



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

**TWENTY FIRST CENTURY SCIENCE (EXTENDED)**

**0608/02**

Paper 2 Multiple Choice

**May/June 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 Why are drugs often tested on animals?
- A to find out if they work and if they are safe
  - B to prevent the animals passing on diseases to humans
  - C to protect endangered animals from disease
  - D to work out how much money to charge for them
- 2 What would make it more likely for an organism to become extinct?
- A if a predator of the organism is introduced
  - B if more food becomes available for the organism
  - C if the environment stays the same
  - D if the organism is made a protected species
- 3 When did life on Earth first appear?
- A 3500 years ago
  - B 350 thousand years ago
  - C 3500 million years ago
  - D 35 billion years ago
- 4 Air quality would improve if more people travelled by bus instead of car.
- What is the best explanation for this?
- A Buses give out polluting gases.
  - B Buses have bigger engines than cars.
  - C Each car journey uses less fuel than each bus journey.
  - D The amount of pollution per passenger is less for a bus.

5 Look at the comments made by these two farmers.



Why do some organic crops contain harmful chemicals?

- A Crops take in toxic gases from the air.
  - B Harmful chemicals form in crops if they are not watered often enough.
  - C Nitrogen compounds in the soil produce harmful chemicals in the crops.
  - D When crops are stored, harmful moulds can grow on them.
- 6 Why are preservatives used in food?
- A They improve the flavour of food.
  - B They make food look more attractive.
  - C They prevent the growth of microbes in food.
  - D They reduce the energy content of the food.
- 7 How do scientists know so much about distant stars?
- A They have sent space probes to these stars.
  - B They have studied the radiation from these stars.
  - C They have talked to people who live on these stars.
  - D They have visited these stars.

8



Which statement best describes the girl's decision to fly on holiday?

- A She believes the benefit outweighs the risk.
- B She believes the risk outweighs the benefit.
- C She is aware of a risk and decides not to go ahead.
- D She is unaware of any risk, so she goes ahead.

9 What is **not** caused by global warming?

- A climate change
- B ice caps melting
- C rising sea levels
- D skin cancer

10 Which type of microorganism causes influenza?

- A a bacterium
- B a fungus
- C an antibiotic
- D a virus

11 The body's immune system tries to attack the microorganism that causes influenza.





Which method may the body use to do this?

- A Red blood cells make antibodies.
- B Red blood cells make antibiotics.
- C White blood cells make antibodies.
- D White blood cells make antibiotics.

The following information should be used to answer questions 12 and 13.

A combined vaccination is one injection containing several vaccines. Many people disagree about combined vaccinations.

Four people were asked their opinions about combined vaccinations.

 Penny	 Shireen
 Don	 Carol

Speech bubbles:

- Penny: Combined vaccinations put children's immune systems under too much stress at one time.
- Shireen: When a combined vaccination is split into three separate injections, cases of the three diseases go up.
- Don: Children only have to go once for a combined vaccination. Children may stop going for vaccinations if they have to go many times.
- Carol: Some children suffer from brain damage after having a combined vaccination.

12 Which people think that combined vaccinations are a good idea?

- A Carol and Penny
- B Don and Penny
- C Don and Shireen
- D Penny and Shireen

13 A doctor said,

'Children's immune systems can easily cope with the microorganisms used in vaccinations. A child's immune system is used to coping with many microorganisms at one time.'

This doctor's view could make one person change their ideas about combined vaccinations.

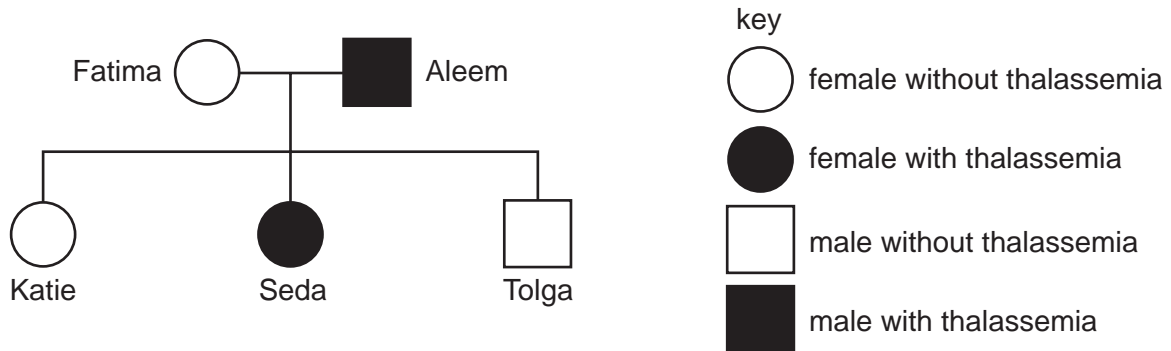
Which person is this?

- A Carol
- B Don
- C Penny
- D Shireen

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

Thalassaemia is a genetic condition, caused by a recessive allele.

The diagram shows a family tree.



**14** Katie is a carrier for thalassaemia.

Which other people are also carriers for thalassaemia?

- A** Aleem and Seda
- B** Fatima and Tolga
- C** Fatima only
- D** Tolga only

**15** Katie wants to marry a man who has thalassaemia.

What would be the probability of their first baby having thalassaemia?

- A** 0
- B**  $\frac{1}{3}$
- C**  $\frac{1}{2}$
- D**  $\frac{2}{3}$

The following information should be used to answer questions **16** and **17**.

A scientist takes measurements of sulfur dioxide in the air near a power station.

**16** Which process causes sulfur dioxide to form?

- A** incomplete combustion of fuel
- B** sulfur in the air reacts with oxygen at high temperatures
- C** sulfur in the fuel burns
- D** sunlight causes reactions in the smoke that leaves the chimney

17 The scientist takes five readings. The table shows the results collected.

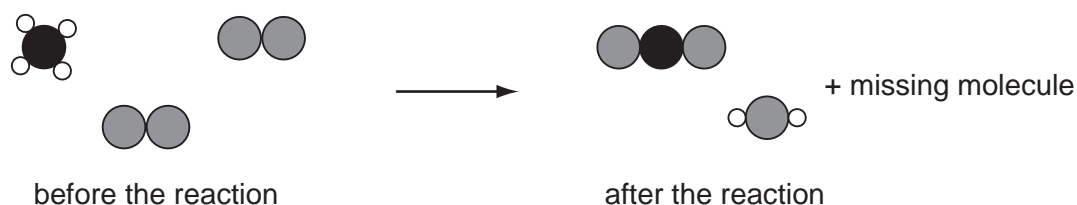
reading number	1	2	3	4	5
sulfur dioxide concentration in $\mu\text{g}/\text{m}^3$	322	318	307	311	312

Why did the scientist take five readings?

- A to find a correlation
- B to find out if the readings are reliable
- C to practise using the measuring device
- D to use one of the readings as a control

18 Methane gas is used as a fuel.

When methane burns, it reacts with oxygen to make carbon dioxide and water.



What is the missing molecule?

- A
- B
- C
- D

19 Electric cars run on a rechargeable battery. The battery is charged by plugging the car into mains electricity overnight.

Why will using electric cars improve air quality in towns?

- A A catalytic convertor will remove harmful gases from the car exhaust.
- B Generating electricity does not produce any air pollution in towns.
- C Less fossil fuel will be burned in power stations.
- D Less fossil fuel will be burned in towns.

20 All amino acids contain carbon and hydrogen atoms.

Which other elements do all amino acids contain?

- A calcium and nitrogen
- B nitrogen and oxygen
- C oxygen and calcium
- D potassium and phosphorus

21 Ultraviolet light can cause skin cancer.

What is the best explanation of this?

- A Ultraviolet light can heat up skin cells.
- B Ultraviolet light causes sunburn.
- C Ultraviolet light is an ionising radiation.
- D Ultraviolet light is next to X-rays in the electromagnetic spectrum.

22 A block diagram for a nuclear power station is shown.



What are the correct labels for X, Y and Z?

	X	Y	Z
<b>A</b>	generator	reactor	turbine
<b>B</b>	reactor	generator	turbine
<b>C</b>	reactor	turbine	generator
<b>D</b>	turbine	generator	reactor



The following information should be used to answer questions **23**, **24** and **25**.

Sue and Tim are discussing a new medical treatment which uses radioactive sources.

I think it is a good idea. The new treatment will be very safe. The government has said only trained doctors will be able to use it. It will help improve many people's lives and think how happy their families will be.



Sue

The treatment is very expensive and not everybody who needs it will be able to have it. It uses radiation which kills living cells and it cannot be completely safe. I don't think we should use it.



Tim

**23** Who talks about risks?

- A Sue
- B Tim
- C both Sue and Tim
- D neither Sue nor Tim

**24** Who talks about official regulations?

- A Sue
- B Tim
- C both Sue and Tim
- D neither Sue nor Tim

**25** Who talks about the economic cost?

- A Sue
- B Tim
- C both Sue and Tim
- D neither Sue nor Tim

26 What determines the sex of a human baby?

- A a combination of the baby's genes and the environment
- B a gene on the X chromosome
- C a gene on the Y chromosome
- D the number of Y chromosomes present

27 Strains of bacteria have appeared that are not affected by antibiotics.

What is the most likely reason for this?

- A A random mutation has produced bacteria that are resistant to the antibiotic.
- B Bacteria have mutated in order to become resistant to the antibiotic.
- C Resistant bacteria have been produced by gene therapy.
- D The bacteria have developed an immunity to the antibiotic.

28 Heart disease kills thousands of people in the USA every year.

Why is it difficult to decide why a person gets heart disease?

- A It is a rare disease and so the statistics are limited.
- B It is difficult to measure some of the risk factors for heart disease.
- C Many different microorganisms cause heart disease.
- D There are no genetic links to heart disease.

29 Many of our modern ideas about evolution were first suggested by Charles Darwin over 100 years ago. He suggested a process that may explain how organisms evolve.

What is the name of this process?

- A biodiversity
- B competition
- C natural selection
- D selective breeding

30 Darwin's theory was not accepted at first by other scientists but then gradually became accepted.

Which statement best explains why?

- A Darwin did not collect any proof for his theory but it did explain how characteristics were inherited.
- B Darwin was not a well known scientist but his theory did prove why the Earth was so old.
- C Darwin's theory did not explain any observations but was finally proved to be correct.
- D Darwin's theory upset many people but explained why living organisms shared many characteristics.

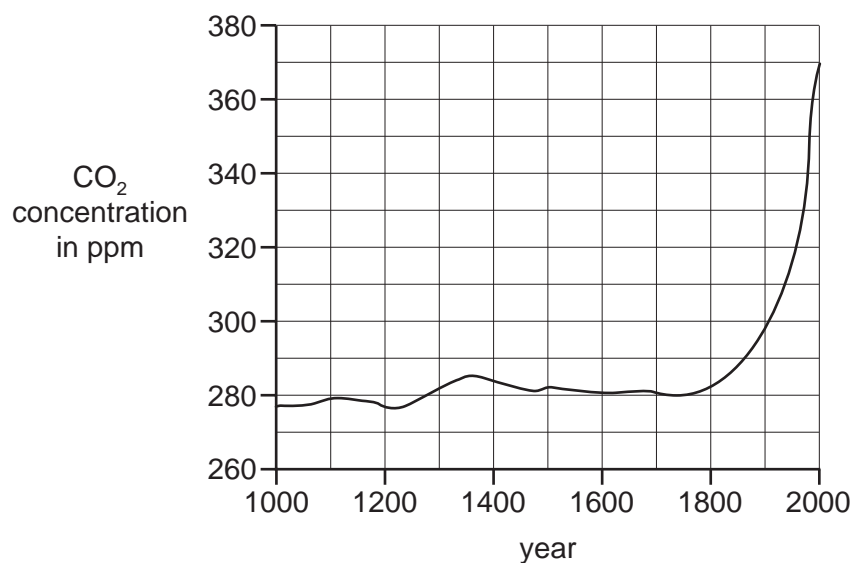
31 Some of the gases present in air are listed.

- 1 argon
- 2 carbon dioxide
- 3 carbon monoxide
- 4 nitrogen
- 5 nitrogen dioxide
- 6 oxygen

Which gases are **only** present in polluted air?

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

- 32 The graph shows how the concentration of carbon dioxide in the atmosphere has changed over time.



Which statement correctly describes the change in carbon dioxide concentration between the year 1000 and the year 2000?

- A The amount in the year 2000 is over five times greater.
  - B The concentration has increased at a steady rate.
  - C There has been an increase of about 30 %.
  - D There has been an increase of over 100 ppm.
- 33 Poly(ethene) is a polymer which has two different forms.
- Low density poly(ethene) (ldpe) has a lower melting point than high density poly(ethene) (hdpe).

Which statement gives the best explanation for this?

- A ldpe is more crystalline than hdpe.
- B The amount of energy needed to separate chains of hdpe is lower than for ldpe.
- C There are stronger forces between molecules of hdpe.
- D There is cross linking between chains of ldpe.

**34** The human body breaks down proteins into amino acids.

The next four stages in the processing of amino acids are shown below.

- 1 Urea passes out of the body in urine.
- 2 Urea is removed from the body by the kidneys.
- 3 Amino acids are absorbed into the blood.
- 4 Excess amino acids are broken down by liver cells to form urea.

What is the correct order for these stages?

- A** 3 → 2 → 4 → 1
- B** 3 → 4 → 2 → 1
- C** 4 → 2 → 3 → 1
- D** 4 → 3 → 2 → 1

**35** Ann's daughter suffers from asthma.

Ann reads a newspaper article that says a food additive known as E211 can make asthma worse in some children.

Four statements that Ann could make are listed.

Which statement is an example of the precautionary principle?

- A** Food labels tell us what additives are in foods so I can choose whether or not I buy it.
- B** I am not sure whether E211 is harmful but I won't let my daughter have any food or drink that contains it.
- C** My daughter's favourite drink contains E211 and it's never harmed her up to now.
- D** The food additives have all been safety tested so I am not sure how they can be harmful.

**36** Which electromagnetic wave is an ionising radiation?

- A** microwave
- B** radio
- C** visible light
- D** X-rays

- 37 The Sun produces a lot of ultraviolet radiation. Most of this radiation is absorbed by gases in the atmosphere.

What happens to the energy absorbed?

- A It causes reversible chemical changes.
- B It is radiated as violet light.
- C It is used in photosynthesis.
- D It produces a photon.

The following article should be used to answer questions 38, and 39.

Read the article. Each statement is labelled with a number.

### Planets Found Around Other Stars?

Some astronomers claim to have found evidence for planets around nearby stars.

- 1 They found very small changes in the brightness of some stars and very small wobbles in the position of the stars.
- 2 They think these are caused by planets orbiting these stars.
- 3 Some of the results have been published in peer reviewed scientific journals, but only very few have been repeated by other astronomers.
- 4 A newspaper article says this means there is life on worlds orbiting other stars.

- 38 Which statement from the article is data?

- A 1                      B 2                      C 3                      D 4

- 39 Which statement from the article is an explanation?

- A 1                      B 2                      C 3                      D 4

- 40 How fast does light travel in space?

- A 300 000 000 km/s
- B 300 000 km/s
- C 300 km/s
- D 3 km/s



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