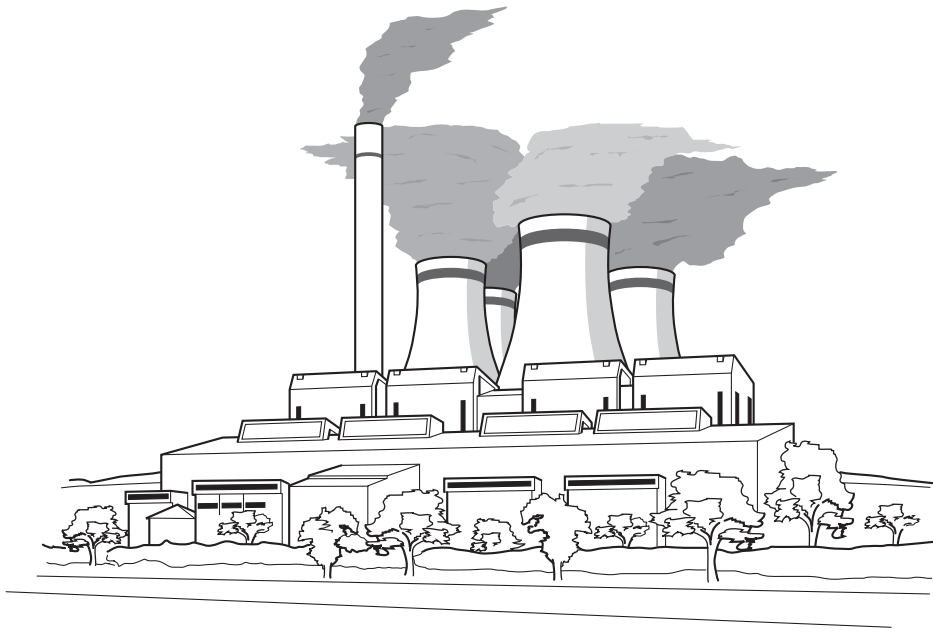
Put a tick (✓) in the **one** correct box next to each question.

	Sue	Tim	both Sue and Tim	neither Sue nor Tim
Who talks about risk?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Who talks about official regulations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Who talks about economic cost?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Who talks about social issues?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

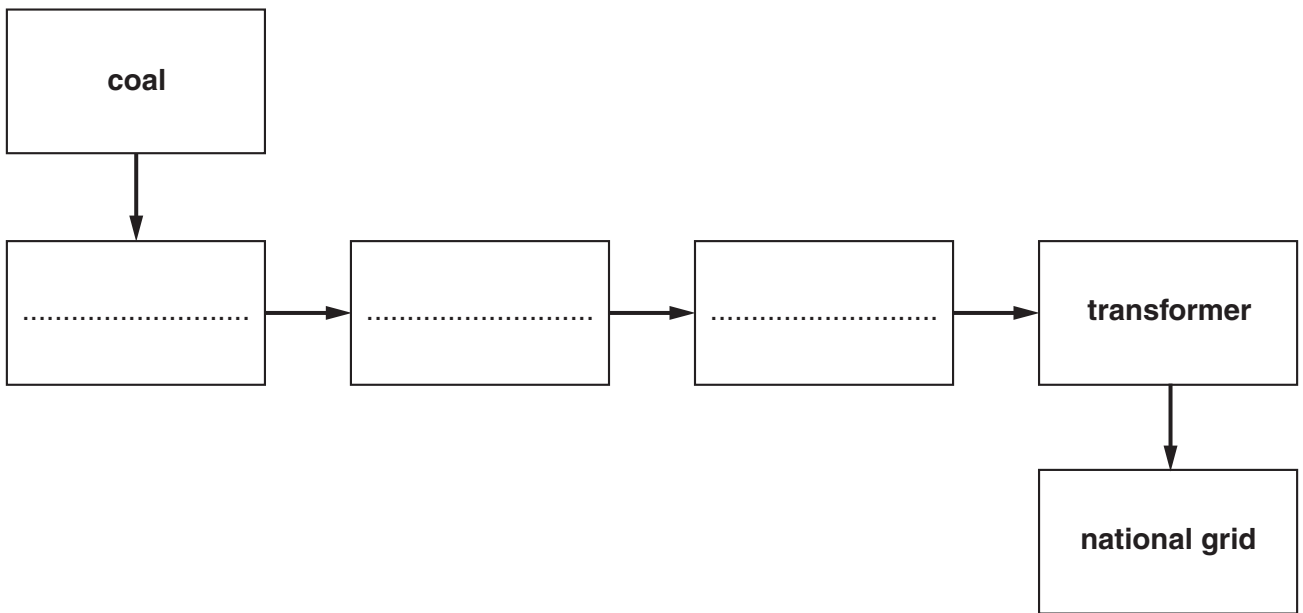
[4]

[Total: 11]

8 This question is about electricity generation in coal-fired power stations.



Complete the block diagram showing how a coal-fired power station produces electricity.



[4]

[Total: 4]

END OF QUESTION PAPER

PLEASE DO NOT WRITE ON THIS PAGE

15
BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE

PLEASE DO NOT WRITE ON THIS PAGE



Copyright Information

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations, is given to all schools that receive assessment material and is freely available to download from our public website (www.ocr.org.uk) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact the Copyright Team, First Floor, 9 Hills Road, Cambridge CB2 1GE.

OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.