



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education Ordinary Level

**TWENTY FIRST CENTURY SCIENCE**

**5131/01**

Paper 1 Multiple Choice

**October/November 2010**

**1 hour**

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



**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 **14** printed pages and **2** blank pages.



1 *Staphylococcus* is a type of bacteria that often grows on the body surface.

It only causes problems if it gets into the bloodstream. The bacteria can then be killed by taking a tablet containing a drug.

Which type of drug is the tablet likely to contain?

- A an antibiotic
- B an antibody
- C a disinfectant
- D a vaccine

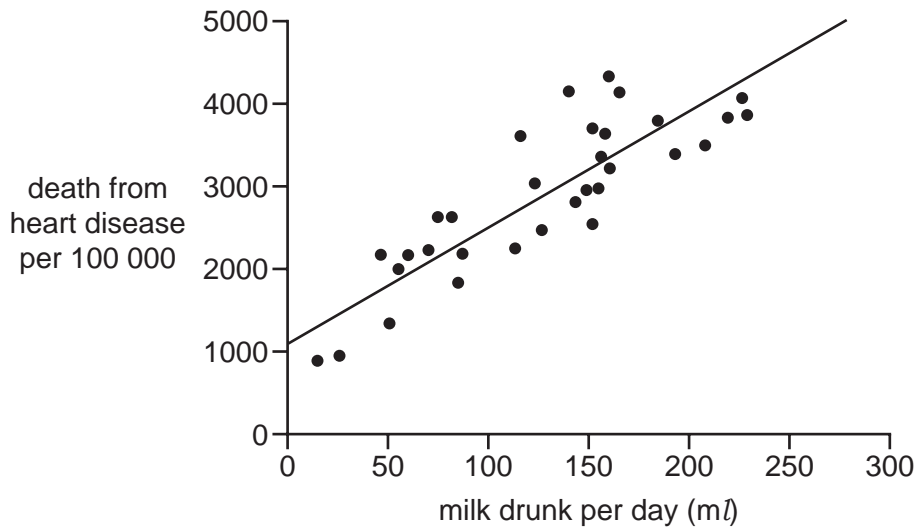
2 A new resistant strain of *Staphylococcus* bacteria has now appeared.

Which action would help stop resistant strains of bacteria appearing?

- A Allow people to buy the drug without a prescription.
- B Always complete the dose of the drug.
- C Give the drug to everybody to stop the bacteria spreading.
- D Stop taking the drug as soon as you feel better.

- 3 A scientist wanted to see if there was a link between the amount of milk people drink and their chance of dying from heart disease.

He looked up death rates from heart disease for many different countries and how much milk people drank in each country. He plotted his data on a graph.



Which conclusion can be made from the scientist's data?

- A Drinking large amounts of milk causes heart disease.
  - B Drinking milk gives some protection from heart disease.
  - C There does not seem to be any link between the amount of milk drunk and the chance of having heart disease.
  - D There is a correlation between the amount of milk drunk and the number of people dying of heart disease.
- 4 When fossil fuels burn, particles of carbon are released into the air.

Four people are talking about what happens to the particles of carbon.

Which person gives the correct explanation for what happens to the carbon particles?

- A 'Carbon particles are used up by plants.'
- B 'The particles dissolve in the rain.'
- C 'The particles settle on buildings.'
- D 'They are a gas so they just float away.'

- 5 Poly(ethene) used to wrap food has a plasticiser added to it.

How does the plasticiser change the properties of the poly(ethene)?

- A It goes a darker colour.
- B It has a higher melting point.
- C It is harder and stronger.
- D It is softer and more flexible.

- 6 A shop uses poly(ethene) bags. The owner of the shop is thinking about starting to use paper bags.

The table shows some information about each type of bag.

Which row shows why the Life Cycle Assessment is different for each type of bag?

	poly(ethene) bag	paper bag
<b>A</b>	made from crude oil	made from trees
<b>B</b>	stretches when pulled hard	breaks when pulled hard
<b>C</b>	transparent	opaque
<b>D</b>	used for the last 50 years	used for hundreds of years

- 7 Which statement suggests that asteroids could be hazardous?

- A All asteroids are in stable orbits around the Sun, between Mars and Jupiter.
- B An asteroid hitting the ocean would cause a Tsunami.
- C There are many more small asteroids than large asteroids.
- D There is less chance of the Earth being hit by a large asteroid than a small asteroid.

- 8 Which statement best describes visible light?

- A Light is a microwave.
- B Light is a type of electromagnetic radiation.
- C Light is ionising radiation.
- D Light is radiation produced by radioactive sources.

The following information should be used to answer questions 9 and 10.

A scientist looked at tree snails on different mountains in Hawaii. He noticed that the snails that lived on different mountains had different coloured shells.

He made four statements about the snails.

- 1 Snails are often born with different coloured shells.
- 2 The snails are 'fighting' for resources.
- 3 Many of the snails are eaten by birds.
- 4 Natural selection produced different results on different mountains.

9 Which word can be used to describe the snail's behaviour in statement 2?

- A biodiversity
- B competition
- C evolution
- D variation

10 Each of the four statements contains data or is an explanation.

Which statement contains an explanation for the different coloured snails on different mountains?

- A 1                      B 2                      C 3                      D 4

11 Which is the best definition of asexual reproduction?

- A Genetically identical offspring are made from one parent.
- B One parent produces two types of sex cell which join.
- C One parent splits to form two offspring that have different genes.
- D Two parents make sex cells that join to make an embryo.

12 Jane is sitting reading a book.

The door bell rings.

She gets up to answer it.

What are the **effectors** in Jane's response to the door bell?

- A The effectors are her ears.
- B The effectors are her eyes.
- C The effectors are her glands.
- D The effectors are her muscles.

13 *Staphylococcus* is often destroyed on the skin by natural chemicals made by the body.

In which liquid are these chemicals found?

- A blood
- B saliva
- C stomach acid
- D sweat

14 Which product is **not** made from the chemicals in crude oil?

- A fuels
- B lubricants
- C natural fibres
- D polymers

15 The diagram shows the arrangement of atoms in some molecules.



Which compound is **not** shown in the diagram?

- A CO
- B CO<sub>2</sub>
- C H<sub>2</sub>O
- D SO<sub>2</sub>

16 The diagram shows the atoms in a molecule found in living things.



key

- carbon
- hydrogen
- oxygen
- nitrogen

What is the name of this type of molecule?

- A amino acid
- B carbohydrate
- C hydrocarbon
- D polymer

The following information should be used to answer questions 17 and 18.

Eve has a fridge magnet that shows the healthy amounts of sugar, fat and salt in food.

<b>Check the LABELS!</b>		
	What's a little? (per 100 g)	What's a lot? (per 100 g)
sugar	2 g	10 g
fat	3 g	20 g
salt	0.3 g	1.5 g

She looks at the label on a packet of Krunchy Crisps.

	per 100 g
energy	2190 kJ
sugar	2.5 g
fat	33.0 g
salt	1.9 g

Use the fridge magnet and label to decide if the crisps are high or low in sugar, fat or salt.

17 Which statement is correct?

- A The crisps are high in fat and salt but not sugar.
- B The crisps are high in sugar, fat and salt.
- C The crisps are low in salt.
- D The crisps are very low in sugar.

18 Eve knows that she cannot assess the risk of eating Krunchy Crisps, to her health, using only this information.

Which statement shows why she **cannot** assess the risk?

- A Other brands of crisps have different amounts of sugar, fat and salt.
- B She does not know the outcome of eating too much sugar, fat and salt.
- C She might be eating other foods that are high in sugar, fat and salt.
- D There are other factors in Eve's life to consider.

**19** Eve reads an article that says eating too much fat can increase the risk of getting heart disease.

She knows that her grandmother eats lots of fatty foods but has a very healthy heart. Which statement explains this?

- A** Eve's grandmother eats lots of fat and sugar too.
- B** Eve's grandmother may get heart disease in the future.
- C** Smoking is also a cause of heart disease.
- D** The article is making a correlation between groups of people.

The following information should be used to answer questions **20** and **21**.

Kelly and Tunde are discussing the plan to build a nuclear power station near where they live.

I don't want the power station. It might replace 2 or 3 coal power stations or 500 wind turbines but it would put tourists off from visiting our excellent beach.



Kelly

I think we should have the power station, as we need more electricity. But I think the nuclear waste is a problem that we need to spend more money on to make it safe, because nuclear power is the most reliable.



Tunde

**20** Who made a comment about power output?

- A** Kelly
- B** Tunde
- C** both Kelly and Tunde
- D** neither Kelly nor Tunde

**21** Who made a comment about economic cost?

- A** Kelly
- B** Tunde
- C** both Kelly and Tunde
- D** neither Kelly nor Tunde



22 Which statement about microwaves is **not** correct?

- A Microwaves can cause water molecules to vibrate.
- B Microwaves produce ions in living cells.
- C The energy in microwaves is carried as photons.
- D The intensity of microwaves decreases as the distance from the source increases.

23 A scientist thinks that mountains must be forming all the time.

She uses some of the statements below in her explanation.

- 1 Mountains are part of the Earth's crust.
- 2 Erosion causes mountains to be worn down.
- 3 The Earth is older than the oldest rocks.
- 4 If no new mountains are formed, the world would be flat.
- 5 Mountains exist today.
- 6 Mountains are only formed on drifting continents.

Which statements make up an explanation for mountains forming all the time?

- A 1, 3 and 6      B 2, 4 and 5      C 3, 4 and 6      D 4, 5 and 6

24 Radiations from radioactive sources have different powers of penetration.

What is the order of penetration for alpha, beta and gamma radiation?

	most	→	least
<b>A</b>	alpha	beta	gamma
<b>B</b>	alpha	gamma	beta
<b>C</b>	beta	gamma	alpha
<b>D</b>	gamma	beta	alpha

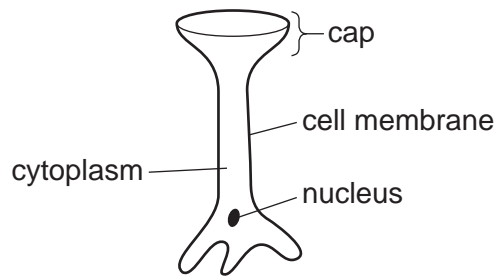
25 It is now possible to artificially produce a clone of an animal.

Which process is used to do this?

- A An egg is fertilised by a body cell.
- B A nucleus is transferred into an empty egg cell.
- C Genes are moved from an egg to a body cell.
- D The cells of an embryo are separated to make identical twins.

26 *Acetabularia* is a single celled organism that lives in the sea.

It has an unusual shape.



Which part of *Acetabularia* contains the genetic material?

- A cap
  - B cell membrane
  - C cytoplasm
  - D nucleus
- 27 The genetic material is made up of long molecules of a certain chemical.

What is the name of this chemical?

- A DNA
  - B fat
  - C protein
  - D sugar
- 28 'Double-blind tests' are sometimes used in human trials to test medical treatment.
- Which statement is true for 'double-blind tests'?
- A Neither the doctor nor the patient are influenced by knowing who has taken the real drug.
  - B The doctor knows who has the real drug, making analysis of the results easier.
  - C The placebo reduces the costs by containing a low dose of the drug.
  - D They always produce positive results.

29 Many people think that placebos should not be used in some human drug trials.

Why is this?

- A It is unfair to give an ill person a treatment that will not help them.
- B They make it harder to work out the actual effect of the real drug.
- C They make the trial last much longer.
- D They may make the person more susceptible to disease.

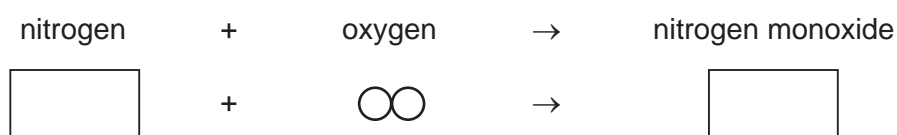
30 Four people are discussing nitrogen dioxide pollution in the area where they live.

Which person is suggesting a correlation between a factor and an outcome?

- A 'It is very difficult to measure the concentration of nitrogen dioxide accurately.'
- B 'Nitrogen dioxide is made in thunderstorms.'
- C 'Nitrogen dioxide levels are higher when people are driving to and from work.'
- D 'Nitrogen dioxide reacts with water to make acid rain.'

31 Cars and power stations both produce nitrogen monoxide, NO.

The diagram shows part of this reaction.



Which diagrams are needed to make the reaction balanced?

	nitrogen	nitrogen monoxide
A	●	●●
B	●●	●●
C	●    ●	●●    ●●
D	●●	●●    ●●

32 The diagram shows part of a polymer chain.



Which statement about the polymer is **not** correct?

- A The polymer is a hydrocarbon.
- B The polymer is made from a monomer with formula  $\text{CH}_3=\text{CH}_3$ .
- C The polymer is made from chemicals from crude oil.
- D The polymer is not cross linked.

33 Synthetic rubber is made from crude oil.

The rubber can be used to make car tyres and surfaces for children's playgrounds.

Why is the Life Cycle Assessment different for rubber used in car tyres compared to rubber used in playground surfaces?

- A Car tyres wear out more quickly than playground surfaces.
- B More people drive cars than use playgrounds.
- C Playgrounds do not belong to individual consumers.
- D Synthetic rubber is non-biodegradable.

34 In developed countries, the number of farmers using manure as a fertiliser is increasing.

In developing countries, the number of farmers using synthetic fertilisers is increasing.

Which statement gives a reason for this?

- A Developing countries have food shortages but developed countries have plenty of food available.
- B Farmers in developed countries are more interested in profits.
- C Farmers in developed countries have more information about organic farming methods.
- D Farmers in developing countries have more land available for farming.

35 Sometimes it is very difficult to make accurate observations.

Which observation is the **most** difficult to make?

- A diameter of the Earth
- B distances to far galaxies
- C distance to the Moon
- D time for the Earth to orbit the Sun

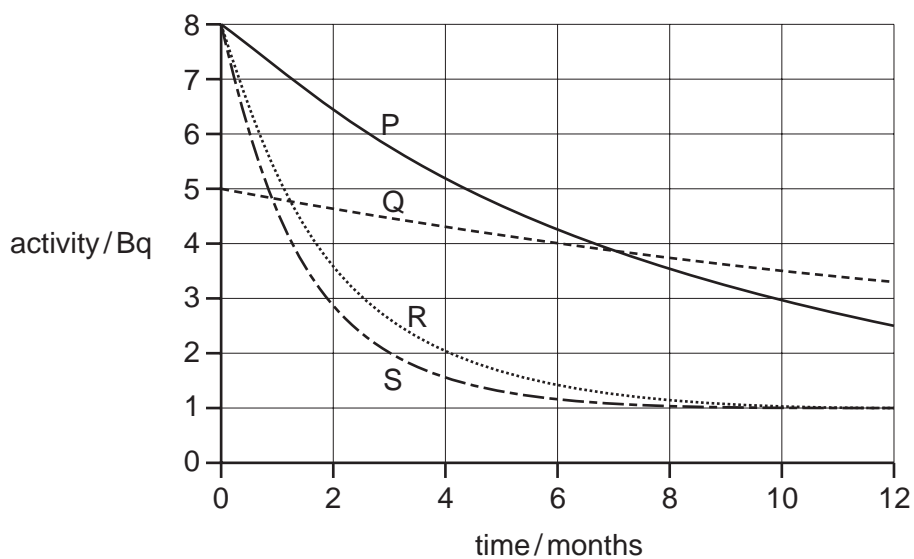
36 A radio wave signal gets weaker the further away it is from the transmitter.

Which statement correctly explains the decrease in intensity of the radio beam?

- A Photons cannot travel very far as they have relatively low energy.
- B Photons lose energy as they travel away from the transmitter.
- C Photons slow down as they travel away from the transmitter.
- D Photons spread apart as they travel away from the transmitter.

The following graph should be used to answer questions 37 and 38.

The graph shows how the activity of some radioactive sources changes over time.



37 Which radioactive source has the shortest half-life?

- A P
- B Q
- C R
- D S

38 What is the background radiation?

- A 1 Bq
- B 4 Bq
- C 5 Bq
- D 8 Bq

39 What is the approximate speed at which continents move apart?

- A 1 mm/yr      B 10 cm/yr      C 1 m/yr      D 10 m/yr

40 Which gas produces reversible chemical changes in the atmosphere when it absorbs ultraviolet radiation?

- A carbon dioxide  
B nitrogen  
C oxygen  
D ozone



**BLANK PAGE**

---

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

University of Cambridge International Examinations 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.