



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

TWENTY FIRST CENTURY SCIENCE (CORE)

0608/01

Paper 1 Multiple Choice

May/June 2013

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.

DO NOT WRITE IN ANY BARCODES.

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.

Electronic calculators may be used.

This document consists of **15** printed pages and **1** blank page.



1 Which set of alleles correctly completes the genetic diagram?

	H	h
H	?	Hh
h	Hh	hh

A HH

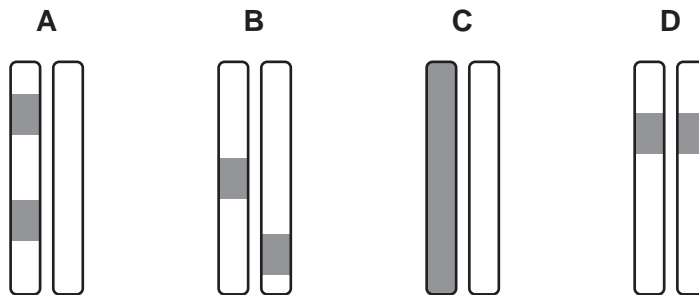
B Hh

C hh

D hH

2 A pair of chromosomes carry the same gene.

Which diagram shows the position of a single gene on a pair of chromosomes?



3 Sue has Gaucher disease.

Gaucher disease is caused by a faulty allele.

Scientists are planning to replace her faulty alleles with working alleles.

This will cure Sue of the condition.

What is the name of the process?

A cloning

B gene therapy

C genetic testing

D vaccination

- 4 Duncan and David are twins. In their baby photographs it is impossible to tell them apart.

Their sister says that they are clones.

She is correct, but what does she mean?

- A They both inherited all of their genes from their father.
 - B They developed from different eggs and sperm, which had the same combination of genes in them.
 - C They have exactly the same alleles because they developed from the same fertilised egg.
 - D They have slightly different combinations of alleles, but they are growing up in the same environment.
- 5 Now that they are adults, David's friends can easily identify him as different from his twin brother, Duncan.

What is the best explanation for this?

- A Their appearance depends on both the environment and their alleles.
- B As they grew up, their alleles developed and changed.
- C David's cells have different alleles to the ones in Duncan's cells.
- D Their environment completely controlled their appearance as they grew up.

The following information should be used to answer questions 6 and 7.

A scientist took some readings of the amount of carbon particles in the air near a power station.

She repeated the same test five times. She did her tests at 12 noon each day.

The table shows her results.

day	amount of carbon particles in $\mu\text{g}/\text{m}^3$					
	test 1	test 2	test 3	test 4	test 5	mean
Monday	60	59	58	51	62	60
Tuesday	77	73	75	76	74	75

6 What evidence is there that the tests are reliable?

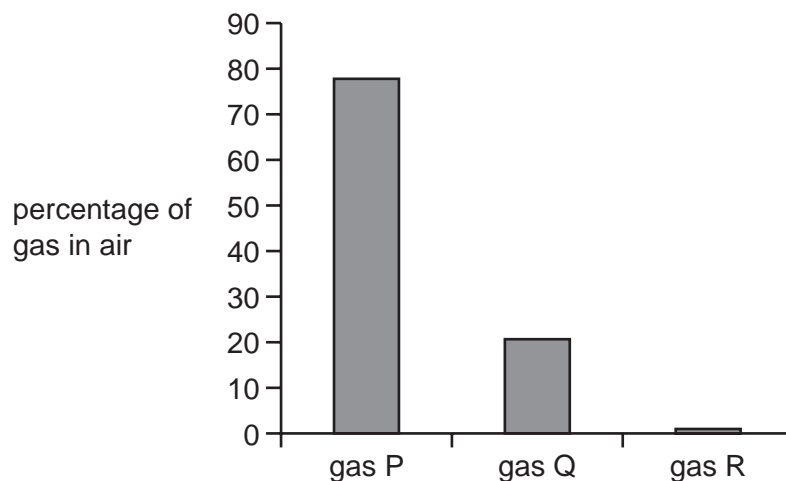
- A On each day all five test results are similar to each other.
- B The scientist calculated a mean of her results each day.
- C The tests were all done at the same time of the day.
- D The tests were repeated.

7 The mean values for Monday and Tuesday are different.

What is the most likely explanation of this difference?

- A The amount of carbon particles varies at different times in the day.
- B The mean can indicate the true value for the amount of carbon particles.
- C The power station burned more fuel on Tuesday.
- D There are outliers in the results.

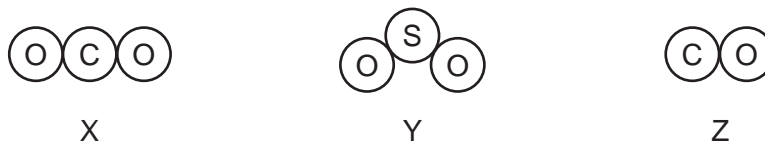
- 8 Sarah draws a bar chart for her homework. It shows the percentages of gases in the air today.



What is the name of gas Q?

- A argon
 - B carbon dioxide
 - C nitrogen
 - D oxygen
- 9 Pollutant gases are formed when fuels are burned.

Molecules of three pollutant gases are shown.



Which row identifies the pollutants?

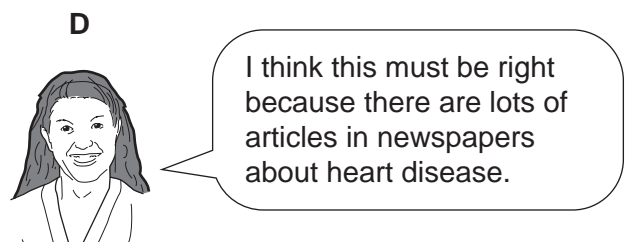
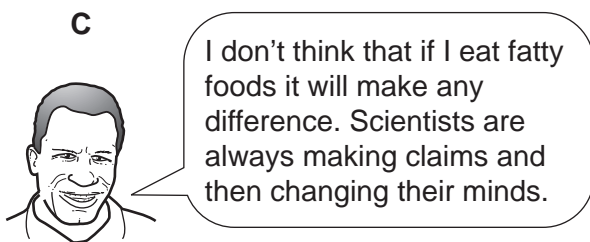
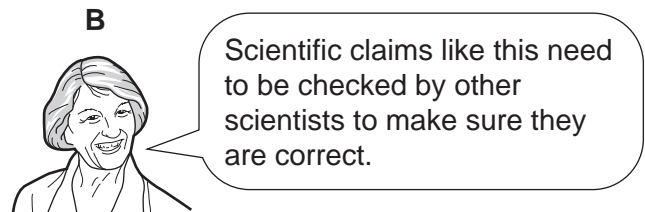
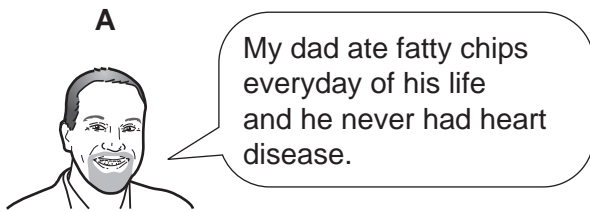
	X	Y	Z
A	carbon dioxide	sulfur dioxide	carbon monoxide
B	carbon dioxide	sulfur dioxide	water
C	carbon monoxide	carbon dioxide	sulfur dioxide
D	carbon monoxide	sulfur dioxide	carbon dioxide

- 10 Which statement about the theory of continental drift describes an explanation rather than an observation that supports the idea?
- A Coastal rocks on the opposite sides of oceans contain similar fossils.
 - B Some continents have a close geometrical fit.
 - C The Earth's crust is made up of plates moving over the mantle.
 - D There are chains of mountains under most oceans.
- 11 What is the main source of the Sun's energy?
- A burning of helium
 - B combustion of hydrogen
 - C fission of helium
 - D fusion of hydrogen
- 12 Which geological process **cannot** be explained in terms of Wegener's theory of continental drift?
- A sedimentation
 - B an earthquake
 - C mountain building
 - D volcanic eruption
- 13 Scientists have found moons in distant solar systems.
- Which statement about moons is true?
- A A moon is an object moving in orbit around asteroids.
 - B A moon is an object moving in orbit around a planet.
 - C A moon is an object moving in orbit around a star.
 - D A moon is an object moving in orbit around the Sun.

The following information should be used to answer questions 14 and 15.

Scientists think that eating lots of fatty food can increase the risk of having heart disease.

Different people have different views about this issue.



14 Which person is talking about peer review?

15 Which person is saying that individual cases do **not** necessarily fit a correlation?

16 Fatty deposits in blood vessels supplying the heart muscle can cause a heart attack.

Which statement explains why?

- A The fat increases the blood flow to the heart muscle.
- B The fat kills heart muscle cells.
- C The fat reduces the amount of oxygen reaching the heart muscle.
- D The fat stops blood from leaving the heart muscle.

17 Vaccination protects us from disease-causing organisms.

Which statement explains why?

- A Vaccines are injected straight into the blood stream.
- B Vaccines contain safe forms of the disease-causing microorganism.
- C Vaccines cause the production of antibodies before the disease-causing microorganism enters the body.
- D Vaccines stop microorganisms entering the body.

18 The chickenpox virus **cannot** be destroyed by antibiotics.

Which statement best explains this?

- A Antibiotics only kill bacteria or fungi.
- B The virus hides inside human body cells.
- C The virus is too small for antibiotics to destroy.
- D The virus produces toxins.

19 Crude oil is a mixture of hydrocarbons.

Which statement about these hydrocarbon molecules is **not** correct?

- A They are all the same length.
- B They contain chains of atoms.
- C They contain only carbon and hydrogen atoms.
- D They produce carbon dioxide when they burn.

20 The table shows information about some polymers.

polymer	effect of heat
melamine	does not melt
PVC	melts at about 300 °C
poly(ethene)	melts at about 120 °C
nylon	melts at about 180 °C

A hot oven is at a temperature of 220 °C.

Which polymers would **not** melt in this oven?

- A melamine only
- B melamine and PVC
- C melamine, PVC and nylon
- D melamine, PVC and poly(ethene)

21 PVC can be used to make packaging.

It is treated to make it more flexible.

How can PVC be made more flexible?

- A by adding cross links
- B by increasing its density
- C by making the chain length longer
- D by using plasticisers

22 Which product can **not** be made from the chemicals in crude oil?

- A fuels
- B lubricants
- C poly(ethene)
- D silk

23 Which equation describes a reaction that does **not** produce carbon dioxide?

- A $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$
- B $2\text{C}_3\text{H}_8 + 7\text{O}_2 \rightarrow 2\text{CO}_2 + 2\text{CO} + 2\text{C} + 8\text{H}_2\text{O}$
- C $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$
- D $\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \rightarrow 6\text{CO}_2 + 6\text{H}_2\text{O}$

24 Which row correctly describes what happens to allow a student to read a book?

	the light bulb	the air	the white paper	the black ink	the student's eyes
A	emits light	transmits light	absorbs light	reflects light	transmit light
B	emits light	transmits light	reflects light	absorbs light	absorb light
C	transmits light	absorbs light	emits light	reflects light	absorb light
D	transmits light	absorbs light	reflects light	absorbs light	reflects light

25 Four people are discussing the effects of mobile phones.

Which person is making a correct statement?

A



Mobile phones are definitely safe. All scientists believe this.

B



There may be some risks from mobile phones, but not all scientists agree.

C



The majority of scientists believe that mobile phones pose a serious health risk.

D



Most scientists believe that the risks from mobile phones are so high that they should be banned.

26 Here is a poster about protecting yourself from the Sun.



T-shirts, sunscreen and hats provide physical barriers to which kind of harmful radiation from the Sun?

- A gamma rays
- B microwave
- C ultraviolet
- D visible

27 Sami is using a microwave.

She puts a cup of water in the microwave for one minute.

The water gets hot, but the handle of the cup remains cool.

Which row explains the effect of the microwave radiation on the vibration of the particles?

	vibration of particles in the cup handle	vibration of particles of water
A	no effect	no effect
B	no effect	increased vibration
C	increased vibration	no effect
D	increased vibration	increased vibration

28 Scientists have recently discovered fossils of an animal that they think is related to humans.

Here are some statements about the fossil.

- 1 It is 4 million years old.
- 2 The animal was probably a good climber because it had long arms.
- 3 The animal's brain was slightly larger than that of a modern chimpanzee.
- 4 The animal probably died out because of competition.

Which of the four statements contain only data?

- A** statements 1 and 3
- B** statements 2 and 4
- C** statement 2 only
- D** statement 3 only

29 The information in the table describes some differences in the features of two hominid species.

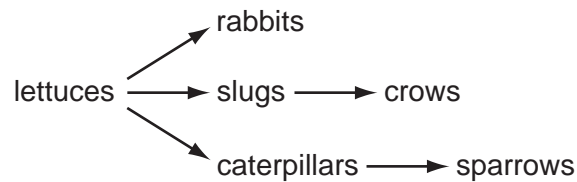
feature	<i>Homo erectus</i>	<i>Homo sapiens</i>
bones	large and heavy	slim and light
brain size	1000 cm ³	1300 cm ³
height	145 cm	170 cm
skull shape	large brow ridges	small brow ridges

Homo erectus is extinct. *Homo sapiens* is still alive.

The difference in which feature is most likely to be the reason for this?

- A bones
- B brain size
- C height
- D skull shape

30 The diagram shows a food chain in a garden.



A gardener uses chemicals in his garden to kill all the slugs.

Which is **most** likely to happen?

- A The number of crows increases.
 - B The number of lettuces increases.
 - C The number of rabbits decreases.
 - D The number of sparrows decreases.
- 31 Two plants are growing towards the light in a dim woodland.

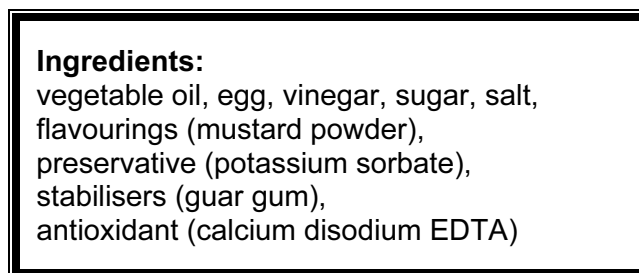
What is the name of this process?

- A competition for resources
- B divergence
- C natural selection
- D selective breeding

32 Which two chemicals react together during respiration?

- A carbon dioxide and water
- B glucose and oxygen
- C glucose and water
- D water and carbon dioxide

33 The diagram shows the label on a bottle of mayonnaise.



Which ingredient is used to stop the oil and vinegar in the mayonnaise separating?

- A calcium disodium EDTA
- B guar gum
- C potassium sorbate
- D salt

34 Antioxidants are added to mayonnaise.

Why are antioxidants added to mayonnaise?

- A to improve the appearance of the food
- B to improve the flavour of the food
- C to prevent oxygen reacting with the food
- D to prevent the growth of micro-organisms

35 Proteins in our body are natural polymers.

They are formed when many small molecules join together in our body cells.

Which small molecules join together to form protein?

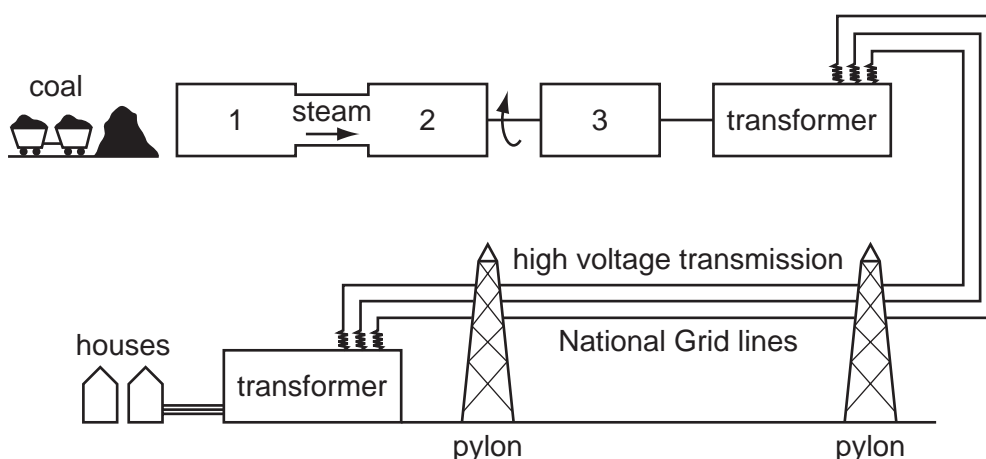
- A amino acids
- B carbohydrates
- C sugars
- D water and carbon dioxide

36 Tom is an organic farmer. He owns a very large farm and grows lots of different crops.

Which method would Tom **not** use on his farm?

- A chemical pesticides
- B crop rotation
- C spreading manure
- D using natural predators

37 The following diagram shows the main parts of a coal fired power station.



Which labels should be in positions 1, 2 and 3 on the diagram?

	position 1	position 2	position 3
A	furnace/boiler	generator	turbine
B	furnace/boiler	turbine	generator
C	generator	turbine	furnace/boiler
D	turbine	generator	furnace/boiler

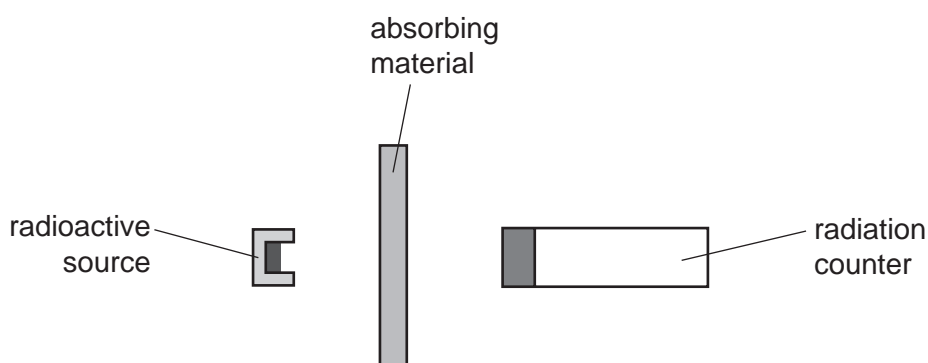
38 Nuclear power stations produce radioactive waste.

The waste contains different radioactive elements.

Which one of the radioactive elements in the table would take longest to become safe, if they all started with the same activity?

	radioactive element	half life
A	antimony	2.76 years
B	caesium	2.3 million years
C	iodine	15.7 million years
D	technetium	211 thousand years

- 39 A science teacher used the equipment shown to investigate the radiation emitted by a particular radioactive source.



absorbing material	average number of counts in one minute
none	98
thin paper	27
1 mm aluminium	27
1 cm lead	8

What types of radiation were emitted by this source?

- A alpha particles and beta particles
 - B alpha particles and gamma rays
 - C beta particles and gamma rays
 - D beta particles only
- 40 Radioactive materials must be labelled with this symbol.



What is the main reason that radioactive materials must be labelled?

- A They can heat up materials around them.
- B They contribute to global warming.
- C They damage living cells.
- D They sometimes glow in the dark.

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