

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.

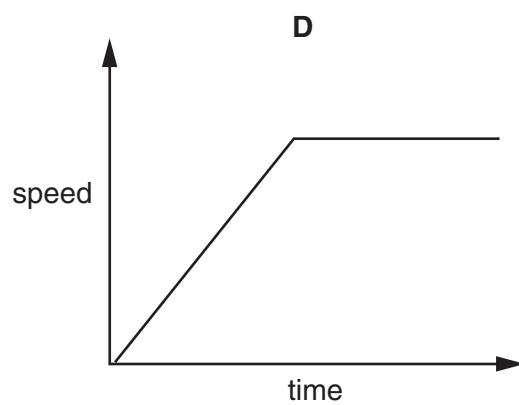
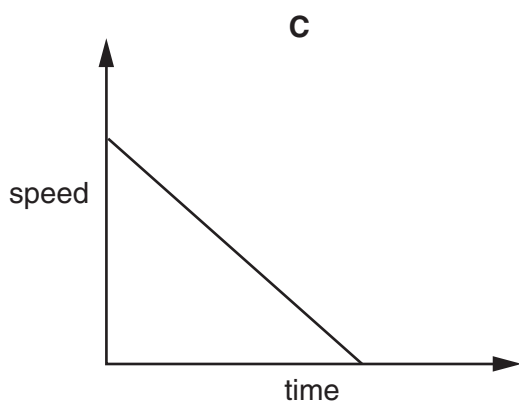
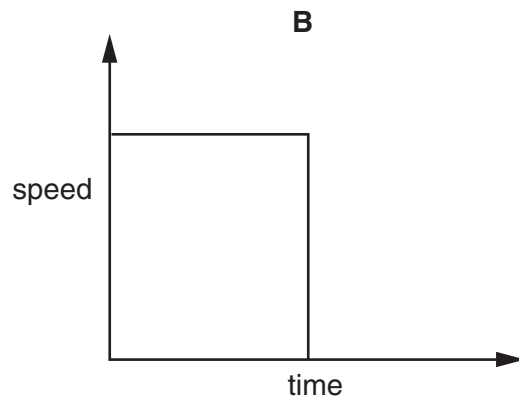
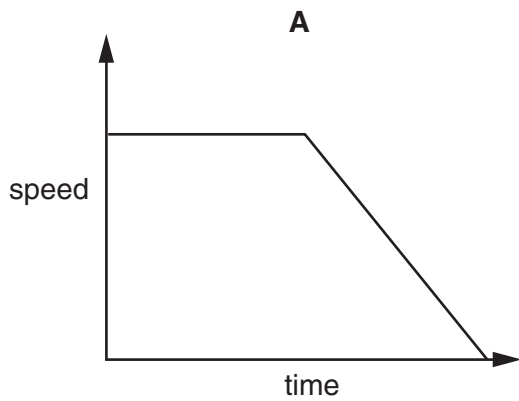
A copy of the Periodic Table is included on page 16.

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?

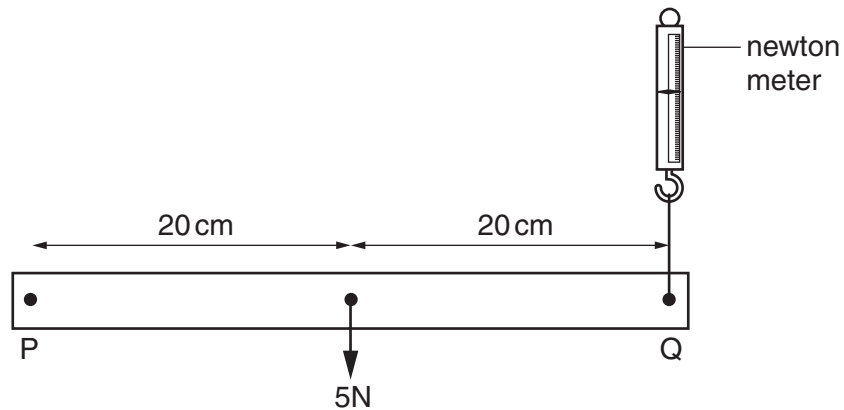
- A** 0.2 kg      **B** 5.0 kg      **C** 6.8 kg      **D** 14.5 kg

- 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
<b>A</b>	beaker	beaker
<b>B</b>	beaker	water
<b>C</b>	water	beaker
<b>D</b>	water	water

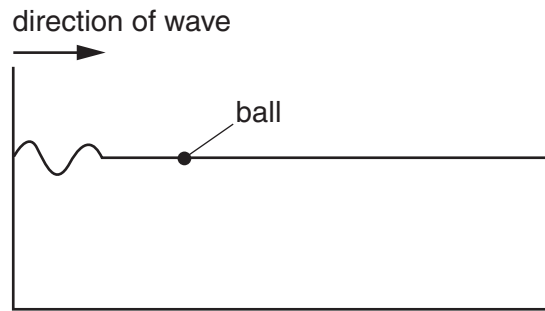
- 4 A metal bar, PQ, has a weight of 5 N and is pivoted at P.  
It is held horizontal by a newton meter acting at Q.



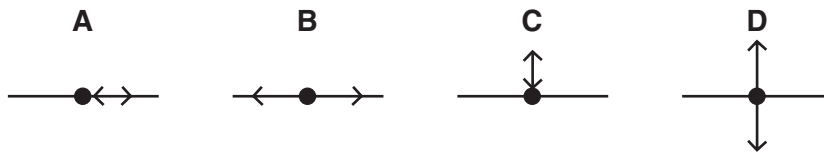
What is the reading on the newton meter?

- 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.



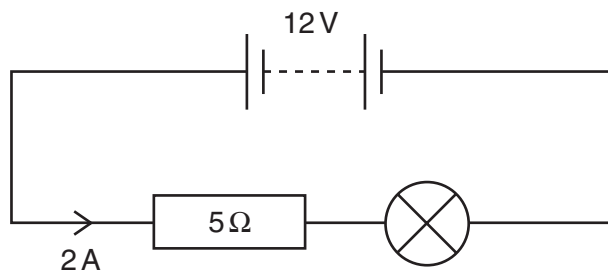
Which diagram shows the movement of the ball when the wave passes?



- 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?

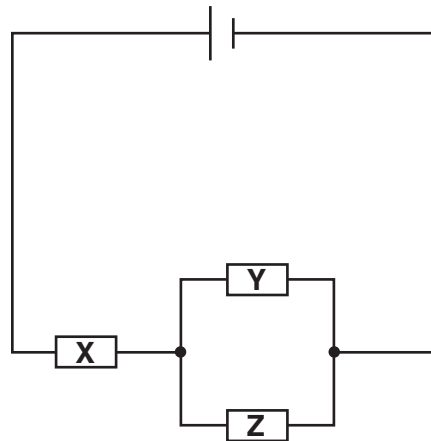
- A copper and steel  
 B copper and zinc  
 C iron and steel  
 D iron and zinc
- 9 The diagram shows the value of various quantities in a circuit.



What is the potential difference across the resistor?

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

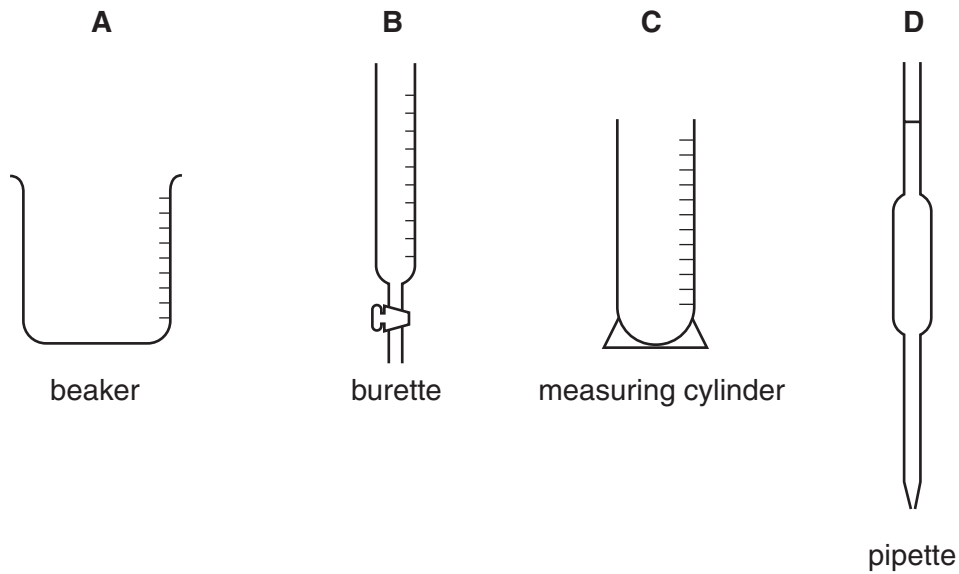
- 10 The diagram shows a simple d.c. circuit. The resistances of the three resistors **X**, **Y** and **Z** are equal.



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  $22.5 \text{ cm}^3$  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.

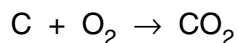
16 Substance **X** has the following properties

- 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?

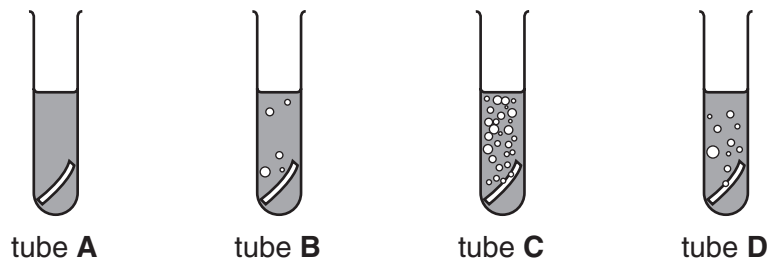
- A 2      B 2, 6      C 2, 8, 2      D 2, 8, 8

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

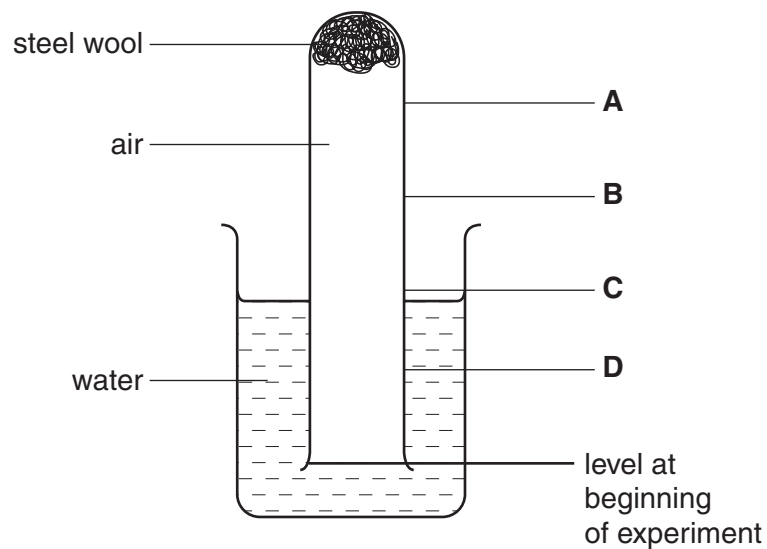
23 The metals iron, lead, magnesium and zinc are each added to dilute hydrochloric acid.

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.

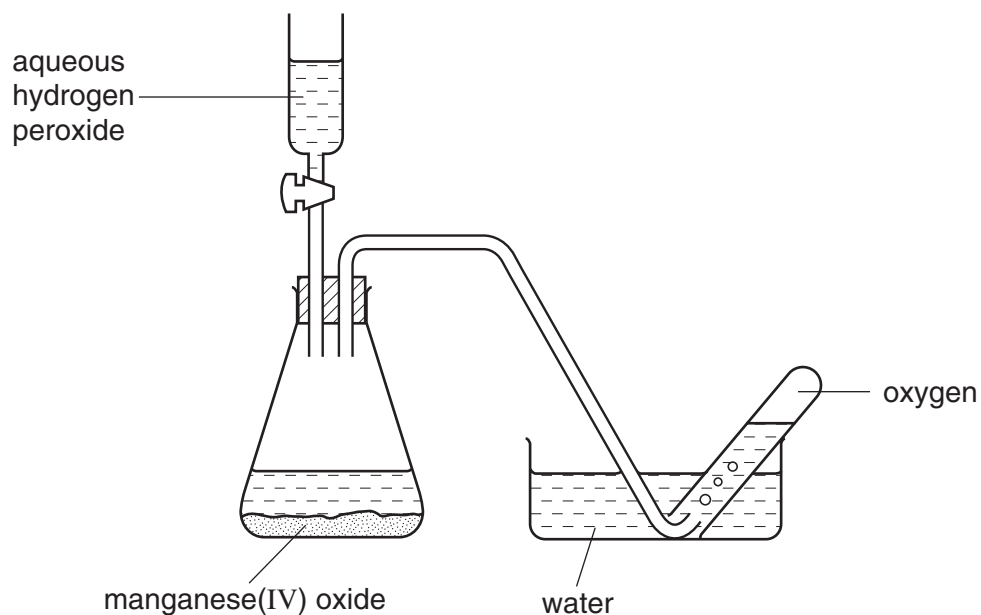
What will be the water level after several days?





- 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			
<b>A</b>	diesel	paraffin	petrol	lubricating oil
<b>B</b>	paraffin	petrol	lubricating oil	diesel
<b>C</b>	petrol	paraffin	diesel	lubricating oil
<b>D</b>	petrol	diesel	lubricating oil	paraffin

28 Which structures are present in animal cells?

	cell membrane	cell wall	cytoplasm
<b>A</b>	x	✓	✓
<b>B</b>	✓	x	✓
<b>C</b>	✓	✓	x
<b>D</b>	✓	✓	✓

key

✓ = structure present  
x = structure absent

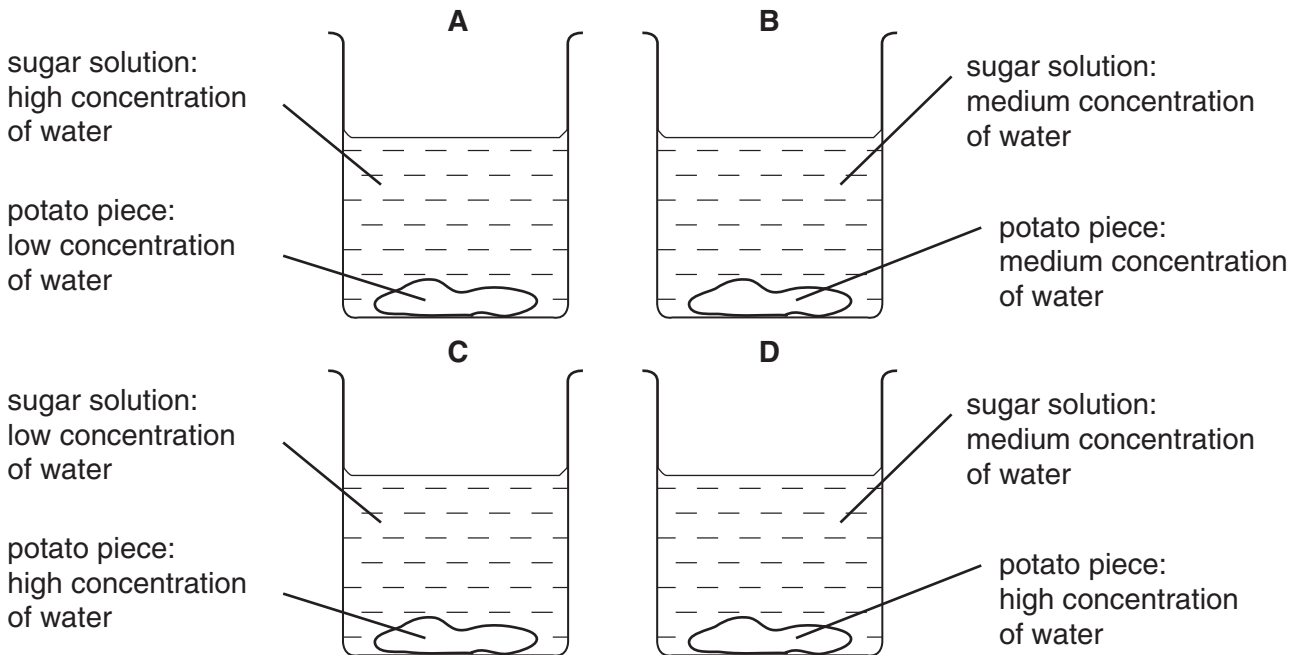
29 The table shows the main functions of red blood cells and root hair cells.

Which row is correct?

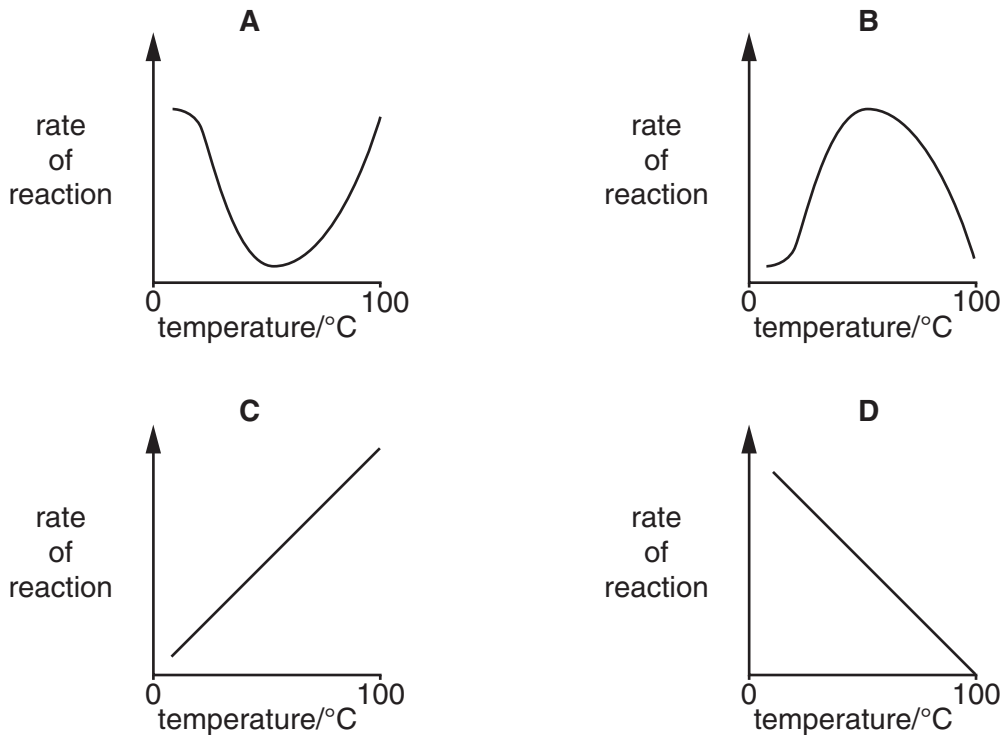
	red blood cell	root hair cell
<b>A</b>	absorption	absorption
<b>B</b>	absorption	transport
<b>C</b>	transport	absorption
<b>D</b>	transport	transport

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?

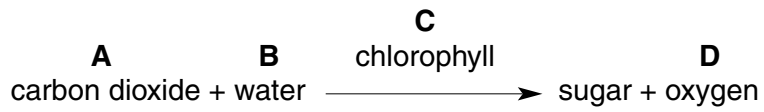


31 Which graph shows the effect of temperature on an enzyme-controlled reaction?



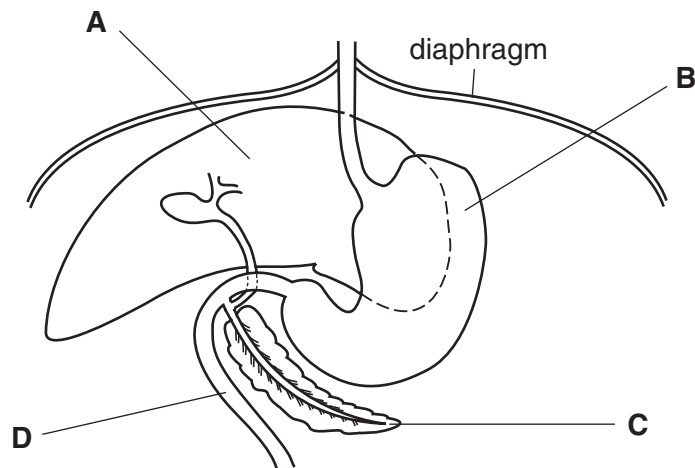
32 The word equation represents the overall chemical reactions of photosynthesis.

Which labelled substance traps light energy?



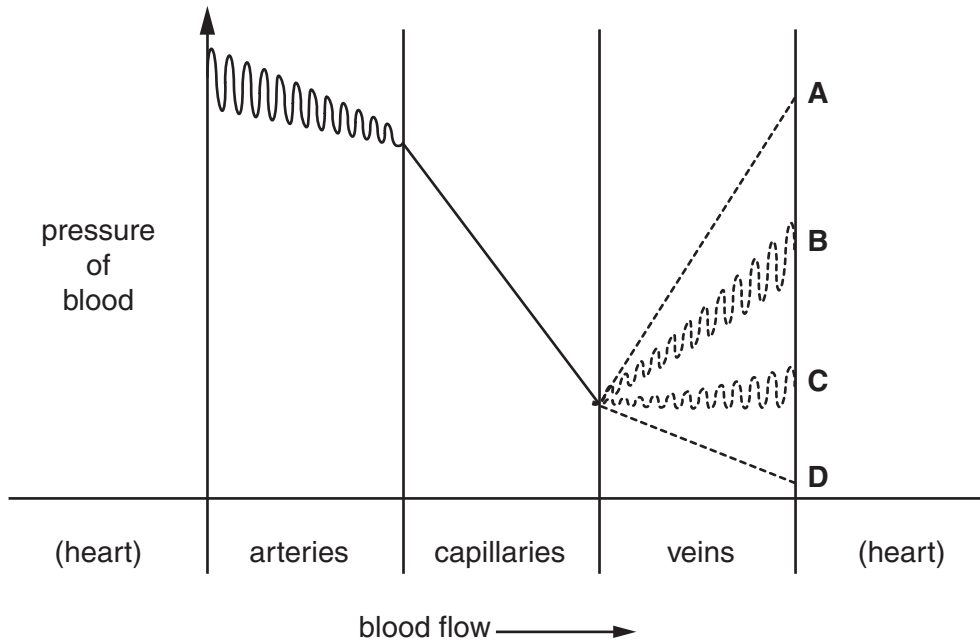
33 The diagram shows part of the human digestive system.

Which part secretes an acidic digestive juice containing a protease?



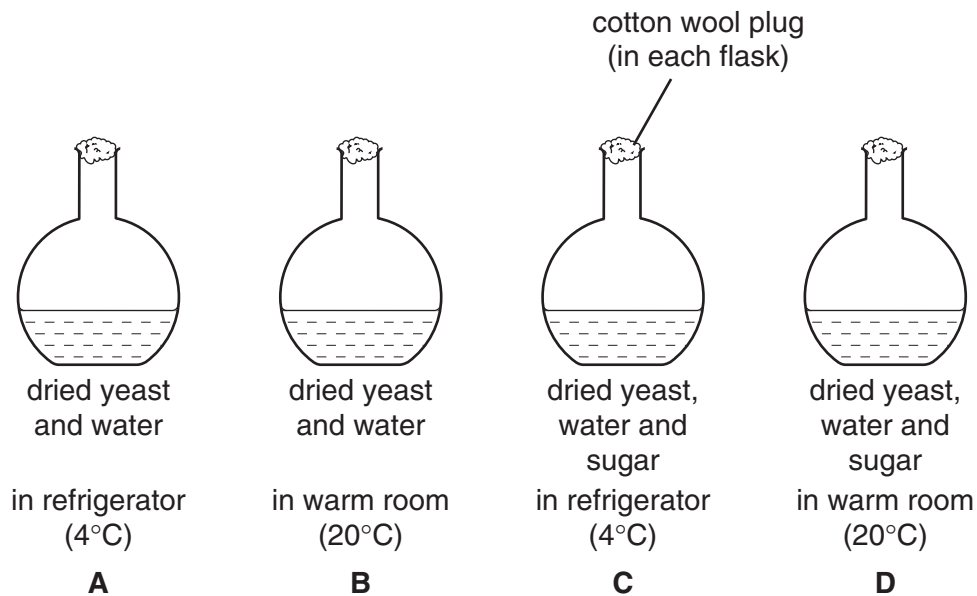
- 34 The diagram shows the pressure of blood after it leaves the heart and passes through arteries and then capillaries.

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

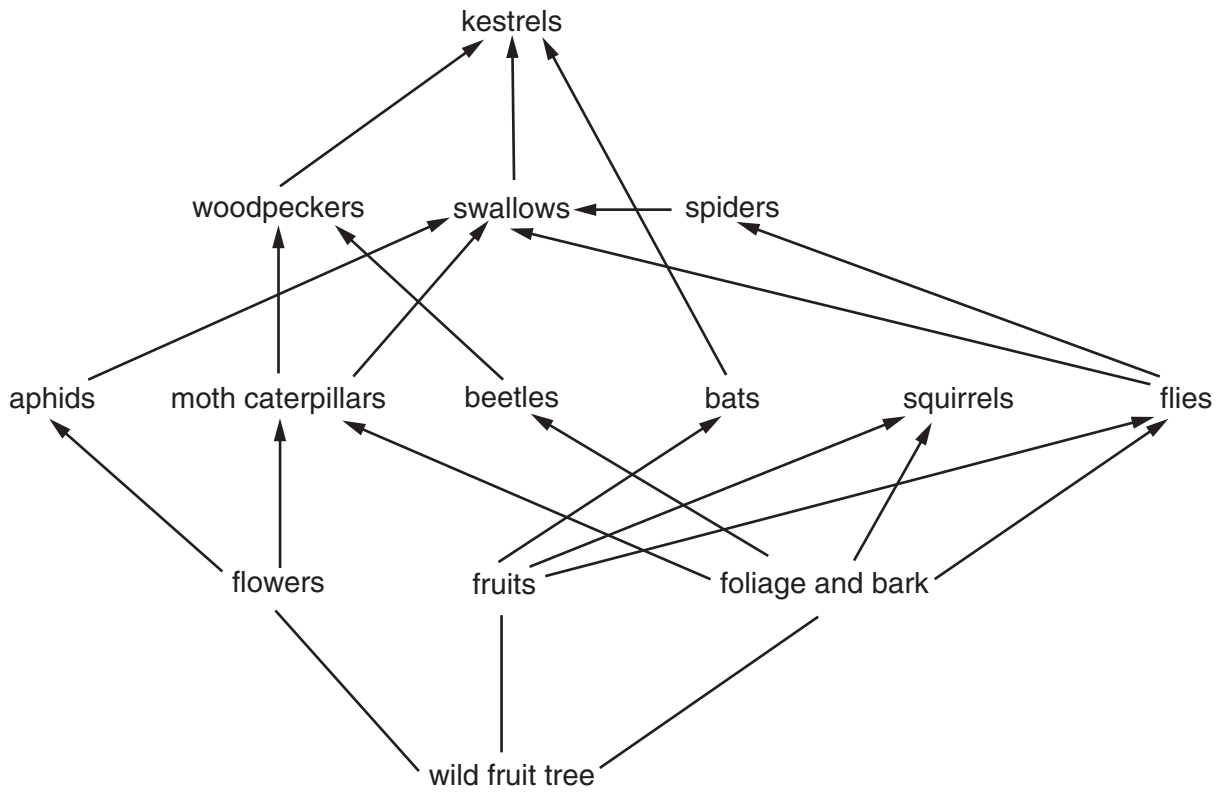


- 35 Four flasks were sterilised and set up as shown in the diagram.

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
<b>A</b>	absorbs	absorbs
<b>B</b>	absorbs	releases
<b>C</b>	releases	absorbs
<b>D</b>	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 <b>H</b> Hydrogen 1																							
7 <b>Li</b> Lithium 3	9 <b>Be</b> Beryllium 4		11 <b>B</b> Boron 5	12 <b>C</b> Carbon 6	14 <b>N</b> Nitrogen 7	16 <b>O</b> Oxygen 8	17 <b>F</b> Fluorine 9	18 <b>Ne</b> Neon 10				20 <b>He</b> Helium 2													
23 <b>Na</b> Sodium 11	24 <b>Mg</b> Magnesium 12	27 <b>Al</b> Aluminium 13	28 <b>Si</b> Silicon 14	31 <b>P</b> Phosphorus 15	32 <b>S</b> Sulphur 16	35.5 <b>Cl</b> Chlorine 17	40 <b>Ar</b> Argon 18																		
39 <b>K</b> Potassium 19	40 <b>Ca</b> Calcium 20	45 <b>Sc</b> Scandium 21	48 <b>Ti</b> Titanium 22	51 <b>V</b> Vanadium 23	52 <b>Cr</b> Chromium 24	55 <b>Mn</b> Manganese 25	56 <b>Fe</b> Iron 26	59 <b>Co</b> Cobalt 27	59 <b>Ni</b> Nickel 28	64 <b>Cu</b> Copper 29	65 <b>Zn</b> Zinc 30	70 <b>Ga</b> Gallium 31	73 <b>Ge</b> Germanium 32	75 <b>As</b> Arsenic 33	79 <b>Se</b> Selenium 34	80 <b>Br</b> Bromine 35	84 <b>Kr</b> Krypton 36								
85 <b>Rb</b> Rubidium 37	88 <b>Sr</b> Strontium 38	89 <b>Y</b> Yttrium 39	91 <b>Zr</b> Zirconium 40	93 <b>Nb</b> Niobium 41	96 <b>Mo</b> Molybdenum 42	101 <b>Ru</b> Ruthenium 44	101 <b>Rh</b> Rhodium 45	103 <b>Pd</b> Palladium 46	106 <b>Ag</b> Silver 47	112 <b>Cd</b> Cadmium 48	115 <b>In</b> Indium 49	119 <b>Sn</b> Tin 50	122 <b>Sb</b> Antimony 51	127 <b>I</b> Iodine 53	128 <b>Te</b> Tellurium 52	131 <b>Xe</b> Xenon 54									
133 <b>Cs</b> Caesium 55	137 <b>Ba</b> Barium 56	139 <b>La</b> Lanthanum 57	178 <b>Hf</b> Hafnium 72	181 <b>Ta</b> Tantalum 73	184 <b>W</b> Tungsten 74	186 <b>Re</b> Rhenium 75	190 <b>Os</b> Osmium 76	192 <b>Ir</b> Iridium 77	195 <b>Pt</b> Platinum 78	197 <b>Au</b> Gold 79	201 <b>Hg</b> Mercury 80	204 <b>Tl</b> Thallium 81	207 <b>Pb</b> Lead 82	209 <b>Bi</b> Bismuth 83	210 <b>Po</b> Polonium 84	210 <b>At</b> Astatine 85	210 <b>Rn</b> Radon 86								
226 <b>Fr</b> Francium 87	226 <b>Ra</b> Radium 88	227 <b>Ac</b> Actinium 89																							
*58-71 Lanthanoid series												140 <b>Ce</b> Cerium 58	141 <b>Pr</b> Praseodymium 59	144 <b>Nd</b> Neodymium 60	150 <b>Sm</b> Samarium 62	152 <b>Eu</b> Europium 63	157 <b>Gd</b> Gadolinium 64	159 <b>Tb</b> Terbium 65	162 <b>Dy</b> Dysprosium 66	165 <b>Ho</b> Holmium 67	167 <b>Er</b> Erbium 68	169 <b>Tm</b> Thulium 69	173 <b>Yb</b> Ytterbium 70	175 <b>Lu</b> Lutetium 71	
†90-103 Actinoid series												232 <b>Th</b> Thorium 90	238 <b>Pa</b> Protactinium 91	238 <b>U</b> Uranium 92	238 <b>Np</b> Neptunium 93	238 <b>Pu</b> Plutonium 94	238 <b>Am</b> Americium 95	238 <b>Cm</b> Curium 96	238 <b>Bk</b> Berkelium 97	238 <b>Cf</b> Californium 98	238 <b>Es</b> Einsteinium 99	238 <b>Fm</b> Fermium 100	238 <b>Md</b> Mendelevium 101	238 <b>No</b> Nobelium 102	238 <b>Lr</b> Lawrencium 103

**Key**

a	<b>X</b>
b	

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

The volume of one mole of any gas is 24 dm<sup>3</sup> at room temperature and pressure (r.t.p.).