



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

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21ST CENTURY SCIENCE (CORE)

0608/01

Paper 1 Multiple Choice

October/November 2009

1 hour

Additional Materials: Multiple Choice Answer Sheet
 Soft clean eraser
 Soft pencil (type B or HB is recommended)

* 4 0 6 6 1 6 6 7 4 1 *

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

Do not use staples, paper clips, highlighters, glue or correction fluid.

Write your name, Centre number and candidate number on the Answer Sheet in the spaces provided unless this has been done for you.

There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A, B, C** and **D**.

Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

Read the instructions on the Answer Sheet very carefully.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Any rough working should be done in this booklet.

You may use a calculator.

This document consists of **17** printed pages and **3** blank pages.



1 Four people have different lifestyles.

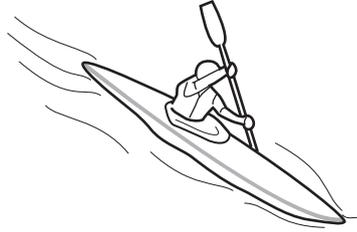
The diagrams show how they spend a large proportion of their time.

Which person is likely to be most at risk from heart disease?

A



B



C



D



2 When did life on Earth begin?

- A** about 100 000 years ago
- B** about 65 million years ago
- C** about 3500 million years ago
- D** about 4600 million years ago

3 Ten samples of bacteria from a hospital were tested with antibiotic X.

The table shows the percentage of the bacteria that were killed in each sample.

sample	percentage of bacteria killed
1	70
2	63
3	71
4	77
5	85
6	65
7	64
8	75
9	72
10	69

What are the reasons for the differences in percentages?

- 1 the antibiotic was tested for safety and effectiveness using human cells grown in the laboratory
- 2 the bacteria in different parts of the hospital vary
- 3 the method used caused the results to vary slightly
- 4 the patients in the hospital always complete their course of antibiotic

A 1 and 2

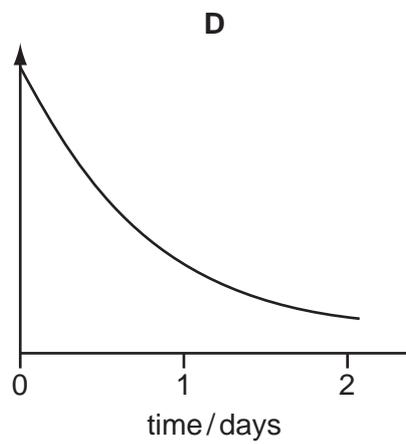
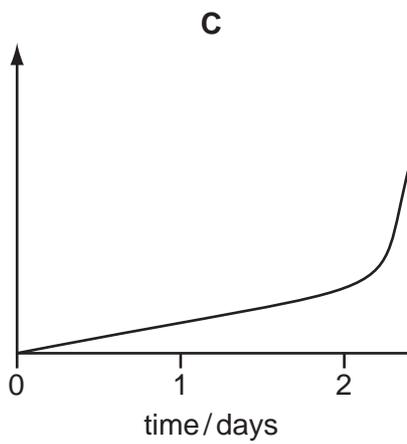
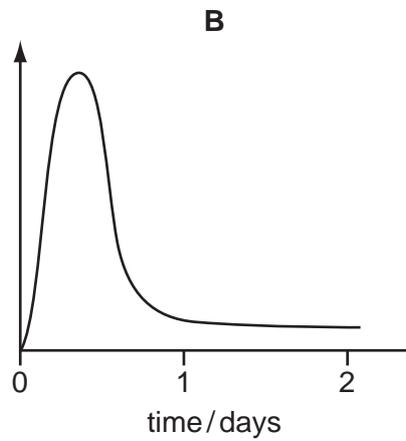
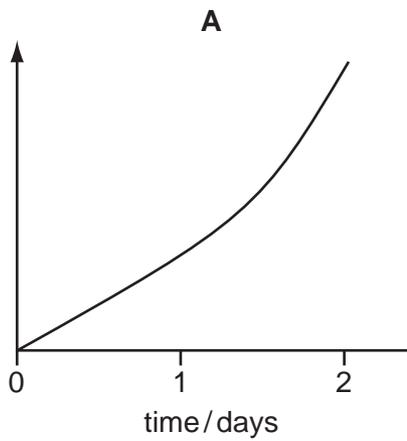
B 2 and 3

C 1 and 4

D 3 and 4

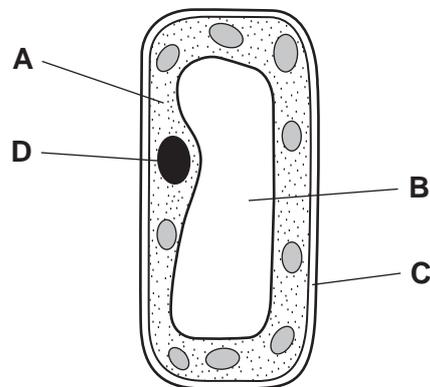
- 4 The body makes an antibody to recognise a particular microorganism.

Which graph shows the production of the antibodies after the body is exposed to a microorganism for a second time?



- 5 The diagram shows a plant cell.

Which structure contains genes?



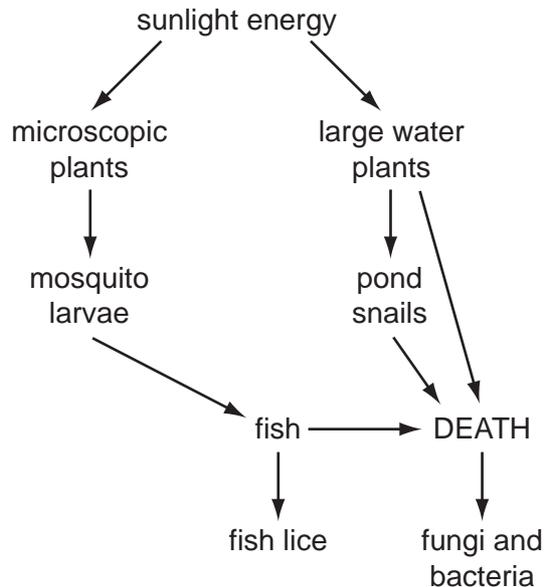
- 6 Rocks which are made in an atmosphere with no oxygen are often dark grey in colour. Rocks which are made in an atmosphere with oxygen are often red in colour.

One view of the origin of life on Earth is that the first organisms did not need oxygen to live and that the oxygen in the atmosphere was released by later organisms.

Which statements are consistent with this view?

	young rocks made recently	old rocks made when the first organisms lived
A	dark grey rocks	dark grey rocks
B	dark grey rocks	red rocks
C	red rocks	dark grey rocks
D	red rocks	red rocks

- 7 The diagram shows part of a food web in a small pond.



The number of fish in the pond was greatly reduced by fishing.

What effect would this have on the numbers of mosquito larvae, pond snails and fish lice?

	fish lice	mosquito larvae	pond snails
A	decrease	decrease	decrease
B	decrease	increase	no change
C	increase	no change	increase
D	no change	decrease	increase

8 Which is a feature of evolution by natural selection?

	variation	competition	increased chance of survival	selective breeding	increased number of individuals with certain characteristics in later generations
A	✓	x	✓	✓	x
B	x	x	x	✓	✓
C	✓	✓	x	✓	✓
D	✓	✓	✓	x	✓

9 Which row shows the sex chromosomes in the body cells and in the sex cells in a man?

	body cells	sex cells
A	XY	XY
B	XY	X or Y
C	XX	XX
D	XX	X

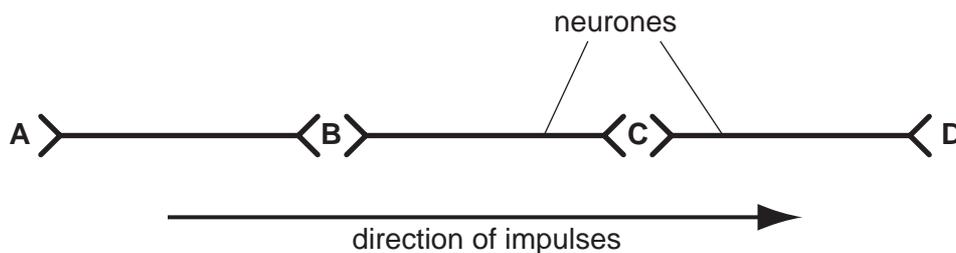
10 Which are natural barriers that reduce the risk of harmful microorganisms entering the body?

- 1 chemicals
- 2 haemoglobin
- 3 muscle
- 4 skin
- 5 stomach acid

A 1, 2 and 3 **B** 1, 4 and 5 **C** 2, 3 and 5 **D** 2, 4 and 5

11 The diagram represents part of a nervous system.

Where would effector cells be found?



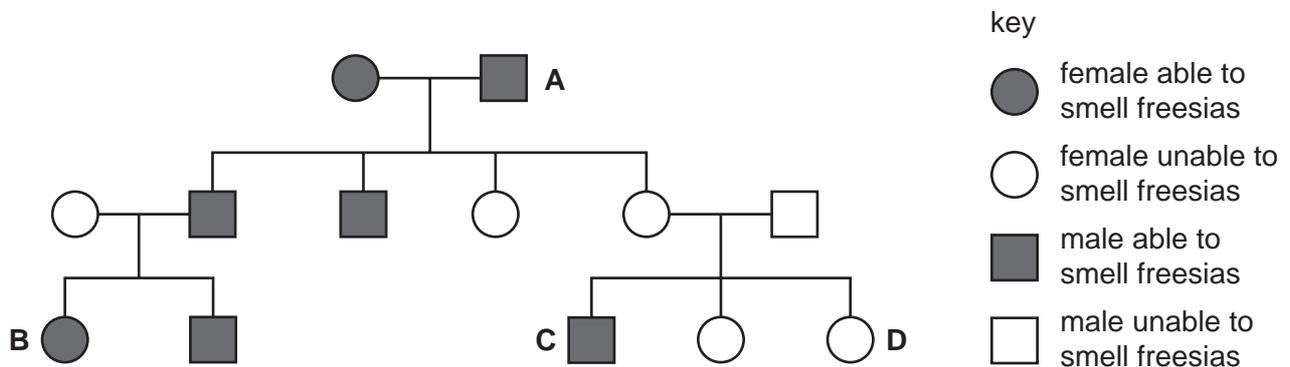
12 In deciding if children should be vaccinated against a disease, which should be considered?

- 1 the chance of getting infected if not vaccinated
- 2 the chance of serious or irreversible harm occurring if not vaccinated
- 3 the various degrees of side effects of the vaccine on different individuals

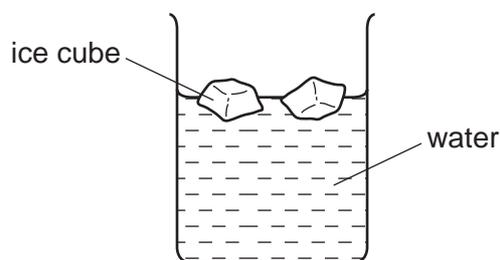
A 1 only B 1 and 2 only C 1, 2 and 3 D 2 and 3 only

13 The family pedigree tree shows the inheritance of the ability to smell certain flowers called freesias. The allele for the ability to smell freesias is dominant.

Which individual must be **incorrectly** marked?



14 The diagram shows a drink of water containing ice cubes



The density of water is 1.0g/cm^3 .

Which is a likely value for the density of ice?

A 0.5g/cm^3 B 0.9g/cm^3 C 1.0g/cm^3 D 1.2g/cm^3

15 Which is a harmful chemical produced by mould that can contaminate crops during storage?

- A aflatoxin in nuts and cereals
- B antioxidants in barley
- C gluten in wheat
- D hydrocyanic acid in uncooked cassava

16 What is needed in the diet of a person working hard in a hot climate?

	extra water	high energy intake	protein
A	✓	✓	✓
B	✓	✓	x
C	✓	x	✓
D	x	✓	✓

key

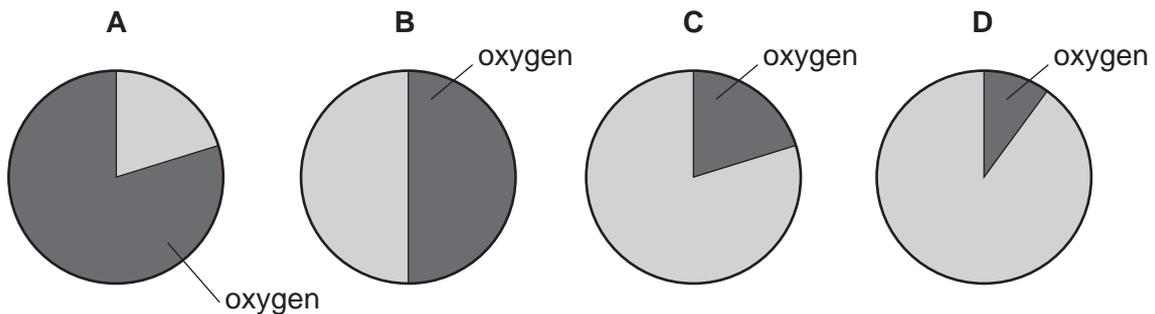
✓ = needed

x = not needed

17 Which substance contains nitrogen?

- A amino acids
- B cellulose
- C starch
- D sugar

18 Which pie chart shows the proportion of oxygen in air?



19 Why are emulsifiers and stabilisers added to food products?

- A to keep food safe for longer
- B to mix ingredients together that would normally separate
- C to prevent food from deteriorating by reacting with oxygen in the air
- D to reduce the amount of sugar

20 A plastic was evaluated for use as an insulator on a wire used inside an oven.

Which property of the plastic would make it **not** suitable for this use?

- A flexible
- B high strength when under tension
- C low density
- D low melting point

21 The petrochemical industry refines crude oil.

What is produced by refining crude oil?

- A cotton
- B lubricants
- C paper
- D silk

22 Carbon monoxide has the formula, CO.
Carbon dioxide has the formula, CO₂.
Water has the formula, H₂O.
Sulfur dioxide has the formula, SO₂.

Which row is correct?

	carbon monoxide	carbon dioxide	water	sulfur dioxide
A				
B				
C				
D				

key

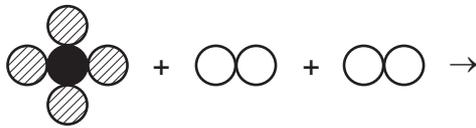
- represents carbon
- represents oxygen
- represents sulfur
- represents hydrogen

- 23 The atmospheric pollution caused by power stations which burn fossil fuels can be reduced by
- 1 fitting a catalytic converter to convert carbon monoxide to carbon dioxide
 - 2 reducing the use of air conditioning to use less electricity
 - 3 removing sulfur from natural gas and fuel oil
 - 4 removing particulates from the gases

Which is correct?

- A 1, 2 and 3 B 1, 2 and 4 C 1, 3 and 4 D 2, 3 and 4
- 24 Two molecules of oxygen and one molecule of methane react when methane burns in air.

The diagram shows the molecules that react.

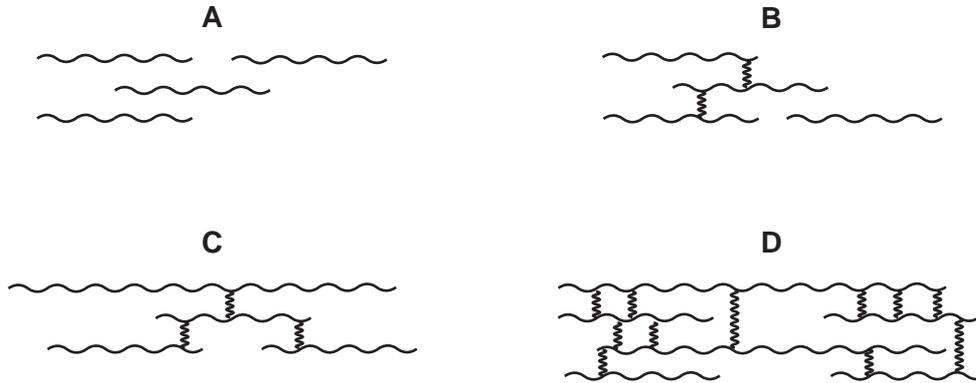


Which diagram shows the correct arrangement of the atoms after the reaction?

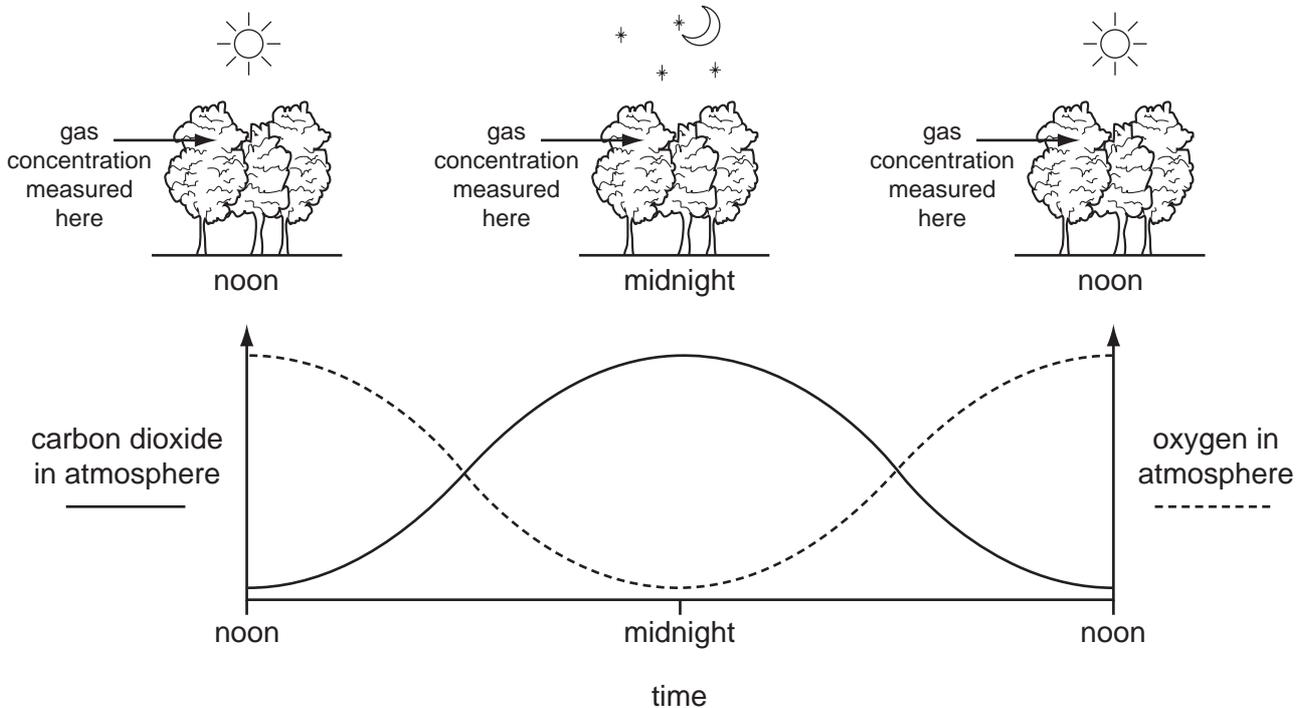
- A
- B
- C
- D
- 25 Which factor is **not** a key feature of a life cycle assessment for a product?
- A environmental impact of disposing of the product
 - B environmental impact of using the product
 - C production costs
 - D requirement for energy input

26 A polymer is modified to increase its melting point.

Which polymer shown below would have the highest melting point?



27 The diagram shows where carbon dioxide and oxygen concentrations were measured in a forest, and a graph of the results.



Which statement correctly explains the shape of the graph?

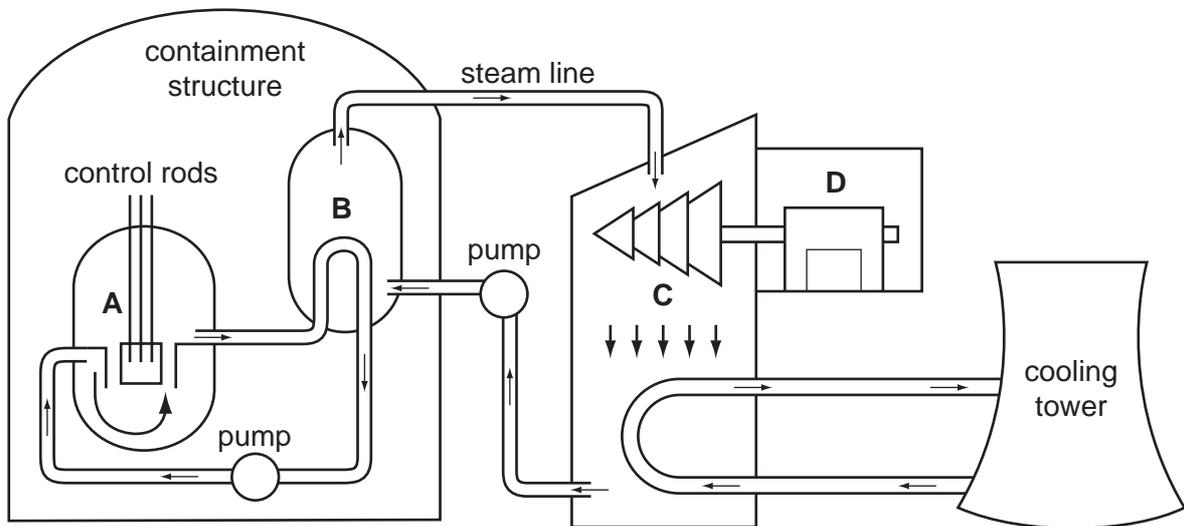
- A** During the day photosynthesis removes carbon dioxide from the atmosphere and adds oxygen.
- B** During the day respiration removes carbon dioxide from the atmosphere and adds oxygen.
- C** During the night photosynthesis adds carbon dioxide to the atmosphere and removes oxygen.
- D** During the night respiration removes carbon dioxide from the atmosphere and adds oxygen.

- 28 A student's grandmother says that she remembers there being many more stars visible in the night sky when she was a child.

What is the **most** likely reason for this?

- A An increase in light pollution interferes with observation of the stars.
 - B Galaxies are moving away from us.
 - C Radiation from the 'big bang' is dying away.
 - D Stars have a life cycle.
- 29 The diagram shows how electricity is made in a nuclear power station.

Which is the generator?



- 30 In an investigation into atmospheric pollution by a coal fired power station the concentration of the air was measured in parts per million (ppm).

sample	day 1	day 2	day 3	day 4
1	101	113	91	82
2	99	114	99	84
3	91	108	87	84
4	102	116	87	76
5	78	112	95	83
6	110	115	92	82
7	109	109	95	87
8	99	113	90	79
9	103	110	94	88
10	100	117	89	85

One of the measurements was discarded as an error.

On which day was this measurement made?

- A** day 1 **B** day 2 **C** day 3 **D** day 4
- 31 CT scans use several beams of x-rays. When a patient is being scanned they are exposed to ionising radiation.

Which person would be most at risk from receiving an x-ray?

- A** a five year old child
B a thirty year old man
C a thirty year old pregnant woman
D a sixty year old woman
- 32 High level nuclear waste is dangerous to living things.

What is the best way to dispose of this waste?

- A** burying it in the soil on the laboratory site
B dumping in landfill in the same way as domestic waste
C pumping it far out to sea to dilute it
D sealing it in tanks and burying it in dry rock deep underground

33 The table lists electromagnetic radiation and their approximate range of frequencies.

electromagnetic radiation	range of frequencies (Hz)
gamma rays	10^{22} to 10^{19}
x-rays	10^{21} to 10^{18}
ultraviolet	10^{18} to 10^{15}
visible	10^{15} to 10^{14}
infra-red	10^{14} to 10^{12}
microwaves	10^{12} to 10^9
radio waves	10^9 to 10^3

Which range of frequencies include ionising radiation?

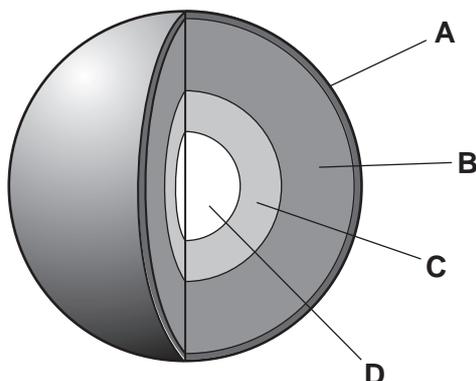
- A 10^3 to 10^9
- B 10^9 to 10^{12}
- C 10^{12} to 10^{15}
- D 10^{15} to 10^{22}

34 Which type of electromagnetic radiation is totally absorbed by the system shown?

	radiation	system
A	ultraviolet	ozone layer in the atmosphere
B	microwave	metal door screen on a microwave oven
C	ultraviolet	sun-screen on the skin
D	visible light	the Earth's atmosphere

35 The diagram shows the structure of the Earth.

Which is the mantle?



36 What are the correct descriptions of the motion and size of a comet?

	motion	size
A	orbits around the Earth	larger than the Earth
B	orbits around the Earth	smaller than the Earth
C	orbits around the Sun	larger than the Earth
D	orbits around the Sun	smaller than the Earth

37 The diagram shows a person looking at the light from a galaxy.



The light has taken1..... years to get to the eye of the person. This is because the galaxy is very2.....

Which words correctly complete gaps 1 and 2?

	1	2
A	ten	close
B	one thousand	distant
C	two million	distant
D	one billion	close

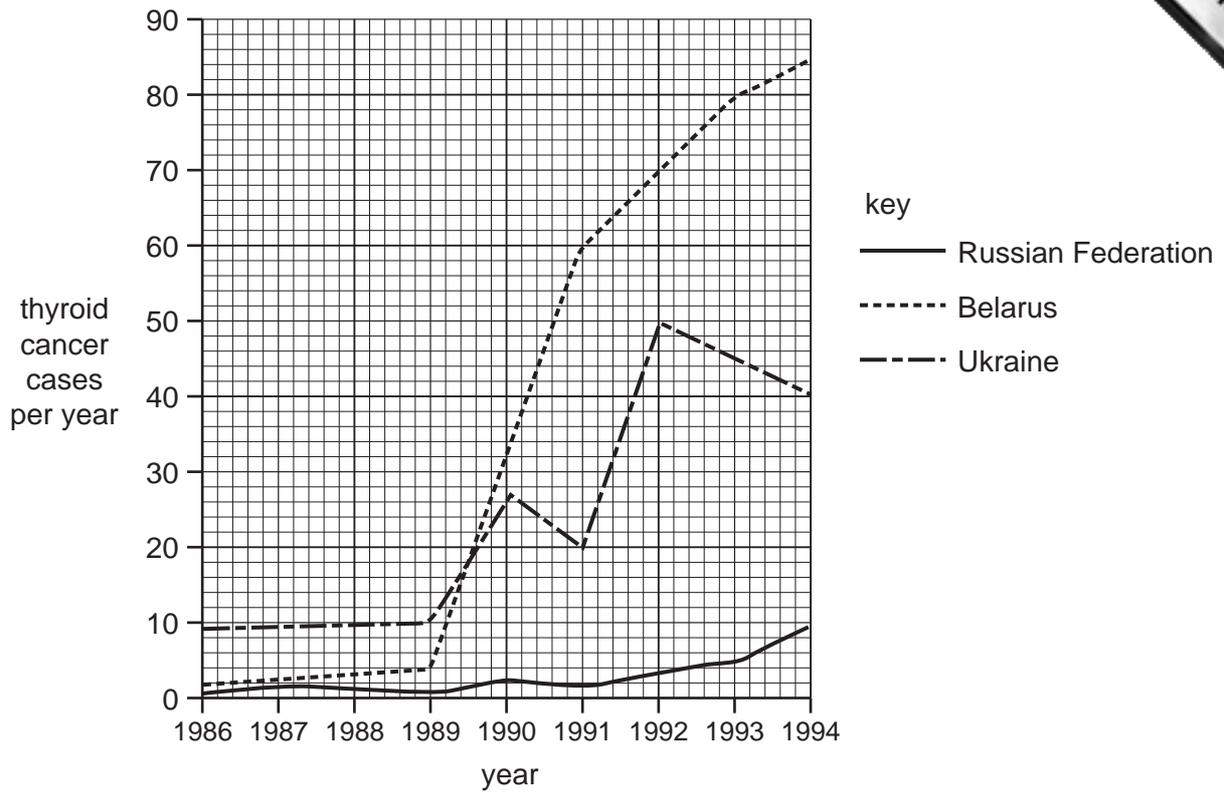
38 Wegener suggested the theory of continental drift. This was rejected by the geologists of his time.

Which reasons caused Wegener's theory to be rejected?

- 1 continents fit together in a geometric pattern
- 2 matching fossils can be found in different continents
- 3 mountain chains in separate continents match up
- 4 Wegener was an outsider in the community of geologists

- A** 1 only
- B** 1, 2 and 4
- C** 2 and 4 only
- D** 4 only

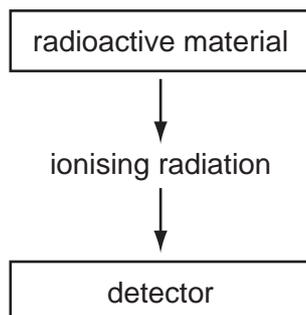
39 The graph shows some data on thyroid cancer.



During which year was the number of thyroid cancer cases per year in Belarus three times greater than that in the Ukraine?

- A** 1987 **B** 1989 **C** 1991 **D** 1993

40 In a smoke detector a radioactive material and detector are set up as shown below.



Which material would be suitable as the radioactive material in a smoke detector?

	half-life	type of ionising radiation
A	a few hours	beta
B	a few hours	alpha
C	tens of years	alpha
D	tens of years	gamma

