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GENERAL CERTIFICATE OF SECONDARY EDUCATION

TWENTY FIRST CENTURY SCIENCE PHYSICS A

A331/01

Unit 1: Modules P1 P2 P3 (Foundation Tier)

OCE/15621

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)

Thursday 24 June 2010
Afternoon

Duration: 40 minutes

A331O1

Candidate Forename		Candidate Surname	

Centre Number						Candidate Number				

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. Additional paper may be used if necessary but you must clearly show your Candidate Number, Centre Number and question number(s).

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.

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Answer **all** the questions.

1 Read the statements about asteroids.

Statements describing data may be true or false.

A All asteroids stay in fixed orbits around the Sun, between Mars and Jupiter.

B I think that the dinosaurs were wiped out when an asteroid hit the Earth.

C A large asteroid hitting the ocean causes a tsunami.

D There is less chance of the Earth being hit by a big asteroid than a small asteroid.

E There are many more small asteroids than large asteroids.

Write down the correct letters, **A**, **B**, **C**, **D** or **E**, to answer the following questions.

(a) Which **three** statements describe data or observations about asteroids?

statements ..... , ... and ..... **[1]**

(b) Which statement supports statement **D**?

statement ..... **[1]**

(c) Which statement disagrees with statement **B**?

statement ..... **[1]**

(d) Which data statement suggests asteroids can be hazardous?

statement ..... **[1]**

[Total: 4]

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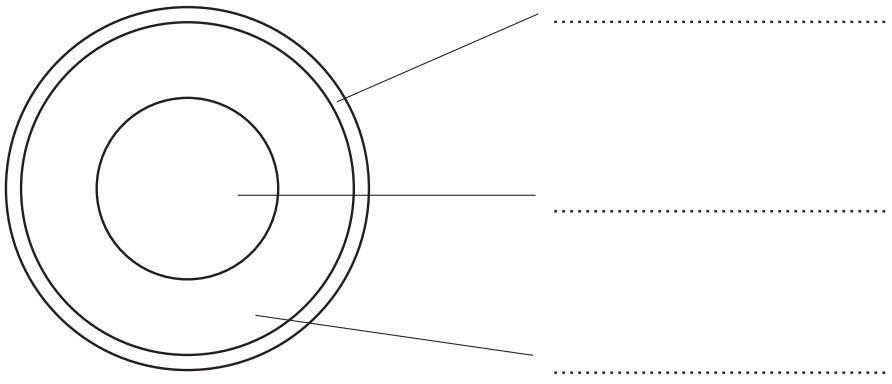
2 **(a)** Complete the labels on the diagram of the Earth.



[3]

(b) Put the following in order of age.

A the Earth

B the Earth's oldest rocks

C the Solar System

oldest | | | | youngest

[1]

(c) Complete the following sentence about the Sun.

Use words from this list.

galaxy **planet** **solar system** **star** **universe**

The Sun is a ..... in the Milky Way..... . **[2]**

[Total: 6]

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3

The following statements are all true.

A All elements except hydrogen are made in stars.

B Hydrogen, helium and lithium were formed in the big bang.

C When a star dies most of it is blown into space.

D Hydrogen and helium are the lightest elements.

E The solar system formed from gas clouds in space.

F Most stars are older than the Sun.

A scientist says, "We are all made from elements like carbon and oxygen, so we are all made from stardust."

(a) Which **three** statements, **A**, **B**, **C**, **D**, **E** or **F**, provide an explanation for what the scientist says?

statements ..... , ... and ..... **[3]**

(b) Another scientist says, "All elements heavier than helium were only made in stars."

Which statement, **A**, **B**, **C**, **D**, **E** or **F**, disagrees with what this scientist says?

statement ..... **[1]**

[Total: 4]

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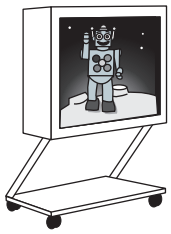

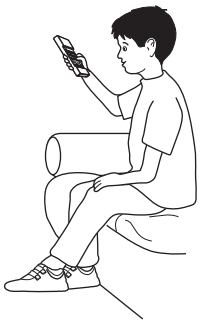

John discovers that the remote control for his TV works when he points it at the ceiling halfway between him and the TV.

(a) Complete the sentences in the explanation.

Use words from this list.

absorbs **emits** **reflects** **refracts**

The remote control ..... radiation.

The radiation ..... from the ceiling.

The receiver in the TV ..... the radiation. **[3]**

(b) What type of electromagnetic radiation does the remote control transmit to the TV?

answer ..... **[1]**

[Total: 4]

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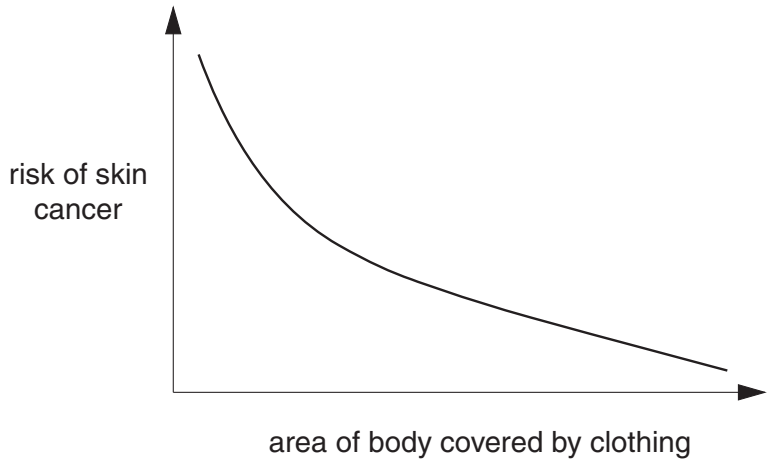
5 Scientists often discover correlations between factors and outcomes.

(a) Look at the graph.



Describe the correlation shown by the graph.

.....

..... **[2]**

(b) Describe a different example of a correlation from everyday life.

.....

..... **[2]**

[Total: 4]

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6 People often confuse the greenhouse effect with holes in the ozone layer.

Complete the two sentences below.

Use words from this list.

cancer **carbon dioxide** **clouds** **global warming** **infrared** **ultraviolet**

The greenhouse effect is caused by ..... in the atmosphere which can lead to ..... .

The ozone layer absorbs ..... radiation which can cause ..... . **[4]**

[Total: 4]

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7 The properties of microwaves mean that they are used for many purposes.

(a) Which of the following statements about microwaves are true?

Put ticks (✓) in the boxes next to each **correct** statement.

Microwaves heat by causing particles to vibrate.	☐
Microwaves are ionising radiation.	☐
The screen on a microwave oven lets light through but blocks microwaves.	☐
Mobile phones produce microwaves.	☐
Microwaves are blocked by the ozone layer.	☐
The higher the intensity of microwaves in a microwave oven the less the food is heated.	☐

[3]

(b) Susie sunbathes on the beach.

Her mum tells her to put on sun cream.

Put a tick (✓) in the box next to the correct explanation for using sun cream.

Sun cream will keep her skin from getting hot.	☐
Sun cream will reflect or absorb ionising radiation from the Sun.	☐
Sun cream will transmit ionising radiation from the Sun.	☐
Sun cream will stop her skin from getting cold.	☐

[1]

[Total: 4]

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8 Joe has been told he has cancer.

He reads an article about a new drug.

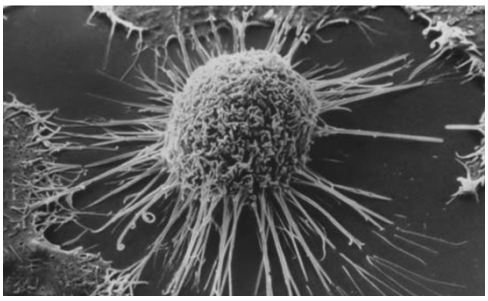
New drug can protect healthy cells from radiation

The radiation used to kill cancer cells also causes some damage to healthy cells.

Scientists experimenting with rats have made a discovery that could improve the effectiveness of radiation therapy.

Damaged cells kill themselves through a process known as apoptosis. The new drug stops the cells killing themselves. The researchers found no sign of side effects in laboratory tests on rats.

Protecting healthy cells against the effects of radiation may allow cancer patients to receive higher doses of radiotherapy, or longer courses of treatment.



cancer cell

(a) This drug may allow higher doses of radiation to be used in treating cancer patients.

Who would make new **regulations** to control the acceptable radiation dose?

Put a (ring) around the correct answer.

government officials **nurses** **patients** **physicists**

[1]

(b) Suggest a possible benefit and a possible risk for Joe if he used this new drug.

.....

.....

.....

..... **[2]**

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(c) The drug works by stopping **apoptosis** in cells.

What does the article say apoptosis means?

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

cells being damaged	☐
cells becoming cancer cells	☐
cells killing themselves	☐
cells becoming radioactive	☐

[1]

[Total: 4]

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9 The table shows what will stop different types of ionising radiation.

(a) Complete the table with the names of the three types of ionising radiation emitted by radioactive materials in the correct spaces.

type of ionising radiation	stopped by		
	paper	aluminium	lead
.....		✓	✓
.....			✓
.....	✓	✓	✓

[3]

(b) The ionising radiation used to treat a cancer must penetrate to the cancer cells in the middle of the body.

Which is the best type of ionising radiation to use?

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

[Total: 4]

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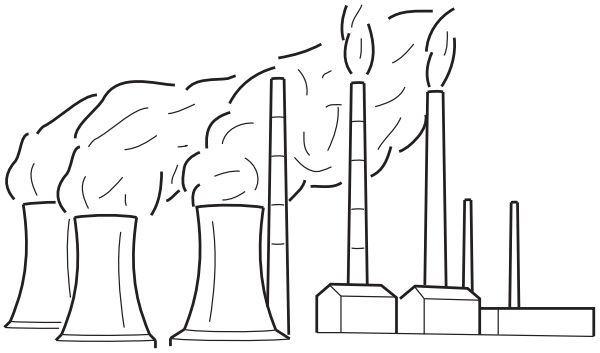

(a) The government is planning to build a new power station.
The table gives some information about three different types of power station.

type of power station	efficiency	cost per kWh in pence	environmental factors
coal	38%	2 to 3	produces carbon dioxide
nuclear	34%	2 to 2.5	produces radioactive waste
wind	35%	4 to 5.5	may damage local wildlife e.g. birds

Which type of power station would you recommend building?

Explain your choice.

Use information from the table to decide.

.....

.....

.....

.....

.....

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

(b) Explain why electricity is described as a **secondary** energy source.

.....

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

[Total: 4]

END OF QUESTION PAPER

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