Candidate forename		Candidate surname	

Centre number						Candidate number				

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)

FRIDAY 24 JUNE 2011: Afternoon
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

DC (CW/SW) 11MEP06470 49663

INSTRUCTIONS TO CANDIDATES

- **Write your name, centre number and candidate number in the boxes on the first page. 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.**

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 (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 is meant by radioactive?

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 opposite showing how a nuclear power station generates electricity.

Choose words from this list.

FURNACE

GENERATOR

PYLON

REACTOR

SOLAR PANEL

TURBINE

[3]

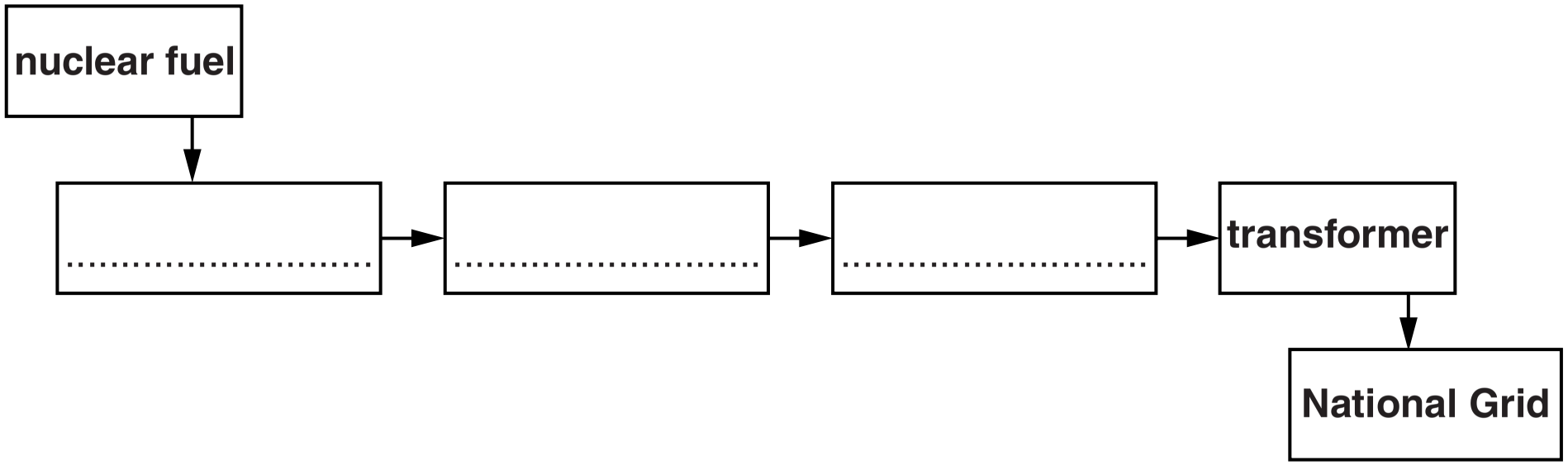
(b) Electricity can also be generated from fossil energy sources.

What is the main gas produced by burning carbon-based fossil fuels?

_____ **[1]**

[Total: 5]

7



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3 Read this news report.

> **YOUTHS WARNED OVER RADIATION RISK**
> **Teenagers have been putting themselves at risk by breaking 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 lead to 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 ignored 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.

Suggest and explain TWO methods a person could use to reduce their risk of developing skin cancer from exposure to sunlight.

Your answer should include

- **two methods**
- **how the methods reduce the risk.**

_____

_____

_____

_____

_____ **[3]**

(f) Many people sunbathe despite understanding the risk of cancer from ultraviolet radiation.

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 factor contributing to 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.

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

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]

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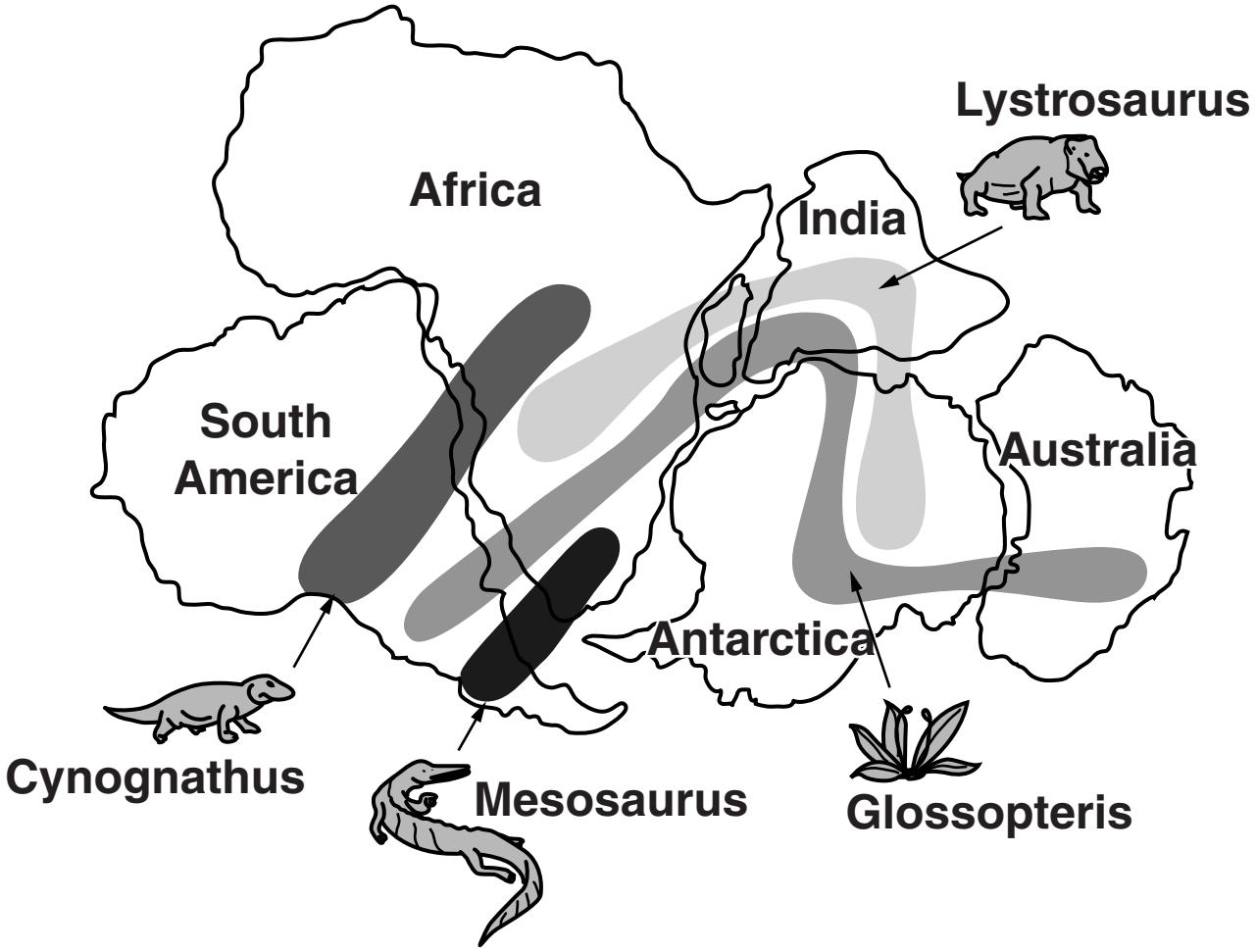
TURN OVER FOR QUESTION 6.

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) Many scientists did not agree with Wegener's theory of continental drift, when he suggested 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. ☐

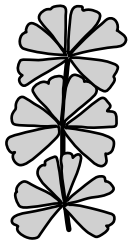
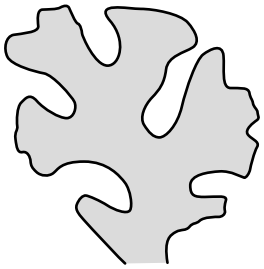
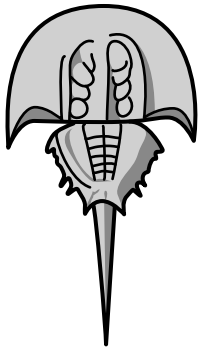
Continents colliding could form mountains. ☐

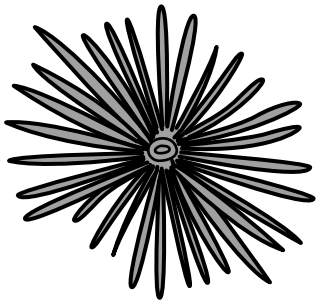
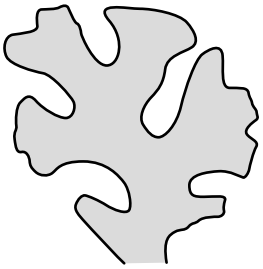
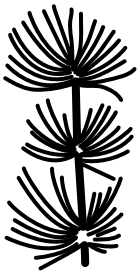
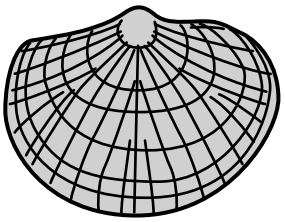
Nobody could detect the movement of a continent. ☐

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 by governments making 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 taking place	☐
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
	can be large or small, but always orbit planets
asteroids	
	are usually made of rocks and ice, spend most of their time outside the orbit of Neptune, some visit the inner solar system
comets	
	are large and orbit the Sun
moons	
	are very large and produce their own light
planets	
	are usually made of rock, most of them are found between the orbits of Mars and Jupiter

[4]

[Total: 4]

END OF QUESTION PAPER

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