Centre Number

Candidate Number

Name

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## CAMBRIDGE INTERNATIONAL EXAMINATIONS International General Certificate of Secondary Education

## **CO-ORDINATED SCIENCES**

0654/01

Paper 1 Multiple Choice

May/June 2003

45 minutes

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.

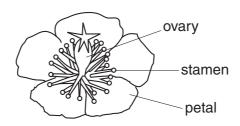
#### Read the instructions on the Answer Sheet very carefully.

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.

A copy of the Periodic Table is printed on page 20.

1 The diagram shows a flower.

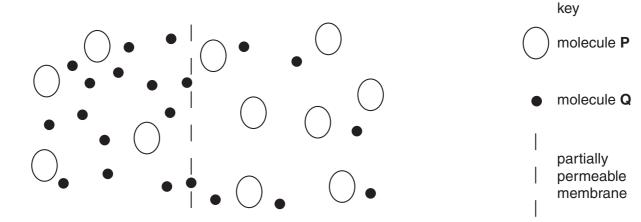


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Use the key to identify the flower.

1	Petals four Petals five	go to 2 go to 3
2	Ovary above the petals  Ovary below the petals	
3	Stamens less than five	

2 The diagram shows a partially permeable membrane through which molecules pass only by osmosis.

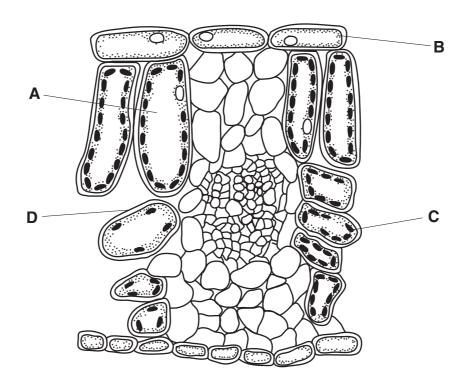


What is molecule **Q**?

- A amino acid
- **B** starch
- **C** sugar
- **D** water

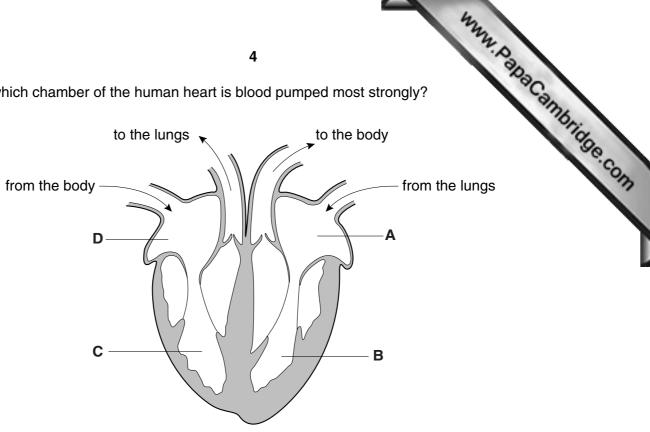
- 3 What is the main support for the stems of woody plants?
  - A cartilage
  - **B** lignin
  - C phloem
  - **D** turgidity
- 4 The diagram shows a section through a green leaf.

Where are carbohydrates made?



- **5** Which are products of respiration?
  - A carbon dioxide and nitrogen
  - B carbon dioxide and water
  - **C** nitrogen and water
  - **D** oxygen and carbon dioxide

From which chamber of the human heart is blood pumped most strongly? 6



Mackean (adapted)

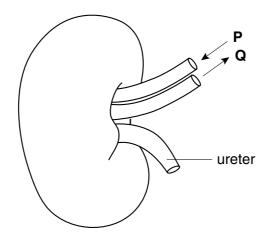
- 7 Which of the following is part of a haemoglobin molecule?
  - Α calcium
  - В iron
  - C vitamin C
  - D vitamin D
- The table shows the amount of protein and fat in 100 g samples of some foods. 8

foods	protein/g	fat/g
meat	18.0	17.0
bread	9.0	1.5
fish	18.0	0.5
eggs	13.0	11.0
potato chips	4.0	9.0

Which foods are the best value for body-building?

- Α bread and meat
- В bread and potato chips
- C meat and eggs
- D meat and fish

- 9 What is always released when respiration takes place?
  - A carbon dioxide
  - **B** energy
  - C lactic acid
  - **D** water
- 10 The diagram shows a human kidney and its blood supply.



Compared with the blood in vessel P, the blood in Q has

- A less urea and less oxygen.
- **B** less urea and more oxygen.
- **C** more urea and less oxygen.
- **D** more urea and more oxygen.
- 11 A student placed four sets of seeds in different conditions.

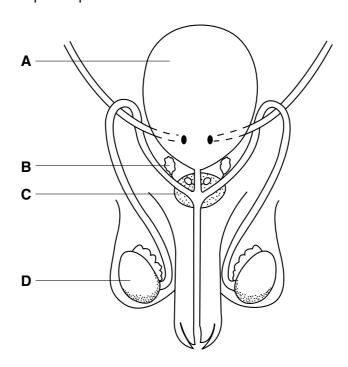
Which set of conditions must be kept constant to show the effect of temperature on germination?

- A temperature and water only
- B temperature only
- **C** temperature, water and oxygen
- **D** water, oxygen and light intensity

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**12** The diagram shows the human male reproductive system.

In which region are sperms produced?



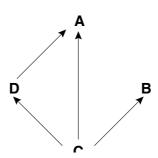
**13** A heterozygous tall plant was crossed with a pure-breeding short plant of the same species. The resulting seeds were collected and grown to produce the next generation.

What were the approximate percentages of tall and short offspring?

	percentage of tall offspring	percentage of short offspring
Α	25	75
В	50	50
С	75	25
D	100	0

14 The diagram shows a food web of four organisms. The arrows in the diagram show the flow of energy in the food web.

Which organism is a producer?



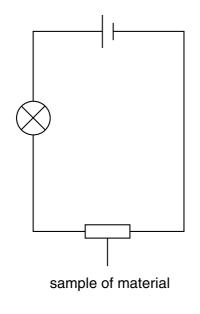
What happens?

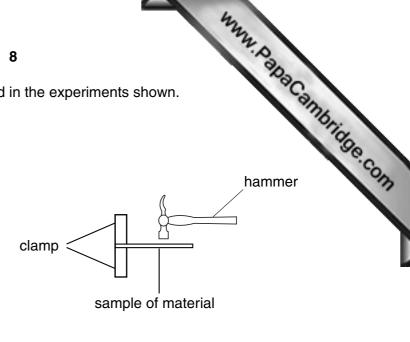
- Atoms of water are formed.
- В The element water is formed.
- C The compound water is formed.
- D The mixture water is formed.
- 16 Element X can form 4 covalent bonds. Element Y can form 2 covalent bonds.

What is the simplest formula of the compound formed by X and Y?

- A  $XY_2$
- $\mathbf{B} \quad \mathbf{X_2Y}$
- $D X_4Y_2$

17 Samples of four different materials are tested in the experiments shown.





experiment 1

experiment 2

The results are given in the table.

Which material is a metal?

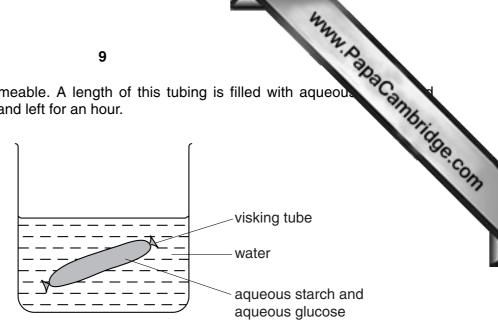
material	experiment 1	experiment 2
Α	lamp does not light	bends
В	lamp does not light	breaks
С	lamp lights	bends
D	lamp lights	breaks

18 Which words correctly complete the gaps below?

Molecules of .......1....... join together to form ......2....... that is thermoplastic and .....3..... on heating.

	gap 1	gap 2	gap 3
A	a monomer	a polymer	hardens
В	a monomer	a polymer	softens
С	a polymer	a monomer	hardens
D	a polymer	a monomer	softens

19 Visking tubing is partially permeable. A length of this tubing is filled with aqueous glucose, placed in pure water and left for an hour.



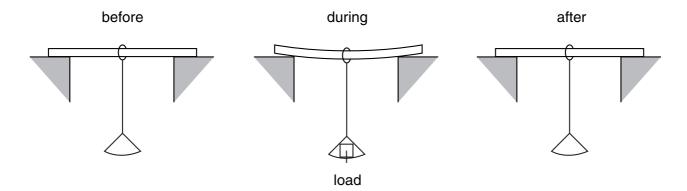
lodine tests and Benedict's tests are then carried out. The results are shown below.

liquid tested	iodine test	Benedict's test
inside visking tubing	blue/black	orange/red suspension
outside visking tubing	no change	orange/red suspension

Which substances can pass through the tubing?

- Α both glucose and starch
- В only glucose
- C only starch
- D neither glucose nor starch

#### 20 A material is tested as shown.



Which property of the material is being tested?

- Α elasticity
- В electrical conductivity
- C hardness
- D norosity

21 The names and formulae of four minerals are shown.

Which mineral does **not** contain a metallic element?

 $\begin{array}{ll} \text{bauxite} & \text{A}l_2\text{O}_3 \\ \\ \text{galena} & \text{PbS} \\ \\ \text{horn silver} & \text{AgC}l \\ \\ \text{quartz} & \text{SiO}_2 \\ \end{array}$ 

- A bauxite
- **B** galena
- C horn silver
- **D** quartz
- 22 The catalytic converter in the exhaust of a car brings about the following reaction.

2NO + 2CO 
$$\longrightarrow$$
 2CO<sub>2</sub> + N<sub>2</sub>

Which changes take place?

	oxidation	reduction
Α	1	✓
В	✓	×
С	X	✓
D	×	×

23 Tests on some 10 cm<sup>3</sup> samples of tap water give the following results.

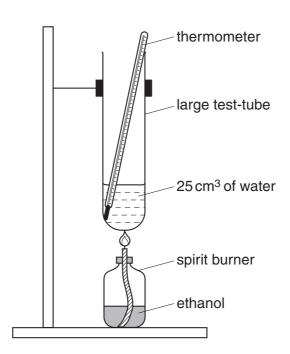
test	result
add 2 cm <sup>3</sup> of soap solution and shake	no lather
boil the tap water, add 2 cm <sup>3</sup> of soap solution and shake	lather
add acidified aqueous barium nitrate	white precipitate

What do the results show about the tap water?

- **A** It is hard and contains chloride ions.
- **B** It is hard and contains sulphate ions.
- **C** It is soft and contains chloride ions.
- **D** It is soft and contains sulphate ions.

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- 24 Which of the following is formed as a result of the weathering of rocks?
  - **A** limestone
  - **B** methane
  - C soil
  - **D** water
- 25 Which metal is used with aqueous sodium hydroxide to test for nitrate ions in solution?
  - **A** aluminium
  - **B** copper
  - **C** magnesium
  - **D** tin
- 26 Ethanol is burnt in a spirit burner as shown.



The mass of the burner and its contents is measured before and after the experiment. The thermometer is read before and after the experiment.

## What are the expected results?

	mass of burner and contents	thermometer reading
Α	decreases	increases
В	decreases	stays the same
С	increases	increases
D	increases	stays the same

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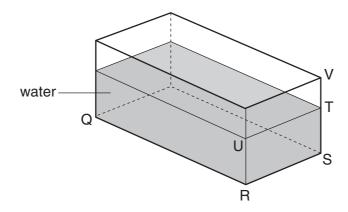
27 The order of reactivity of three metals X, Y and Z is shown.



Which statement is correct?

- A X displaces Y from its salts.
- **B X** displaces **Z** from its salts.
- C Y displaces Z from its salts.
- **D Z** displaces **X** from its salts.

28 A glass tank contains some water.



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

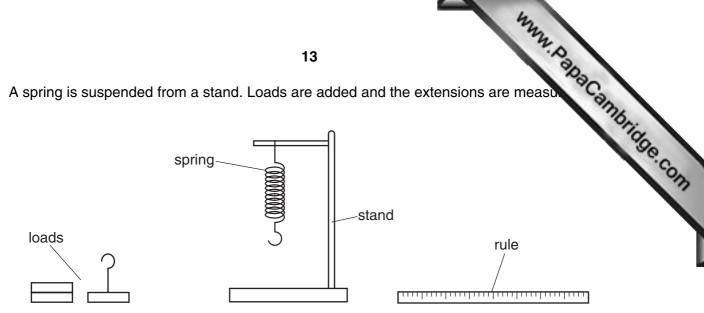
What other distance needs to be measured in order to be able to calculate the volume of the water?

- A ST B SV C TU D TV
- 29 A tunnel has a length of 50 km. A car takes 20 min to travel between the two ends of the tunnel.

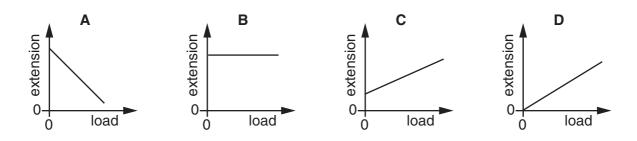
What is the average speed of the car?

- **A** 2.5 km/h
- **B** 16.6 km/h
- C 150 km/h
- **D** 1000 km/h

30 A spring is suspended from a stand. Loads are added and the extensions are measure



Which graph shows the result of plotting extension against load?



**31** When water evaporates, some molecules escape.

Which molecules escape?

- Α the molecules at the bottom of the liquid with less energy than others
- В the molecules at the bottom of the liquid with more energy than others
- C the molecules at the surface with less energy than others
- D the molecules at the surface with more energy than others
- 32 A person holds a glass beaker in one hand and fills it quickly with hot water. It takes several seconds before his hand starts to feel the heat.

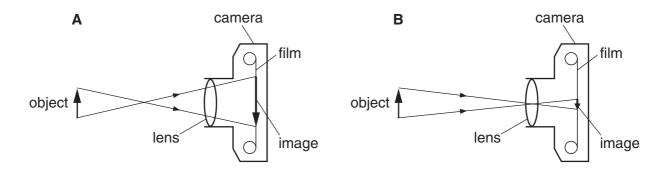
Why is there this delay?

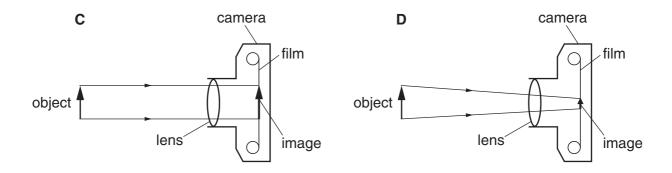
- Α Glass is a poor conductor of heat.
- В Glass is a good conductor of heat.
- C Water is a poor conductor of heat.
- D Water is a good conductor of heat.

- www.PapaCambridge.com What causes refraction when light travels from air into glass?
  - Α The amplitude of the light waves changes.
  - В The colour of the light changes.
  - C The frequency of the light waves changes.
  - D The speed of the light changes.
- A woman tunes her radio to a station broadcasting on 200 m.

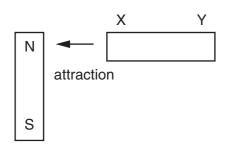
What does the 200 m tell her about the radio wave?

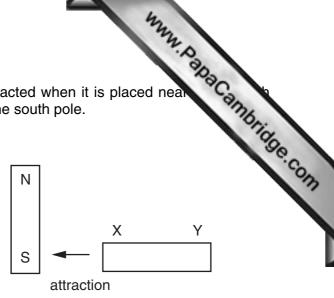
- Α its amplitude
- В its frequency
- C its speed
- D its wavelength
- Which diagram correctly shows rays passing through a camera lens?





36 A metal rod XY is placed near a magnet. End X is attracted when it is placed near pole of the magnet, and also when it is placed near to the south pole.





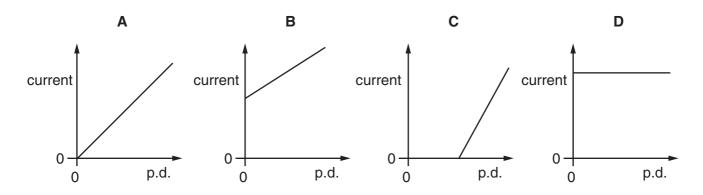
How does end Y behave when it is placed, in turn, near to the two poles of the magnet?

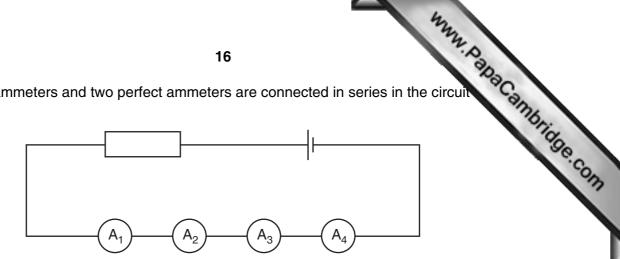
	Y near north pole	Y near south pole
Α	attraction	attraction
В	attraction	repulsion
С	repulsion	attraction
D	repulsion	repulsion

**37** When the potential difference (p.d.) across a piece of resistance wire is changed, the current through the wire also changes.

The temperature of the wire is kept the same.

Which graph shows how the p.d. and current are related?





The readings on the ammeters are

- $A_1$  2.9 A
- A<sub>2</sub> 3.1 A
- A<sub>3</sub> 3.1 A
- A<sub>4</sub> 3.3 A

Which two ammeters are faulty?

- ${f A}$   ${f A}_1$  and  ${f A}_2$   ${f B}$   ${f A}_1$  and  ${f A}_4$   ${f C}$   ${f A}_2$  and  ${f A}_3$   ${f D}$   ${f A}_3$  and  ${f A}_4$
- **39** Which type of radiation can be stopped by a sheet of paper?
  - Α  $\alpha$ -particles
  - β-particles В
  - С γ-rays
  - D X-rays
- The half-life of a radioactive substance is 5 hours. A sample is tested and found to contain 0.48 g of the substance.

How much of the substance was present in the sample 20 hours before the sample was tested?

- Α  $0.03\,\mathrm{g}$
- В 0.12 g
- C 1.92 g
- D 7.68 g

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	<b>Elements</b>
DATA SHEET	The Periodic Table of the

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	38	39	40	41	42	43	44		46	47	48	49	50	51	52	53	54
133	137	139	178	181	184		190		195	197	201	204		209			
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a = relative atomic mass	X = atomic symbol	b = proton (atomic) number
В	×	b
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58	59	09	61	62	63	64	65	99	29	89	69	70	71
232 <b>Tb</b> Thorium	<b>Pa</b> Protactinium	238 Uranium	Neptunium	<b>Pu</b> Plutonium	<b>Am</b> Americium	Curium	<b>B</b> erkelium	<b>Cf</b> Californium	<b>E</b> S	<b>Fm</b> Femium	<b>Md</b> Mendelevium	<b>N</b> obelium	Md No Lr
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