

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

A331/01

Unit 1: Modules P1 P2 P3 (Foundation Tier)

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)

**Friday 24 June 2011
Afternoon**

Duration: 40 minutes



Candidate forename		Candidate surname	
-----------------------	--	----------------------	--

Centre number						Candidate number				
---------------	--	--	--	--	--	------------------	--	--	--	--

MODIFIED LANGUAGE

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- 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).
- Answer **all** the questions.
- Do **not** write in the bar codes.

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 (a) Which of these particles are found in an atom?

Put **rings** around the **two** correct answers.

element

molecule

neutron

photon

proton

[2]

- (b) What does radioactive mean?

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

an element needed for a radio to work

an element that emits ionising radiation

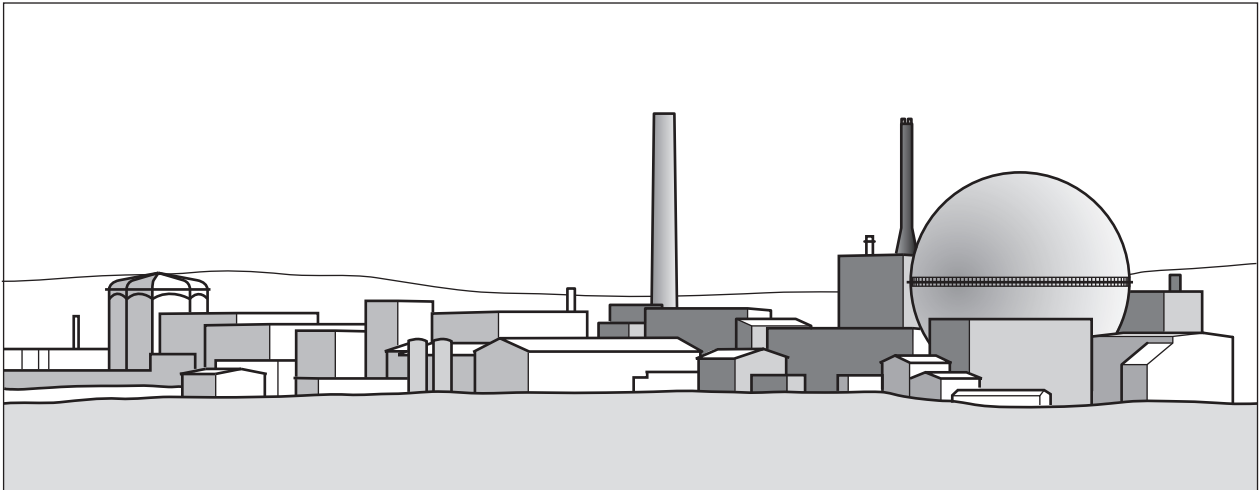
an element that emits infrared radiation

an element that emits radio waves

[1]

[Total: 3]

2 Power stations generate electricity.



(a) (i) Nuclear power stations use nuclear fuels.

How does a nuclear fuel release energy?

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

by reacting with oxygen

by changes in the nucleus

by burning to make fire

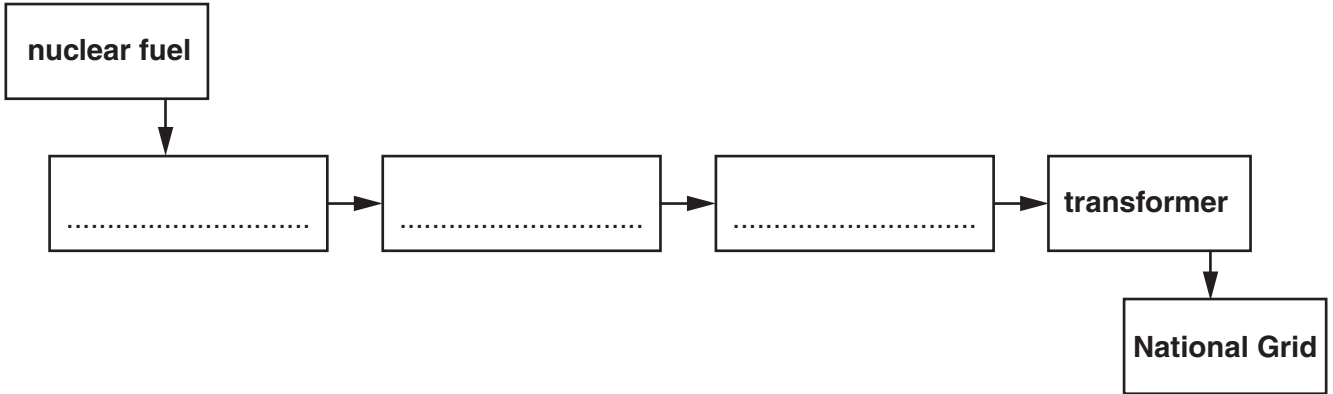
by using energy from water

[1]

(ii) Complete the simplified block diagram showing how a nuclear power station generates electricity.

Choose words from this list.

- furnace generator pylon reactor solar panel turbine**



[3]

(b) Electricity can also be generated from fossil energy sources.

When carbon-based fossil fuels are burned, what is the main gas produced?

..... [1]

[Total: 5]

3 Read this news report.

Youths warned over radiation risk

Teenagers have been putting themselves in danger. They broke into a recently closed cancer treatment hospital which still contains radioactive material.

What are the risks from the radioactive materials and what factors affect these risks?

Your answer should include

- effects of the radiation
- factors that affect the risks.

.....

.....

.....

.....

.....

.....

..... [4]

[Total: 4]

4 Read the news articles.

Ultraviolet causes skin cancer!

Evidence shows ultraviolet light can cause skin cancers. Ultraviolet is an ionising radiation.

Boy gets badly burnt by sunbed

A boy was burnt by the ultraviolet radiation used for producing a tan in a sunbed. The boy did not follow the instructions in the unmanned tanning salon.

Ultraviolet radiation can be harmful because it can ionise atoms in cells.

(a) Which other types of electromagnetic radiation cause damage by ionising atoms in cells?

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

radio waves

microwaves

infrared

visible light

X-rays

gamma

[2]

(b) Which two statements, when taken together, explain why ultraviolet is an ionising radiation?

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

Photons with enough energy can ionise atoms.

Electromagnetic radiation is made by electromagnets.

Ultraviolet light photons let us see in the dark.

Photons emit ionising radiation.

Ultraviolet has high energy photons.

[2]

(c) The overall risk from ultraviolet radiation depends on the amount of energy a person receives.

(i) What is the scientific word for energy arriving each second?

Put a ring around the correct answer.

absorption

infrared

intensity

vibration

[1]

(ii) The energy of each ultraviolet photon affects the total energy a person receives from a source of ultraviolet radiation.

What other factors affect the total energy a person receives from the ultraviolet source?

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

the temperature of the room

the number of photons arriving

the speed of the photons

the distance from the source

the age of the person

[2]

(d) Most of the ultraviolet radiation that people are exposed to comes from the Sun.

What part of the atmosphere absorbs most ultraviolet radiation?

..... [1]

(e) Research has shown a correlation between exposure to sunlight and some skin cancers.

People can reduce their risk of developing skin cancer from exposure to sunlight. Suggest and explain **two** methods for doing this.

Your answer should include

- two methods
- how the methods reduce the risk.

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

(f) Many people understand the risk of cancer from ultraviolet radiation, but still sunbathe.

Why do these people take the risk of sunbathing?
Suggest **two** reasons why.

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

[Total: 13]

- 5 (a) Most scientists think carbon dioxide produced by human activity is the main cause of global warming.

Other people agree that carbon dioxide is produced by human activity but think that global warming has very little to do with human activity.

So both groups can agree that human activity is producing more carbon dioxide and that global warming is happening. But they still disagree overall. Explain how.

You should use the words **correlation** and **cause** in your answer.

.....

.....

.....

..... [2]

- (b) Global warming could have many effects on our planet.

Which effects of global warming are we likely to see in the next ten years?

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

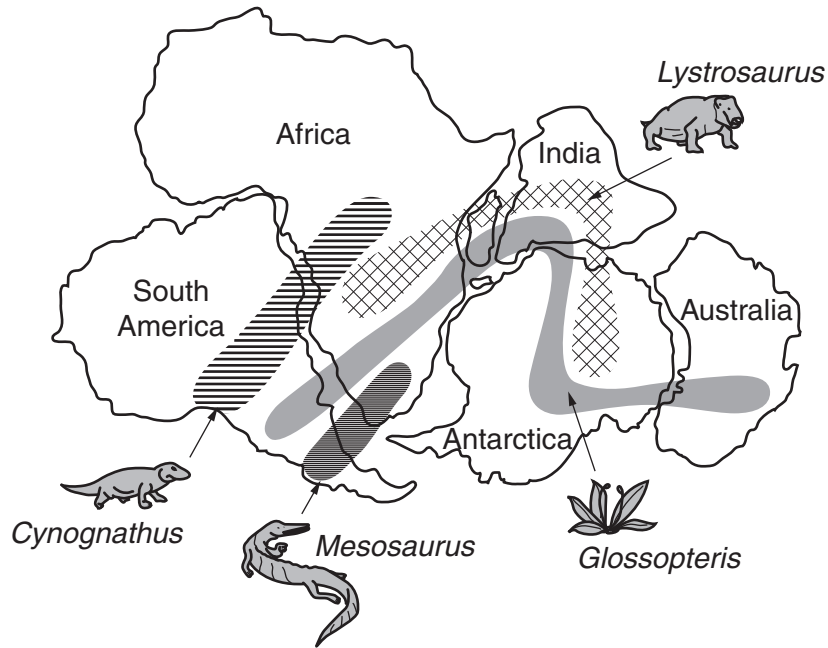
- expansion of water in the oceans
- volcanoes erupting
- some places getting colder winters
- oceans shrinking as water evaporates
- melting of the icecaps

[2]

[Total: 4]

6 Alfred Wegener proposed the idea that the continents drift on the Earth's surface.

(a) The map shows how Wegener thought the continents fitted together in the past.



What is the evidence on the map that supports the idea of continental drift?

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

The shapes of the continents fit together.

There are plants and animals on the map.

The map does not show North America or Europe.

Fossils of the same animals and plants are found on different continents.

There are no humans on the map.

[2]

(b) When Wegener suggested the theory of continental drift, many scientists did not agree with it.

Which reason explains why these scientists did **not** agree with Wegener?

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

Fossils are very old.



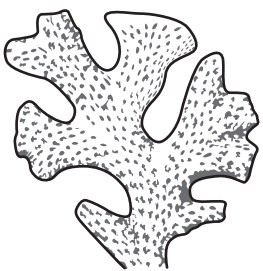
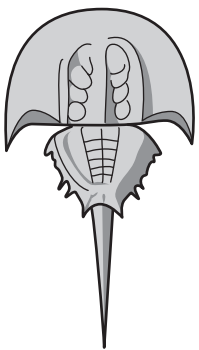
Continents colliding could form mountains.

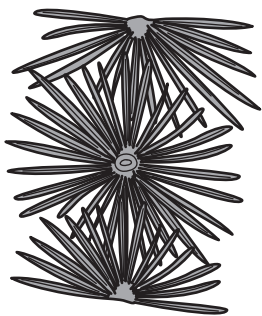
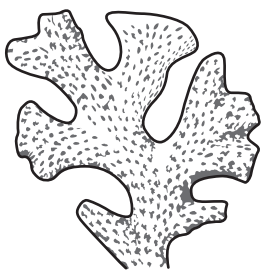

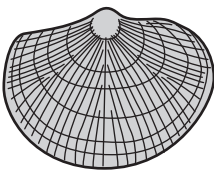
Nobody could detect the movement of a continent.

The same types of rock were found on different continents.

[1]

(c) Here are some fossils found in Africa and South America.

Africa	
A	
B	
C	
D	

South America	
W	
X	
Y	
Z	

Which two fossils, one from Africa and one from South America, could Wegener have used to support his theory of continental drift?

Put rings around the correct answers.

African fossil	A	B	C	D
South American fossil	W	X	Y	Z

[1]

[Total: 4]

7 There have been some very bad earthquakes in the last few years.

(a) The amount of damage and injury can be reduced if governments make plans and regulations before the earthquakes happen.

Here are some of the actions that governments can take.

- A educate people about emergency procedures
- B make sure builders follow the building regulations
- C organise earthquake drills for the public (similar to fire alarm practice)
- D make careful plans for the emergency services
- E make laws about how buildings must be built so they are safer in earthquakes.

Which actions should have the following results?

Write down the letters of the actions from **A, B, C, D** and **E**.

Each letter may be used once, more than once or not at all.

Fewer buildings fall down.

actions and

Emergency staff can go into action more quickly.

action

Everyone knows what to do in an earthquake.

actions and

[3]

(b) Where are earthquakes most likely to happen?

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

- in the Earth's core
- where two tectonic plates meet
- near the centre of a tectonic plate
- where sea floor spreading is happening
- on the continents

[2]

[Total: 5]

- 8 There are many different types of object in the solar system.

Use a straight line to connect each **object in the solar system** to its correct **description**.

object in the solar system

description

asteroids

can be large or small, but always orbit planets

comets

are usually made of rocks and ice, spend most of their time outside the orbit of Neptune, some visit the inner solar system

moons

are large and orbit the Sun

planets

are very large and produce their own light

are usually made of rock, most of them are found between the orbits of Mars and Jupiter

[4]

[Total: 4]

END OF QUESTION PAPER

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 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.