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Centre Number						Candidate Number				
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**OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GENERAL CERTIFICATE OF SECONDARY EDUCATION**

A331/01

TWENTY FIRST CENTURY SCIENCE

PHYSICS A

**UNIT 1: Modules P1 P2 P3
Foundation Tier**

WEDNESDAY 20 JANUARY 2010: Morning

DURATION: 40 minutes

SUITABLE FOR VISUALLY IMPAIRED CANDIDATES

**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)

READ INSTRUCTIONS OVERLEAF

INSTRUCTIONS TO CANDIDATES

- **Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes on the first page.**
- **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.**
- **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.**

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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

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 LARGEST

[1]

(b) Put the following in order of AGE.

A the Earth

B the Universe

C the Sun

OLDEST

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 YOUNGEST

[1]

[Total: 2]

2 Use the words from the list below to complete the sentences about the Sun.

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 below. 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]

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 If no new mountains are formed the continents would be flat.

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.

[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 below.

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 from the list below.

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 from the list below.

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 from the list below.**

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
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(i) Draw an arrow, beneath the diagram, 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 in the list below.

CARBON DIOXIDE

METHANE

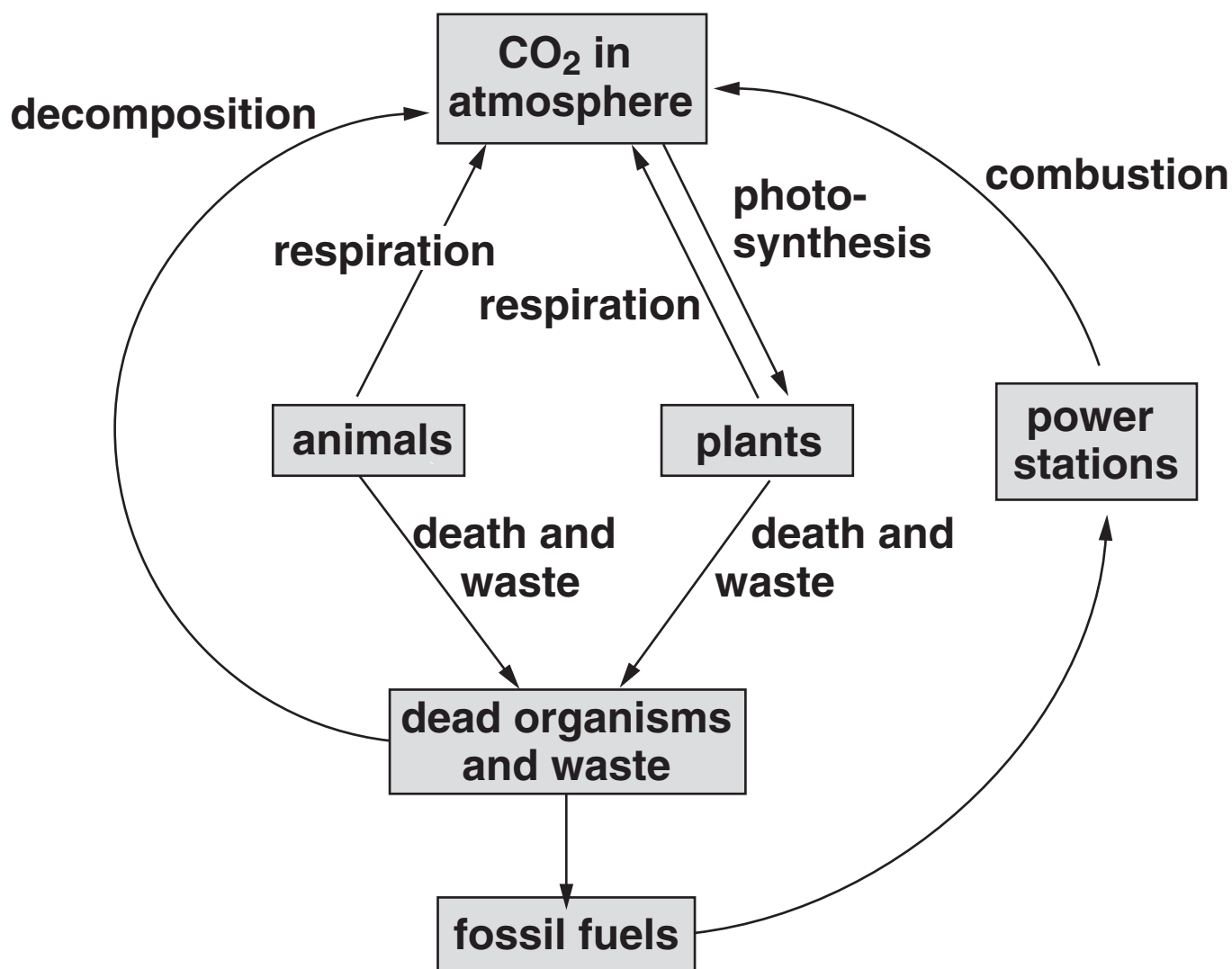
ARGON

OZONE

[1]

[Total: 9]

6 Look at the diagram below, which shows 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.

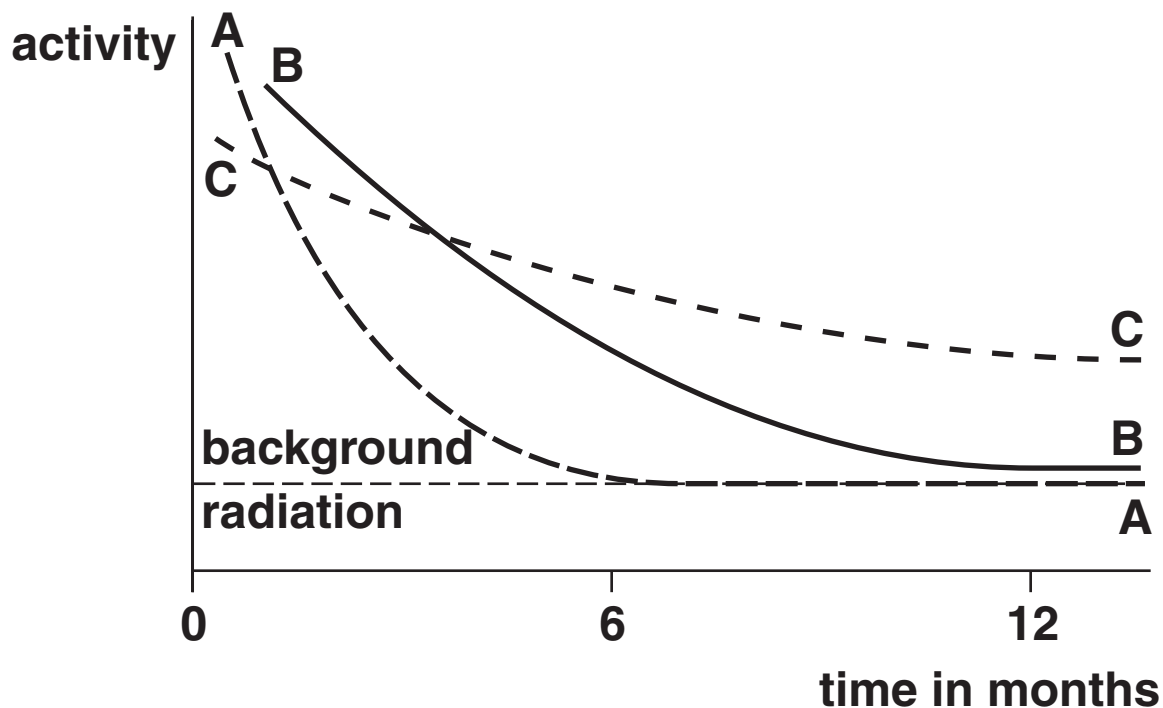
Suggest TWO ways of reducing the risk of global warming, other than not burning forests.

[2]

[Total: 5]

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

(a) The graph below 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) If not specially protected, who is likely to receive the largest dose over a year?

_____ [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 says “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 says “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 of the questions below.

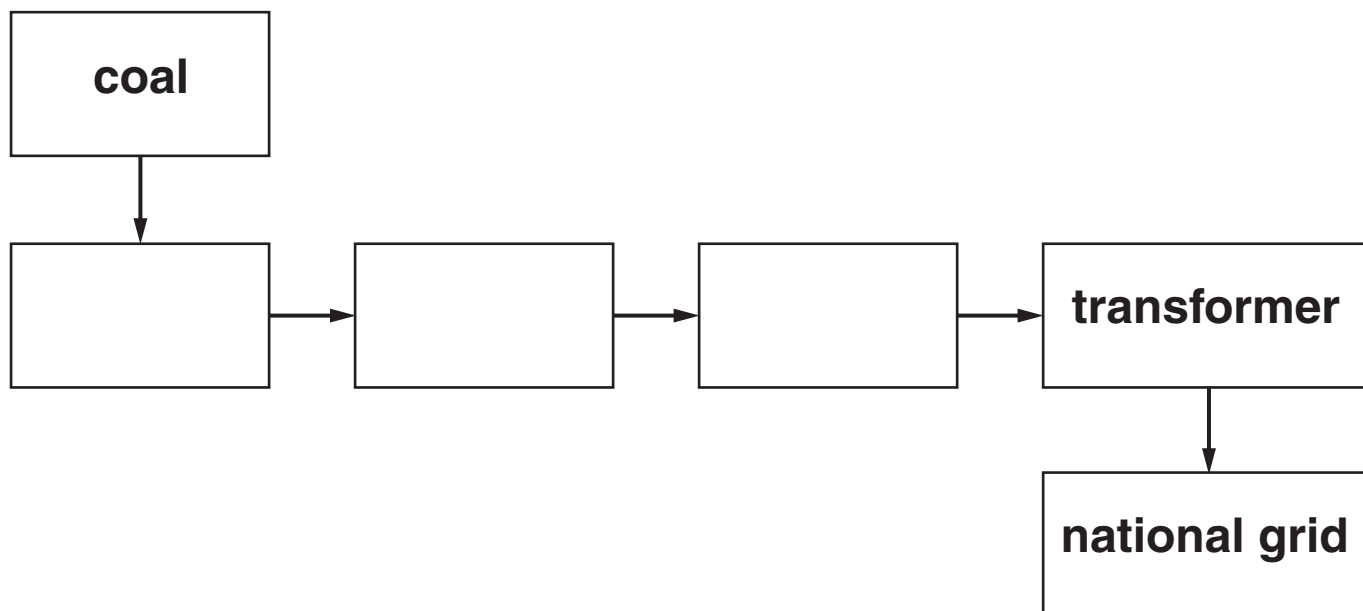
	Sue	Tim	both Sue and Tim	neither Sue nor Tim
Who talks about risk?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Who talks about official regulations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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 below showing how a coal-fired power station produces electricity.



[4]

[Total: 4]

END OF QUESTION PAPER



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