

CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

COMBINED SCIENCE

5129/01

Paper 1 Multiple Choice

October/November 2003

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 in this paper. Answer **all** questions. For each question there are four possible answers, **A, B, C** and **D**.

Choose the **one** you consider to be correct and record your choice in **soft pencil** on the separate answer sheet.

Read very carefully the instructions on the answer sheet.

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.

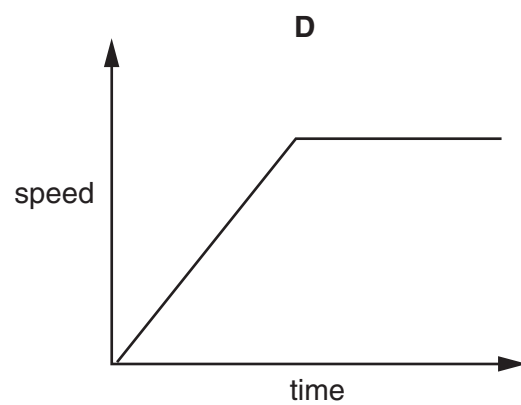
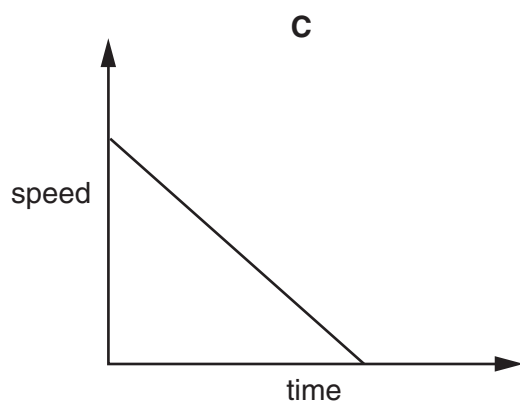
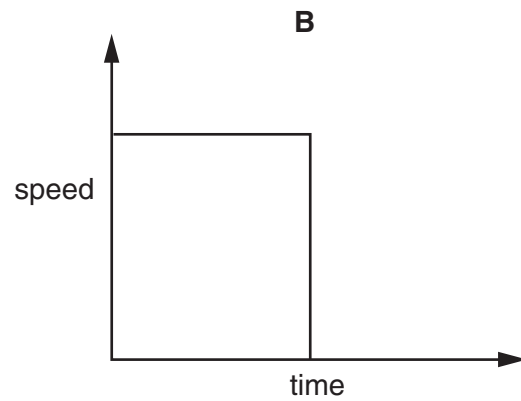
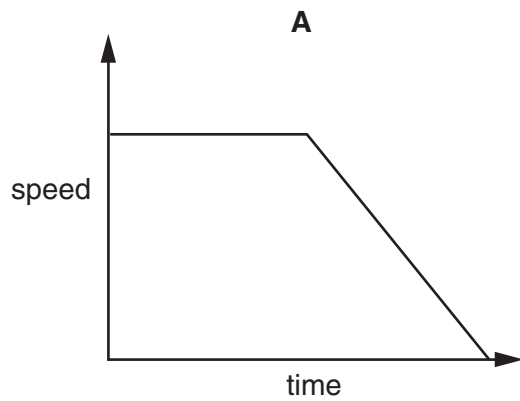
A copy of the Periodic Table is included on page 16.

This document consists of **16** printed pages.



- 1 A car is driven at constant speed. The brakes apply a uniform acceleration and it comes to rest sometime later.

Which graph best illustrates the motion of the car?



- 2 An object weighs 8.5 N on the Moon. The gravitational field strength on the Moon is 1.7 N/kg

What is the mass of the object?

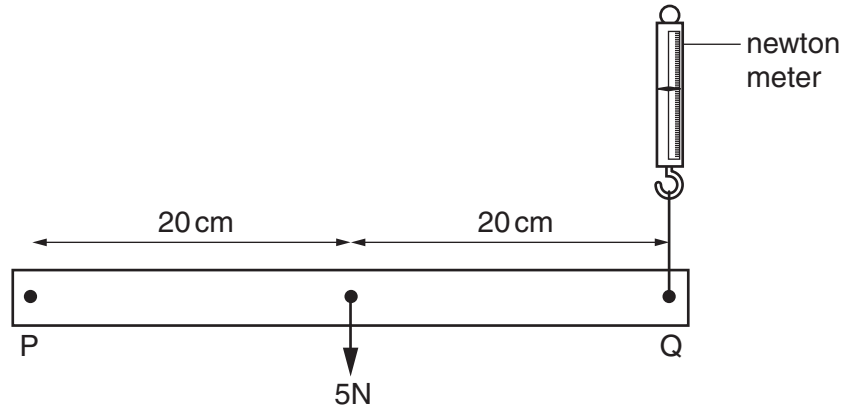
- A** 0.2 kg **B** 5.0 kg **C** 6.8 kg **D** 14.5 kg

- 3 In an experiment, to calculate the density of water, a beaker is partly filled with water.

Which mass and volume readings are needed?

	mass of	volume of
A	beaker	beaker
B	beaker	water
C	water	beaker
D	water	water

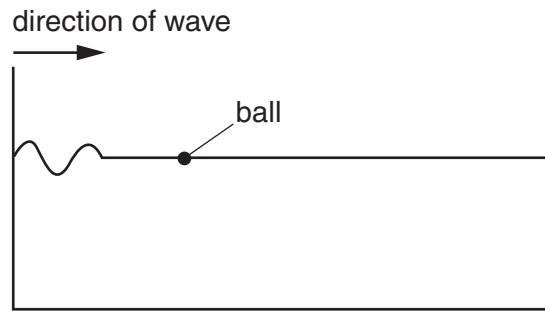
- 4 A metal bar, PQ, has a weight of 5 N and is pivoted at P.
It is held horizontal by a newton meter acting at Q.



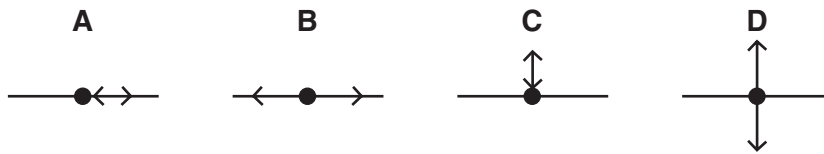
What is the reading on the newton meter?

- A** 2.5 N **B** 5 N **C** 8 N **D** 10 N
- 5 In an energy transformation sequence which of the following produces kinetic energy from gravitational potential energy as part of the sequence?
- A** burning fuel in a power station
B generating hydroelectric energy
C generating energy in a nuclear power station
D generating energy in a geothermal power station
- 6 A thermometer uses a physical property that varies with temperature.
Which of the following could **not** be used as the basis for a thermometer?
- A** e.m.f. developed by two metals joined together
B length of a thread of mercury
C volume of a fixed mass of air
D weight of a fixed mass of air

- 7 The diagram shows a ball floating in a tank of water.



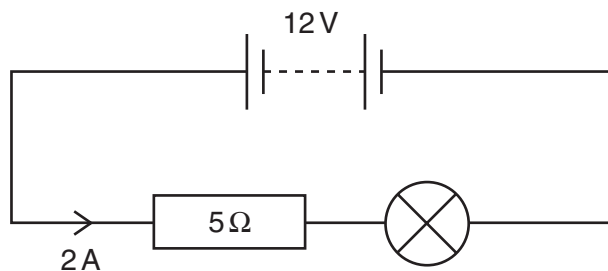
Which diagram shows the movement of the ball when the wave passes?



- 8 Zinc and steel scrap are separated using an electromagnet made of copper wire wound around an iron core.

Which of the materials in this process are non-magnetic?

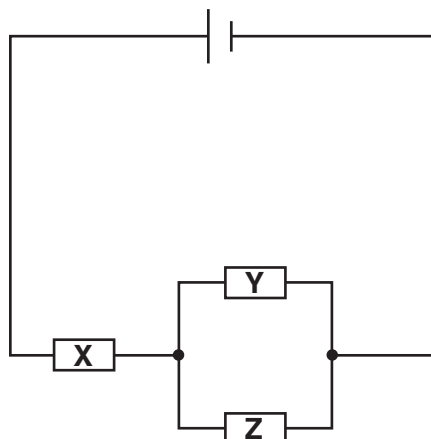
- A copper and steel
 - B copper and zinc
 - C iron and steel
 - D iron and zinc
- 9 The diagram shows the value of various quantities in a circuit.



What is the potential difference across the resistor?

- A 2V
- B 5V
- C 10V
- D 12V

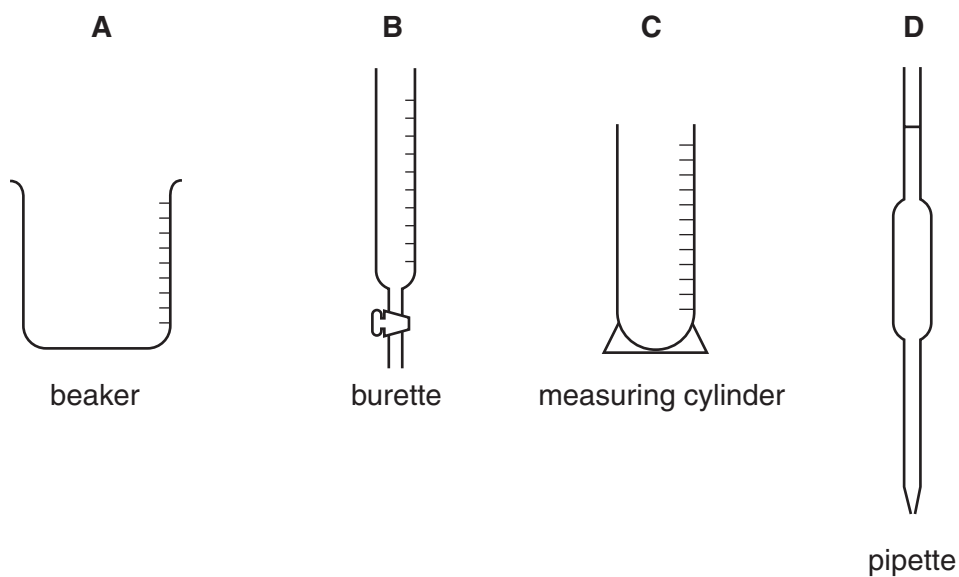
- 10 The diagram shows a simple d.c. circuit. The resistances of the three resistors **X**, **Y** and **Z** are equal.



The current in

- A** **Y** is larger than **X** and equal to **Z**.
B **Y** is larger than **X** and larger than **Z**.
C **Y** is smaller than **X** and equal to **Z**.
D **Y** is smaller than **X** and larger than **Z**.
- 11 A light bulb is marked 120 V, 60 W.
 How much energy does one bulb dissipate in one minute?
- A** 2 J
B 60 J
C 120 J
D 3600 J
- 12 Why are slip rings used in an a.c. generator?
- A** They connect the coil to the external circuit.
B They convert mechanical energy into electrical energy.
C They produce the induced e.m.f.
D They reduce the friction so that the coil can turn more easily.
- 13 When an animal dies, each gram of carbon in its body emits about 16 beta-particles each minute. Some animal remains are discovered that emit about 4 beta-particles each minute from each gram of carbon.
 How old are the animal remains, assuming that the half-life of radioactive carbon is 6000 years?
- A** 1500 years **B** 3000 years **C** 12 000 years **D** 24 000 years

14 Which piece of apparatus is used to measure exactly 22.5 cm^3 of a liquid?



15 What can be deduced from the symbol ${}^4_2\text{He}$?

- A An atom of helium contains 2 electrons.
- B An atom of helium has 2 protons and 4 neutrons in its nucleus.
- C Helium has a proton (atomic) number of 4.
- D Helium occurs as a diatomic molecule.

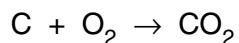
16 Substance **X** has the following properties

- 1 it conducts electricity when molten
- 2 it has a high melting point
- 3 it dissolves in an aqueous solution of hydrochloric acid

What is **X**?

- A copper
- B ethanol
- C iodine
- D sodium chloride

- 17 A 6 g sample of pure carbon is completely burned in oxygen.



Which mass of carbon dioxide is produced?

- A 12 g
B 22 g
C 38 g
D 44 g
- 18 Which word describes the reaction between hydrochloric acid and sodium hydroxide?
- A electrolysis
B neutralisation
C precipitation
D thermal decomposition
- 19 Four aqueous solutions have the pH values shown in the table.

solution	P	Q	R	S
pH	2	6	8	10

If pairs of solutions are mixed, which pair **must** produce an acidic mixture?

- A P and Q B P and R C P and S D Q and R
- 20 Which two substances react to form a salt and water only?
- A dilute ethanoic acid and aqueous sodium hydroxide
B dilute hydrochloric acid and zinc
C dilute sulphuric acid and aqueous sodium carbonate
D aqueous silver nitrate and aqueous sodium chloride
- 21 Which arrangement of electrons is that of a gas normally used to fill light bulbs?

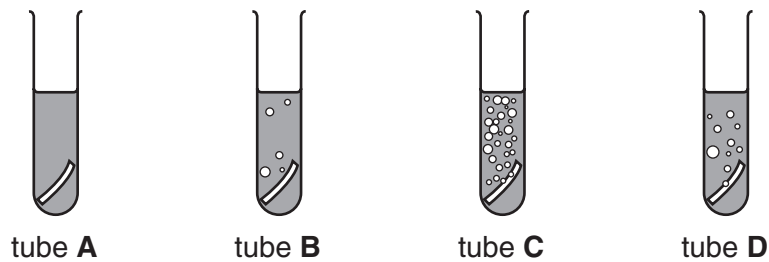
- A 2 B 2, 6 C 2, 8, 2 D 2, 8, 8

22 What is used to decide the order of the elements in the Periodic Table?

- A density
- B number of neutrons
- C number of protons
- D relative atomic mass

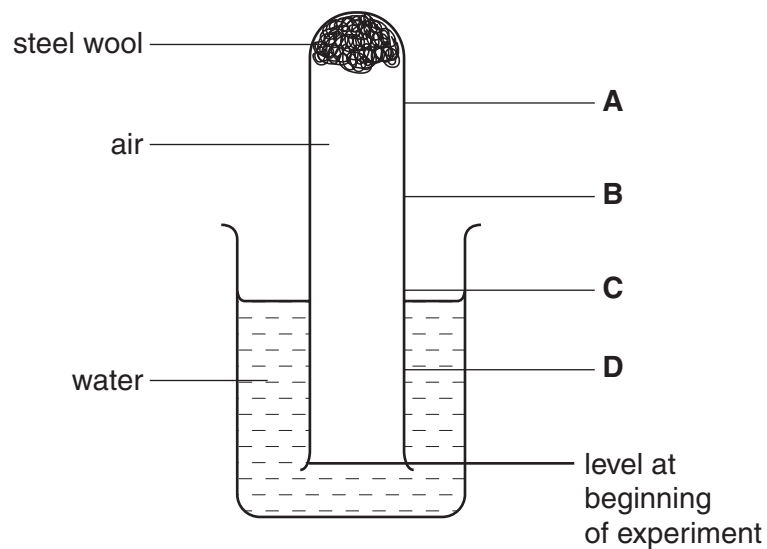
23 The metals iron, lead, magnesium and zinc are each added to dilute hydrochloric acid.

Which tube contains magnesium and dilute hydrochloric acid?



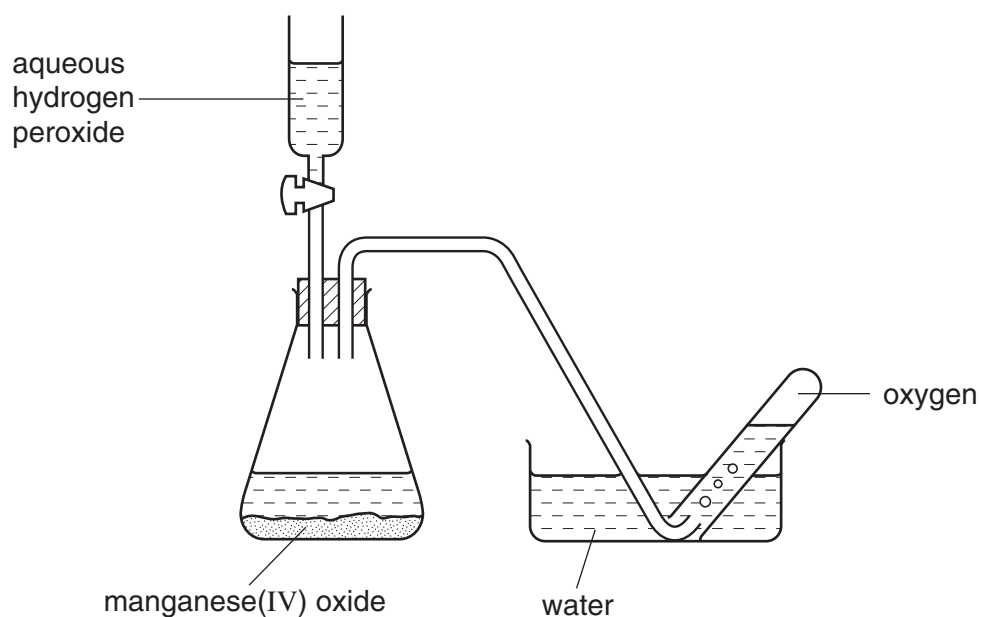
24 The diagram shows steel wool inside a test-tube. The test-tube is inverted in water, trapping air inside.

What will be the water level after several days?



- 25 Using manganese(IV) oxide as a catalyst, aqueous hydrogen peroxide decomposes to form oxygen.

This reaction was used to make and collect oxygen as shown in the diagram.



The first few test-tubes of collected gas should be rejected because the oxygen would be contaminated by

- A air.
 - B hydrogen.
 - C hydrogen peroxide.
 - D manganese(IV) oxide.
- 26 A sample of polluted air is bubbled through water.

The pH of the solution formed is less than 7.

Which gas causes this?

- A ammonia
- B carbon monoxide
- C nitrogen
- D sulphur dioxide

27 When crude oil is distilled, several products are obtained.

What is the correct order of their boiling points?

	lowest boiling point \longrightarrow			highest boiling point
A	diesel	paraffin	petrol	lubricating oil
B	paraffin	petrol	lubricating oil	diesel
C	petrol	paraffin	diesel	lubricating oil
D	petrol	diesel	lubricating oil	paraffin

28 Which structures are present in animal cells?

	cell membrane	cell wall	cytoplasm
A	x	✓	✓
B	✓	x	✓
C	✓	✓	x
D	✓	✓	✓

key

✓ = structure present
x = structure absent

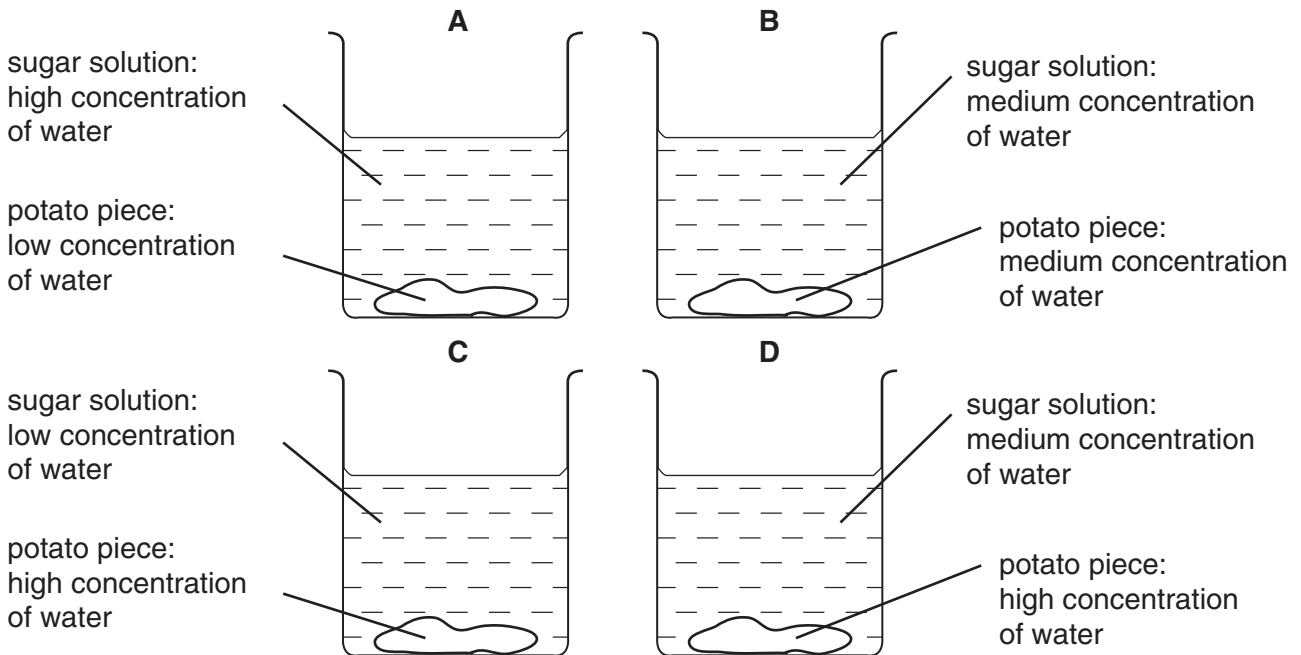
29 The table shows the main functions of red blood cells and root hair cells.

Which row is correct?

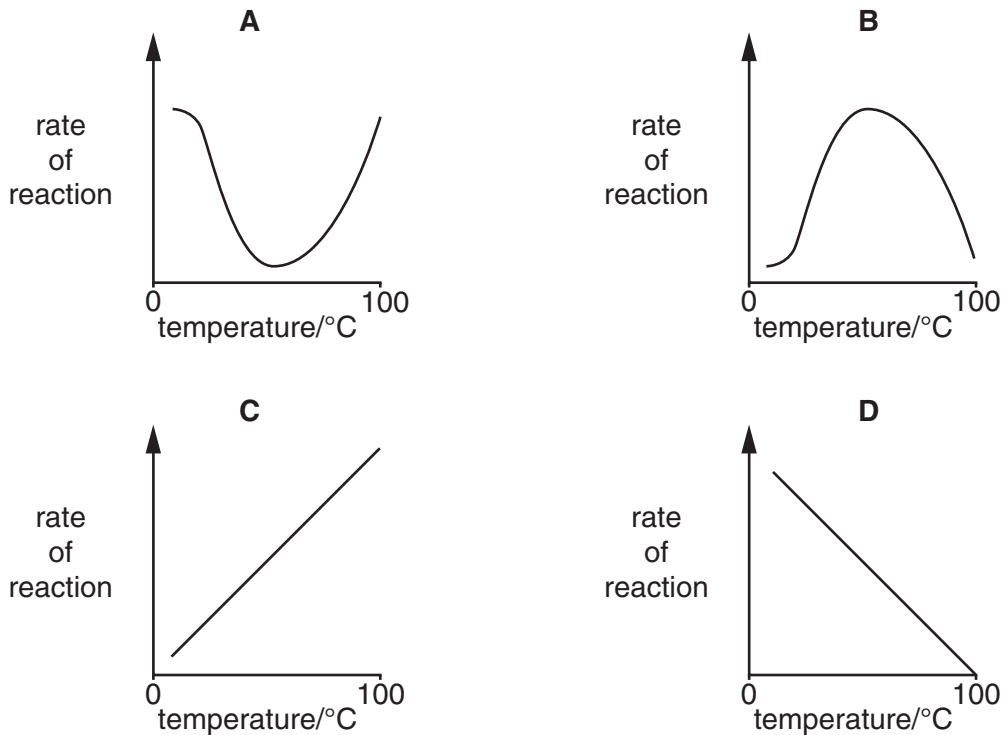
	red blood cell	root hair cell
A	absorption	absorption
B	absorption	transport
C	transport	absorption
D	transport	transport

30 The diagrams show some pieces of potato in four sugar solutions with different concentrations of water.

In which solution will the potato piece take up water from the solution and swell?

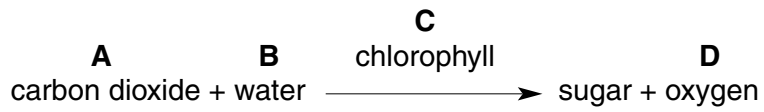


31 Which graph shows the effect of temperature on an enzyme-controlled reaction?



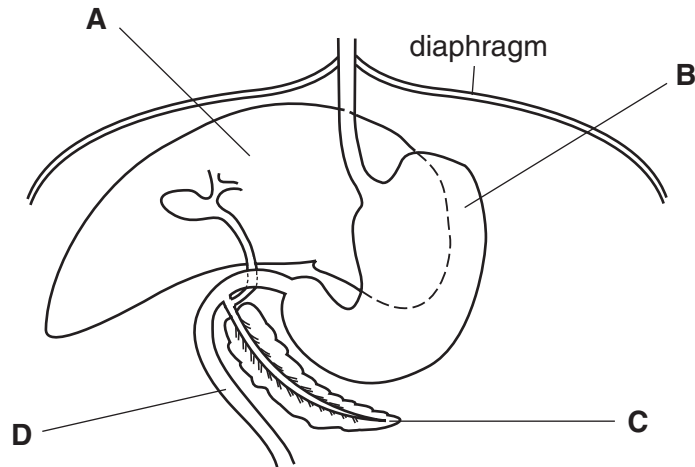
32 The word equation represents the overall chemical reactions of photosynthesis.

Which labelled substance traps light energy?



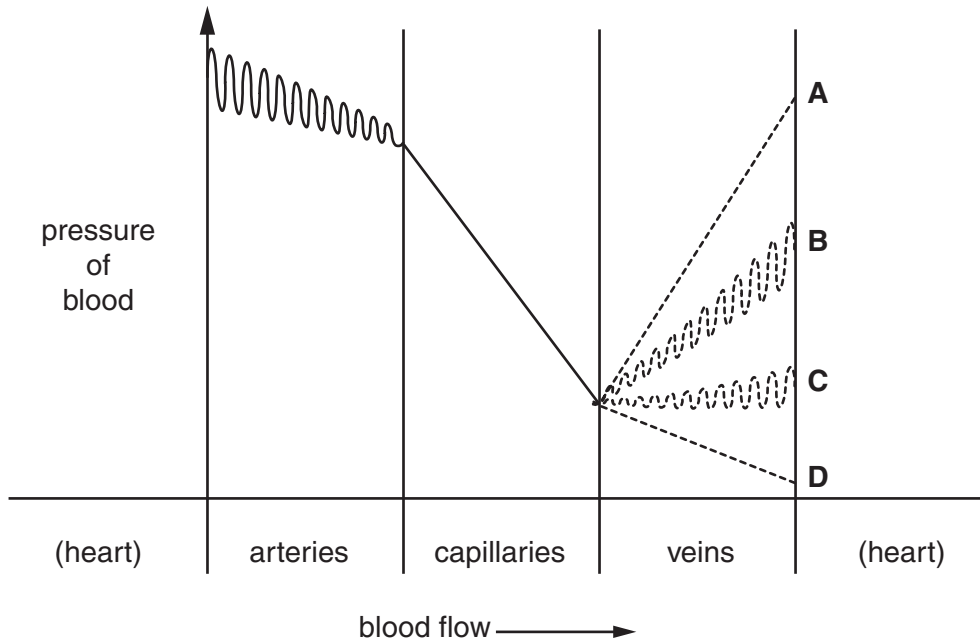
33 The diagram shows part of the human digestive system.

Which part secretes an acidic digestive juice containing a protease?



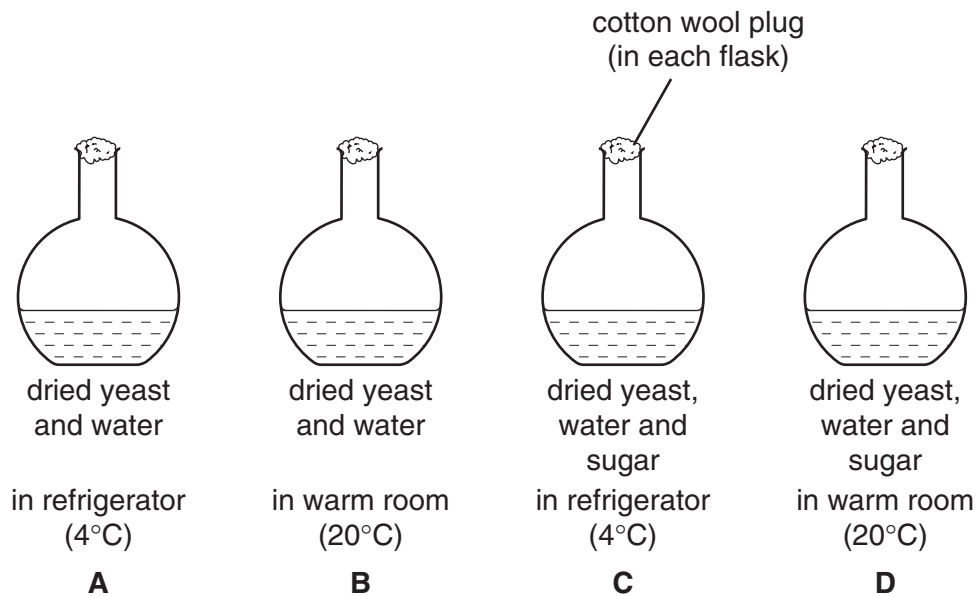
- 34 The diagram shows the pressure of blood after it leaves the heart and passes through arteries and then capillaries.

Which dotted line shows the pressure of blood as it flows through veins before returning to the heart?

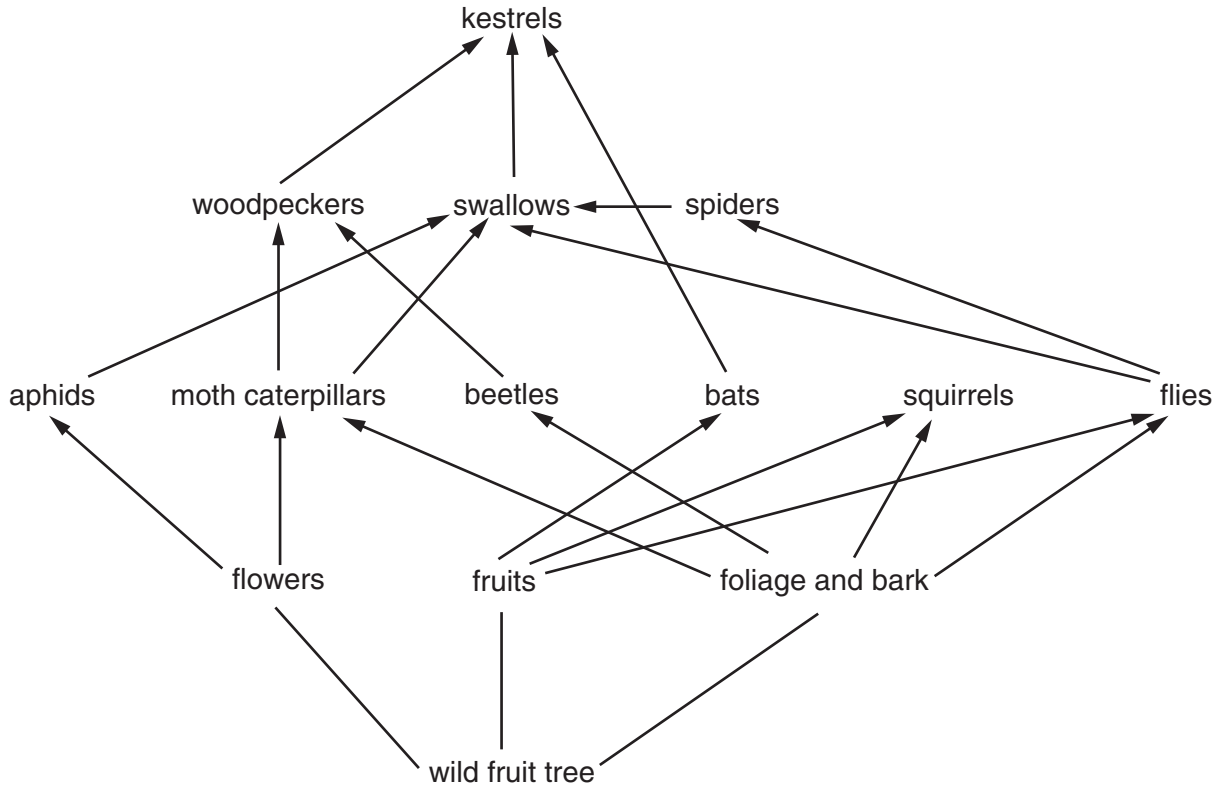


- 35 Four flasks were sterilised and set up as shown in the diagram.

Which flask will show signs of fermentation (anaerobic respiration) after one hour?



36 The diagram shows a food web on a wild fruit tree.



Which animals would be most affected, if the flowers of the tree were **not** pollinated?

- A aphids
- B bats
- C kestrels
- D squirrels

37 When does an ecosystem such as a tropical rainforest absorb or release carbon dioxide?

	in daylight	in darkness
A	absorbs	absorbs
B	absorbs	releases
C	releases	absorbs
D	releases	releases

38 In recent years, important rivers in many parts of the world have become more acidic.

What has caused this change?

- A air pollution by sulphur dioxide
- B heavy metals
- C increased use of insecticides
- D increased use of nitrate fertilisers

39 Which structures protect the flower when it is a bud?

- A anthers
- B carpels
- C petals
- D sepals

40 What is happening when gametes are released by the human female?

- A fertilisation
- B implantation
- C menstruation
- D ovulation

DATA SHEET
The Periodic Table of the Elements

		Group									
I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
		1 H Hydrogen 1									
7 Li Lithium 3	9 Be Beryllium 4										
23 Na Sodium 11	24 Mg Magnesium 12	11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10				
39 K Potassium 19	40 Ca Calcium 20	27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulphur 16	35.5 Cl Chlorine 17	40 Ar Argon 18				
85 Rb Rubidium 37	88 Sr Strontium 38	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36				
133 Cs Caesium 55	137 Ba Barium 56	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54				
226 Ra Radium 88	227 Ac Actinium 89	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	210 Po Polonium 84	210 At Astatine 85	210 Rn Radon 86				
		65 Zn Zinc 30	64 Cu Copper 29	59 Ni Nickel 28	59 Co Cobalt 27	58 Ni Nickel 28	59 Co Cobalt 27	56 Fe Iron 26	55 Mn Manganese 25	52 Cr Chromium 24	51 V Vanadium 23
		112 Cd Cadmium 48	108 Ag Silver 47	106 Pd Palladium 46	103 Rh Rhodium 45	101 Ru Ruthenium 44	101 Ru Ruthenium 44	101 Ru Ruthenium 44	101 Ru Ruthenium 44	96 Mo Molybdenum 42	93 Nb Niobium 41
		201 Hg Mercury 80	197 Au Gold 79	195 Pt Platinum 78	192 Ir Iridium 77	190 Os Osmium 76	190 Os Osmium 76	186 Re Rhenium 75	186 Re Rhenium 75	184 W Tungsten 74	181 Ta Tantalum 73
		162 Dy Dysprosium 66	159 Tb Terbium 65	157 Gd Gadolinium 64	150 Sm Samarium 62	144 Nd Neodymium 60	144 Nd Neodymium 60	144 Nd Neodymium 60	144 Nd Neodymium 60	141 Pr Praseodymium 59	140 Ce Cerium 58
		167 Er Erbium 68	165 Ho Holmium 67	162 Dy Dysprosium 66	150 Sm Samarium 62	144 Nd Neodymium 60	144 Nd Neodymium 60	144 Nd Neodymium 60	144 Nd Neodymium 60	141 Pr Praseodymium 59	140 Ce Cerium 58
		209 Po Polonium 84	207 Pb Lead 82	204 Tl Thallium 81	192 Ir Iridium 77	190 Os Osmium 76	190 Os Osmium 76	186 Re Rhenium 75	186 Re Rhenium 75	184 W Tungsten 74	181 Ta Tantalum 73
		169 Tm Thulium 69	165 Ho Holmium 67	162 Dy Dysprosium 66	150 Sm Samarium 62	144 Nd Neodymium 60	144 Nd Neodymium 60	144 Nd Neodymium 60	144 Nd Neodymium 60	141 Pr Praseodymium 59	140 Ce Cerium 58
		175 Lu Lutetium 71	173 Yb Ytterbium 70	170 Tm Thulium 69	167 Er Erbium 68	165 Ho Holmium 67	165 Ho Holmium 67	165 Ho Holmium 67	165 Ho Holmium 67	165 Ho Holmium 67	165 Ho Holmium 67
		103 Lr Lawrencium 103	102 No Nobelium 102	101 Md Mendelevium 101	100 Fm Fermium 100	99 Es Einsteinium 99	99 Es Einsteinium 99	99 Es Einsteinium 99	99 Es Einsteinium 99	99 Es Einsteinium 99	99 Es Einsteinium 99
		98 Cf Californium 98	98 Cf Californium 98	98 Cf Californium 98	98 Cf Californium 98	98 Cf Californium 98	98 Cf Californium 98	98 Cf Californium 98	98 Cf Californium 98	98 Cf Californium 98	98 Cf Californium 98
		97 Bk Berkelium 97	97 Bk Berkelium 97	97 Bk Berkelium 97	97 Bk Berkelium 97	97 Bk Berkelium 97	97 Bk Berkelium 97	97 Bk Berkelium 97	97 Bk Berkelium 97	97 Bk Berkelium 97	97 Bk Berkelium 97
		96 Cm Curium 96	96 Cm Curium 96	96 Cm Curium 96	96 Cm Curium 96	96 Cm Curium 96	96 Cm Curium 96	96 Cm Curium 96	96 Cm Curium 96	96 Cm Curium 96	96 Cm Curium 96
		95 Am Americium 95	95 Am Americium 95	95 Am Americium 95	95 Am Americium 95	95 Am Americium 95	95 Am Americium 95	95 Am Americium 95	95 Am Americium 95	95 Am Americium 95	95 Am Americium 95
		93 Np Neptunium 93	93 Np Neptunium 93	93 Np Neptunium 93	93 Np Neptunium 93	93 Np Neptunium 93	93 Np Neptunium 93	93 Np Neptunium 93	93 Np Neptunium 93	93 Np Neptunium 93	93 Np Neptunium 93
		92 U Uranium 92	92 U Uranium 92	92 U Uranium 92	92 U Uranium 92	92 U Uranium 92	92 U Uranium 92	92 U Uranium 92	92 U Uranium 92	92 U Uranium 92	92 U Uranium 92
		91 Pa Protactinium 91	91 Pa Protactinium 91	91 Pa Protactinium 91	91 Pa Protactinium 91	91 Pa Protactinium 91	91 Pa Protactinium 91	91 Pa Protactinium 91	91 Pa Protactinium 91	91 Pa Protactinium 91	91 Pa Protactinium 91
		89 Th Thorium 90	89 Th Thorium 90	89 Th Thorium 90	89 Th Thorium 90	89 Th Thorium 90	89 Th Thorium 90	89 Th Thorium 90	89 Th Thorium 90	89 Th Thorium 90	89 Th Thorium 90
		87 Fr Francium 87	87 Fr Francium 87	87 Fr Francium 87	87 Fr Francium 87	87 Fr Francium 87	87 Fr Francium 87	87 Fr Francium 87	87 Fr Francium 87	87 Fr Francium 87	87 Fr Francium 87

*58-71 Lanthanoid series
†90-103 Actinoid series

a = relative atomic mass
X = atomic symbol
b = proton (atomic) number

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).