



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

COMBINED SCIENCE

0653/11

Paper 1 Multiple Choice

May/June 2011

45 minutes

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

* 9 2 5 5 0 1 9 2 0 8 *

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.

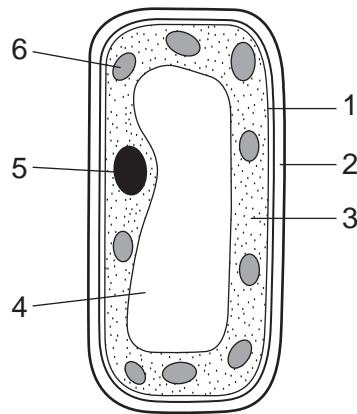
Any rough working should be done in this booklet.

A copy of the Periodic Table is printed on page 16.

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



1 The diagram shows a palisade cell.



Which parts are found in plant cells and **not** in animal cells?

| | 1 | 2 | 3 | 4 | 5 | 6 |
|----------|---|---|---|---|---|---|
| A | ✓ | x | ✓ | ✓ | x | x |
| B | ✓ | x | ✓ | x | ✓ | x |
| C | x | ✓ | x | ✓ | x | ✓ |
| D | x | ✓ | x | x | ✓ | ✓ |

key

✓ = found in plant cells only

x = not found in plant cells only

2 Which list shows substances each of which can diffuse into and out of cells?

- A** amino acids, glucose and oxygen
- B** carbon dioxide, cellulose and glucose
- C** carbon dioxide, oxygen and starch
- D** carbon monoxide, oxygen and protein

3 Where does most of the water enter a plant?

- A** guard cells
- B** mesophyll cells
- C** root hair cells
- D** xylem vessels

4 Which breakdown processes occur inside cells, and which occur outside cells?

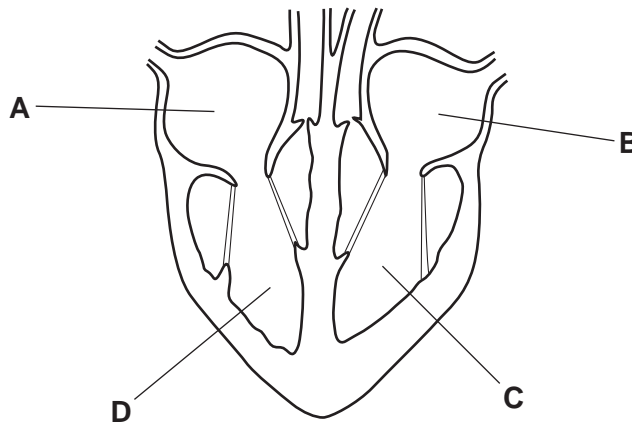
| | large molecules to small molecules for absorption | breakdown of glucose to release energy |
|----------|---|--|
| A | inside | inside |
| B | inside | outside |
| C | outside | inside |
| D | outside | outside |

5 Which health problems may result from smoking cigarettes?

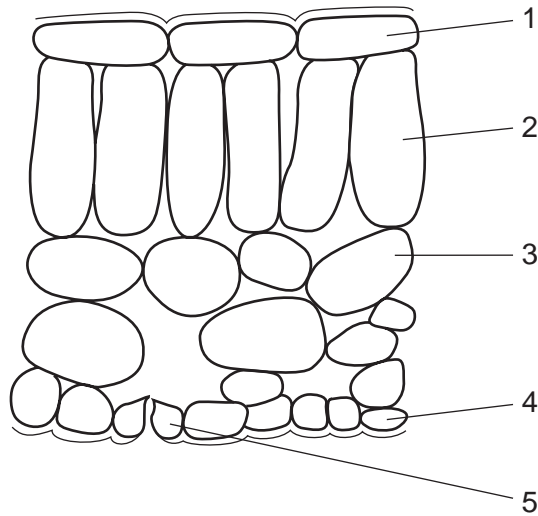
| | bronchitis | emphysema | lung cancer | |
|----------|------------|-----------|-------------|--------------------------|
| A | ✓ | ✓ | ✓ | key ✓ = yes x = no |
| B | ✓ | x | x | |
| C | x | ✓ | ✓ | |
| D | x | ✓ | x | |

6 The diagram shows the human heart in section.

Which chamber of the heart pumps blood the greatest distance?



- 7 The diagram shows the arrangement of cells in a vertical section of a leaf of a green plant. No cell contents are shown.



In which cells is light energy turned into chemical energy?

- A** 1, 2 and 4 **B** 1, 3 and 4 **C** 2, 3 and 5 **D** 2, 4 and 5
- 8 The statements describe events that occur when glucose is absorbed from the alimentary canal.
- 1 Blood sugar level falls.
 - 2 Blood sugar level rises.
 - 3 Insulin is released.
 - 4 Liver removes glucose from the blood.

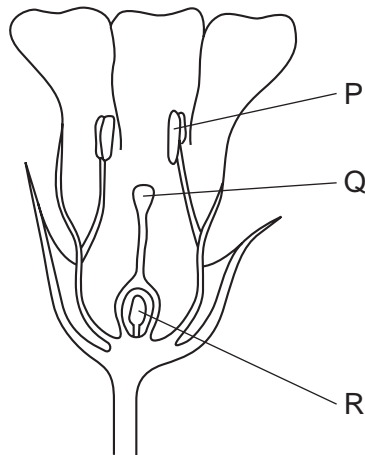
Which is the correct order of events?

- A** 2 → 3 → 4 → 1
B 2 → 4 → 3 → 1
C 3 → 2 → 4 → 1
D 4 → 1 → 3 → 2
- 9 What does the intra-uterine device (IUD) prevent?
- A** fertilisation of the egg
B implantation of the zygote
C release of eggs from the ovary
D sperms entering the uterus

10 Which feature **must** all members of the same clone of a plant have in common?

- A They all grow at the same rate.
- B They all grow from seeds.
- C They all have fruits of the same size.
- D They all have the same alleles.

11 The diagram shows a section through a flower.



Where are the male gametes made and where are the female gametes made?

| | male gametes | female gametes |
|----------|--------------|----------------|
| A | P | Q |
| B | P | R |
| C | Q | P |
| D | Q | R |

12 Which type or types of variation in organisms can be inherited?

| | variation caused by genes | variation caused by the environment |
|----------|---------------------------|-------------------------------------|
| A | ✓ | ✓ |
| B | ✓ | x |
| C | x | ✓ |
| D | x | x |

key
 ✓ = yes
 x = no

13 Deforestation in tropical rain forests can lead to

- A decreased carbon dioxide in the air.
- B decreased species diversity.
- C increased number of habitats.
- D increased oxygen in the air.

14 An atom is represented by the symbol ${}^{19}_{9}\text{X}$.

How many electrons, neutrons and protons are in this atom?

| | electrons | neutrons | protons |
|---|-----------|----------|---------|
| A | 9 | 9 | 9 |
| B | 9 | 10 | 9 |
| C | 10 | 10 | 9 |
| D | 19 | 9 | 10 |

15 Element X reacts with element Y to form compound XY. It also reacts with element Z to form compound XZ.

Compound XY is an electrolyte and compound XZ is a non-electrolyte.

Which row correctly shows whether elements X, Y and Z are metals or non-metals?

| | metals | non-metals |
|---|--------|------------|
| A | X | Y, Z |
| B | X, Z | Y |
| C | Y | X, Z |
| D | Y, Z | X |

16 The diagrams show four different mixtures of gases.

Which diagram represents a mixture containing **only** elements?

A B C D

key

-
-
- ⊗
- ⊘
-
- ⊙

different types of atom

17 Which equation is correctly balanced and shows the correct formulae?

- A $\text{H}_2 + \text{Cl}_2 \rightarrow \text{H}_2\text{Cl}_2$
- B $\text{H}_2 + \text{Cl}_2 \rightarrow 2\text{HCl}$
- C $2\text{H} + 2\text{Cl}_2 \rightarrow \text{H}_2\text{Cl}_2$
- D $2\text{H} + \text{Cl}_2 \rightarrow 2\text{HCl}_2$

18 The position in the Periodic Table of an element Q is shown.

Which description of Q is correct?

- A It is green and has diatomic molecules.
 - B It is soft and a good electrical conductor.
 - C It is very dense and has a high melting point.
 - D It reacts violently with cold water.
- 19 A new alloy is resistant to corrosion. It costs about the same as aluminium but it is slightly poisonous.

Its density compared with stainless steel and aluminium is shown.

| | aluminium | new alloy | stainless steel |
|---------------------------|-----------|-----------|-----------------|
| density/g/cm ³ | 2.7 | 2.8 | 7.9 |

What could this new alloy be used to make?

- A aircraft frames
- B cutlery
- C electrical insulators
- D food containers

20 Carbon monoxide gas is present in car exhausts.

Why is this gas a pollutant?

- A It causes acid rain.
- B It causes asthma.
- C It damages buildings.
- D It is poisonous.

21 Metal X reacts vigorously with dilute hydrochloric acid.

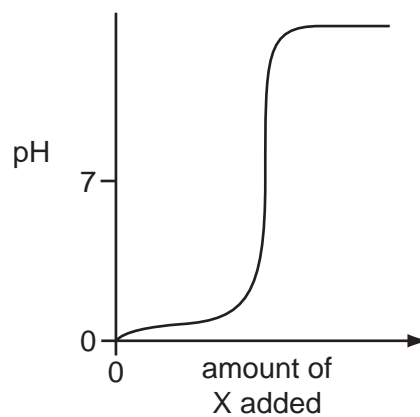
Salts of metal X give a red colour in a flame test.

What is X?

- A calcium
- B copper
- C potassium
- D sodium

22 Substance X is added to dilute sulfuric acid until reaction is complete.

The graph shows how the pH changes during the reaction.



Which type of substance is X?

- A base
- B catalyst
- C indicator
- D salt

23 Which chemical equation represents a thermal decomposition reaction?

- A $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$
 B $\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
 C $\text{H}_2 + \text{Cl}_2 \rightarrow 2\text{HCl}$
 D $\text{MgCO}_3 \rightarrow \text{MgO} + \text{CO}_2$

24 Element X is non-metallic.

It is used in the purification of water.

It is made by electrolysis of one of its salts.

At which electrode is it formed and what is its colour?

| | electrode | colour |
|----------|-----------|--------------|
| A | anode | red |
| B | anode | yellow-green |
| C | cathode | red |
| D | cathode | yellow-green |

25 Many industrial reactions use a catalyst.

What are the advantages of using a catalyst?

| | they are not used up in the reaction | they increase speed of the reaction | they increase the amount of product |
|----------|--------------------------------------|-------------------------------------|-------------------------------------|
| A | ✓ | ✓ | x |
| B | ✓ | x | x |
| C | x | ✓ | ✓ |
| D | x | ✓ | x |

key
 ✓ = true
 x = not true

26 Kerosene is a hydrocarbon fuel obtained from crude oil.

Which statement is correct?

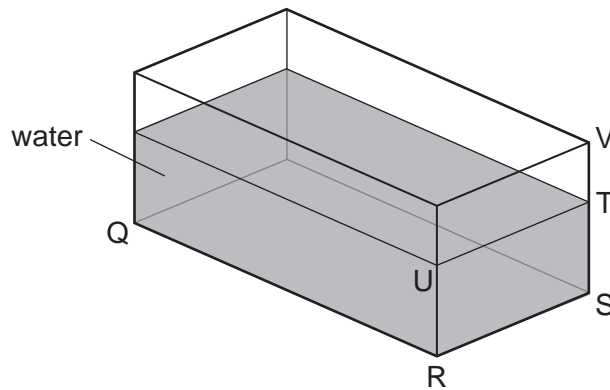
- A Kerosene burns to form carbon dioxide and water.
 B Kerosene contains the elements carbon, hydrogen and oxygen.
 C Kerosene is used as a fuel for cars.
 D The combustion of kerosene is an endothermic reaction.

27 Plastics are used as substitutes for natural materials.

Which statement about the manufacture of plastics is correct?

- A Plastics are made by breaking long-chain molecules into shorter chain ones.
- B Plastics are made by joining polymers together.
- C Plastics are made by fractional distillation of crude oil (petroleum).
- D Plastics are made by joining short-chain molecules together.

28 A glass tank contains some water.



The length QR and the width RS of the tank are known.

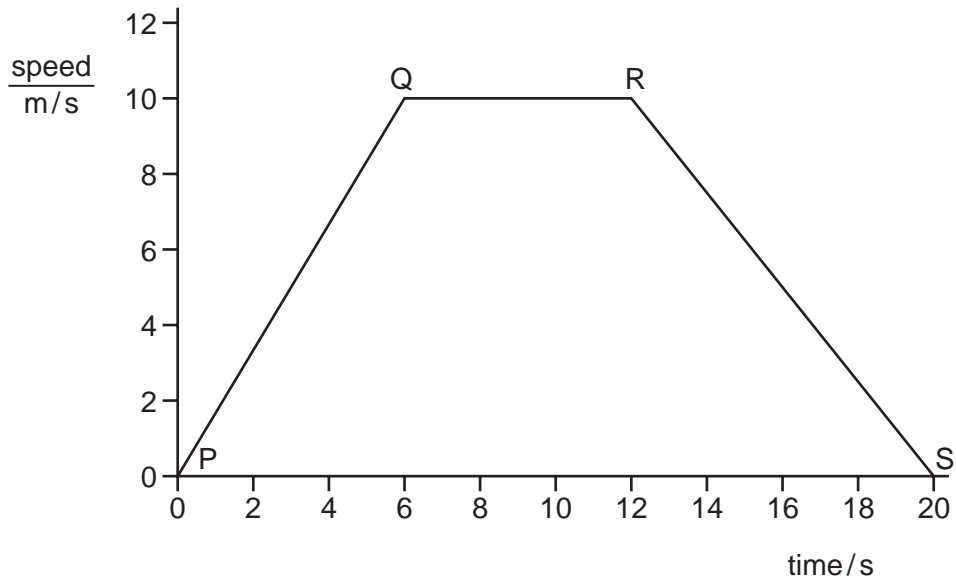
What other distance needs to be known in order to be able to calculate the volume of the water?

- A ST
- B SV
- C TU
- D TV

29 Which is the unit for force and which is the unit for weight?

| | force | weight |
|----------|-------|--------|
| A | kg | kg |
| B | kg | N |
| C | N | kg |
| D | N | N |

30 The graph shows how the speed of a car changes with time.



Between which points on the graph is the acceleration zero?

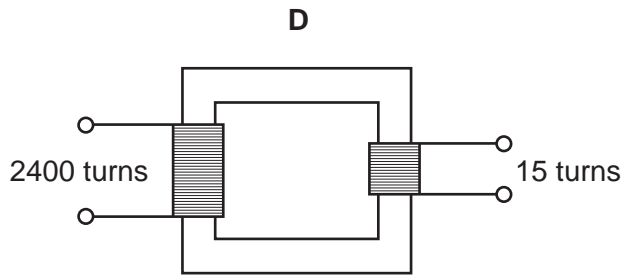
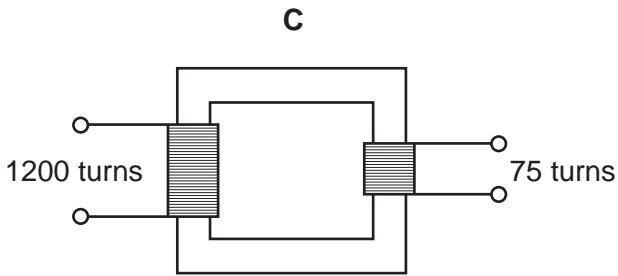
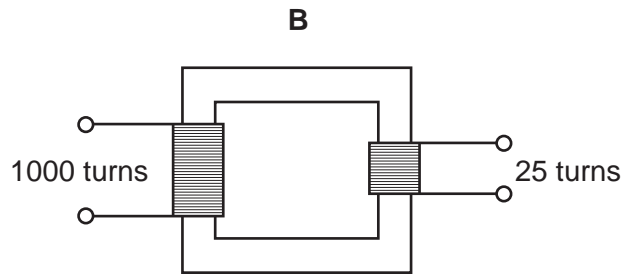
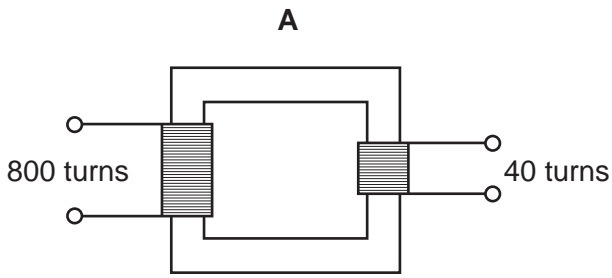
- A** PQ only **B** QR only **C** RS only **D** PQ and RS

31 A car takes 30 minutes to travel a distance of 60 km.

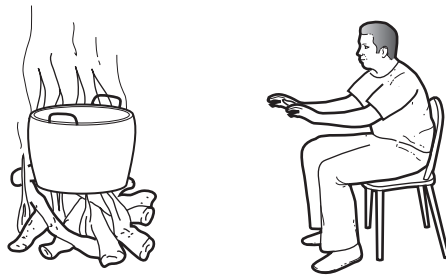
What is the average speed of the car?

- A** 2.0 km/hour
B 30 km/hour
C 120 km/hour
D 1800 km/hour

32 Which transformer would change a 240V a.c. input into a 15V a.c. output?



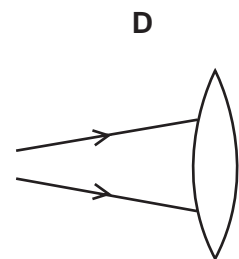
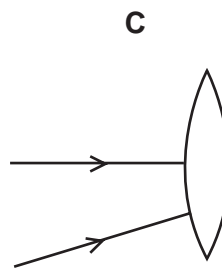
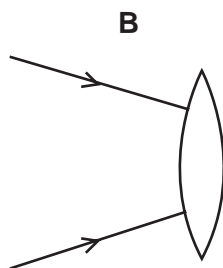
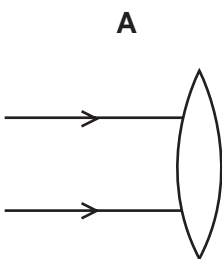
33 A man warms himself by a fire.



Which method of heat transfer supplies the **most** heat energy to him?

- A conduction through the air
- B convection by moving air
- C evaporation by moving water vapour
- D infra-red radiation

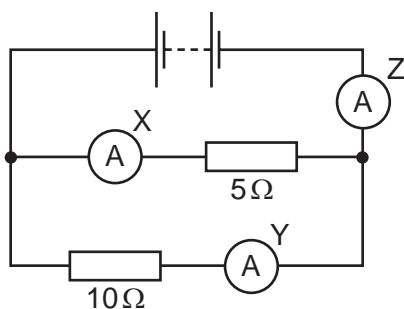
34 In which diagram will the two light rays shown both pass through the principal focus (focal point) of the lens after passing through the lens?



35 Which row shows the input energy and the output energy for a microphone?

| | input energy | output energy |
|----------|--------------|---------------|
| A | electrical | potential |
| B | electrical | sound |
| C | sound | electrical |
| D | sound | potential |

36 The diagram shows a circuit with three ammeters, X, Y and Z.

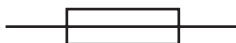


The ammeter readings are 1 A, 2 A and 3 A.

Which ammeter has which reading?

| | X | Y | Z |
|----------|-----|-----|-----|
| A | 1 A | 2 A | 3 A |
| B | 3 A | 2 A | 1 A |
| C | 2 A | 3 A | 1 A |
| D | 2 A | 1 A | 3 A |

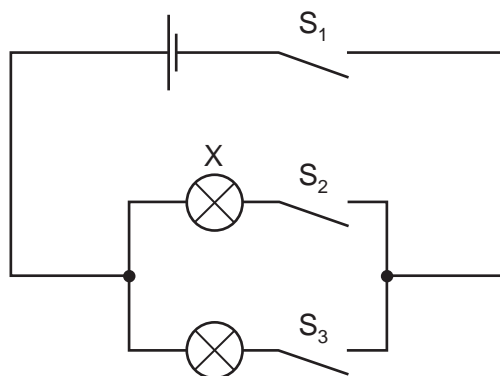
37 A circuit diagram contains the following symbol.



What does this symbol represent?

- A** a fixed resistor
- B** a fuse
- C** a relay
- D** a variable resistor

38 The diagram shows an electric circuit.



Which switches will have to be closed so that **only** bulb X will light?

- A S₁, S₂ and S₃
- B S₁ and S₂ only
- C S₁ and S₃ only
- D S₂ and S₃ only

39 A student copies a diagram of the electromagnetic spectrum but makes a mistake.

| | | | | | | |
|------------------|-------------|-----------------|---------------|------------------|-------------------|------------|
| radio waves | micro-waves | infra-red waves | visible light | X-rays | ultraviolet waves | gamma rays |
| large wavelength | | | | small wavelength | | |

Which **two** names should be interchanged so that the order is correct?

- A infra-red waves and ultraviolet waves
- B radio waves and infra-red waves
- C radio waves and visible light
- D X-rays and ultraviolet waves

40 Which type of radiation has the greatest ionising effect, and which is the most penetrating?

| | greatest ionising effect | most penetrating |
|---|--------------------------|------------------|
| A | alpha-particles | alpha-particles |
| B | alpha-particles | gamma-rays |
| C | gamma-rays | alpha-particles |
| D | gamma-rays | gamma-rays |

