

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

COMBINED SCIENCE

5129/01

Paper 1 Multiple Choice

October/November 2004

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.

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

This document consists of **17** printed pages and **3** blank pages.



- 1 A stone falls freely under gravity.

What is meant by the acceleration of the stone?

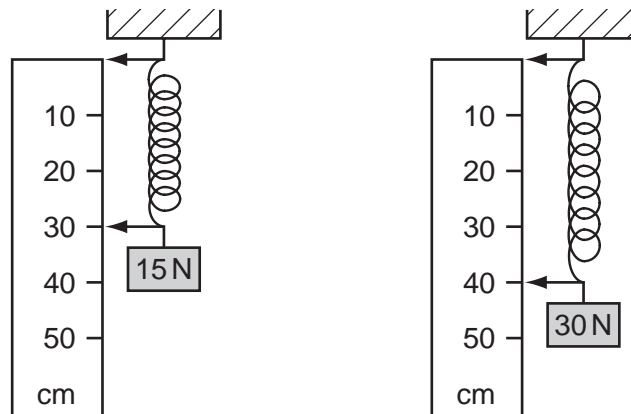
- A The distance the stone falls in one second.
- B The increase in speed of the stone.
- C The increase in speed of the stone in one second.
- D The time for the stone to reach maximum speed.

- 2 The table shows the weights of some masses on the surface of four different planets.

Which planet has the greatest gravitational field strength?

	mass	weight
A	0.5 kg	20 N
B	2.0 kg	20 N
C	0.5 kg	40 N
D	2.0 kg	40 N

- 3 The diagrams show the same spring with different weights attached.



When the weights are removed, the spring returns to its original length.

What is the original length of the spring?

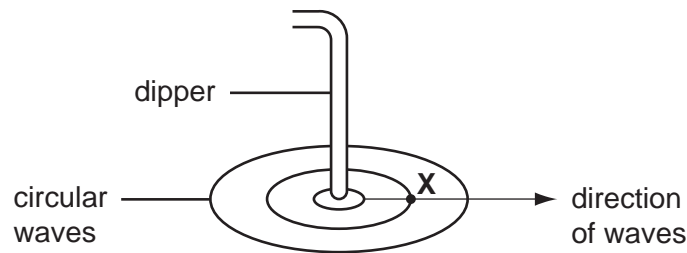
- A 25 cm
- B 20 cm
- C 15 cm
- D 10 cm

- 4 Brakes are used to stop a car.

What is most of the kinetic energy converted into?

- A heat energy
- B light energy
- C potential energy
- D sound energy

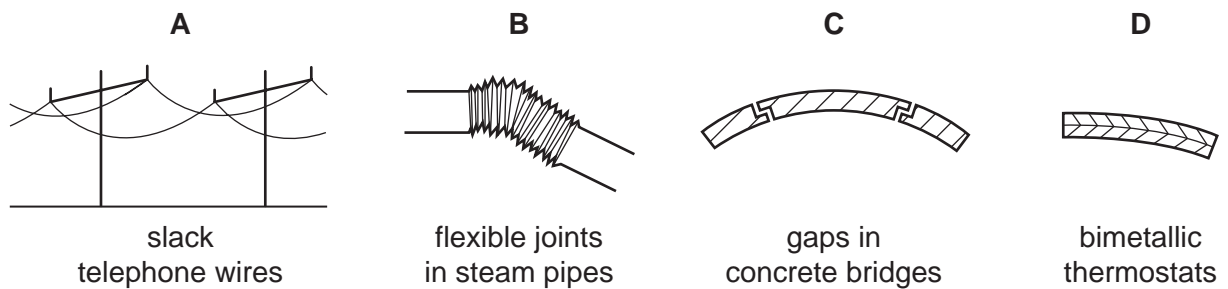
- 5 The diagram shows a dipper producing circular waves in a ripple tank.



Which wave property describes the number of waves passing point X per second?

- A wavelength
- B speed
- C frequency
- D amplitude

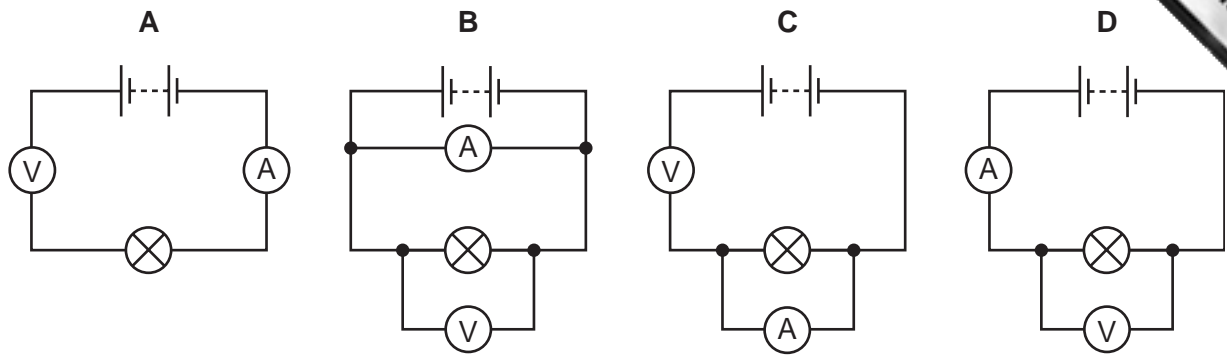
- 6 Which diagram shows a useful application of thermal expansion?



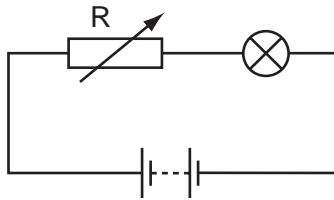
- 7 What is a property of all electromagnetic waves?

- A They are deflected by magnets.
- B They are positively charged.
- C They travel at the speed of sound.
- D They travel through a vacuum.

- 8 Which circuit can be used to find the resistance of the lamp?



- 9 In the circuit shown, the brightness of the lamp can be altered by changing the resistance of the variable resistor, R.



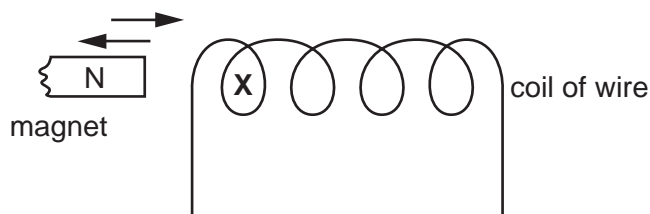
This is because varying the resistance changes

- A the current flowing in the circuit.
 - B the electromotive force (e.m.f) of the battery.
 - C the resistance of the bulb.
 - D the temperature of the battery.
- 10 A heater used on a 250V mains circuit has a 5A fuse in its plug.

Which is the highest power rating for this heater?

- A 50W
- B 250W
- C 1000W
- D 2000W

- 11 The diagram shows the north pole of a magnet moved into, and out of, a coil of wire.



What describes the poles produced in the coil at **X** by the movement of the magnet?

	north pole in	north pole out
A	N	N
B	N	S
C	S	N
D	S	S

- 12 The table shows how the activity of a radioactive substance changes over a period of time. (Allowance has been made for the background radiation.)

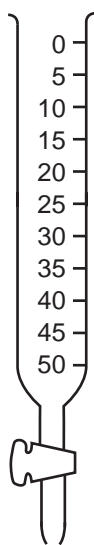
time / minutes	0	5	10	15	20	25	30	35	40
activity / counts per second	114	102	90	83	73	65	57	51	45

What is the half-life of the substance?

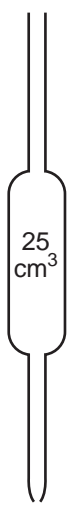
- A** 73 minutes
B 57 minutes
C 30 minutes
D 20 minutes
- 13 What particles are present in the nucleus of the oxygen nuclide $^{17}_8\text{O}$?

	neutrons	protons
A	9	8
B	17	8
C	8	9
D	9	17

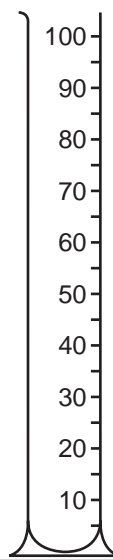
- 14 Which statement about the molecules in carbon dioxide gas is correct?
- A The molecules are close together.
 - B The molecules are diatomic.
 - C The molecules are in fixed positions.
 - D The molecules move randomly.
- 15 Which piece of apparatus would be most suitable to measure accurately the volume of acid needed to neutralise 25.0 cm^3 of an alkali?



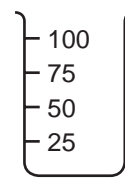
A



B

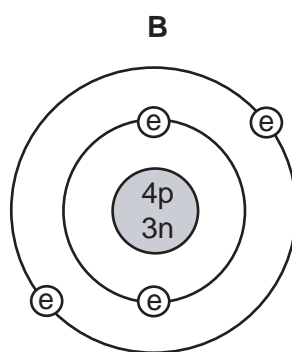
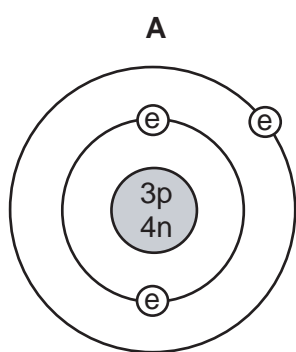


C

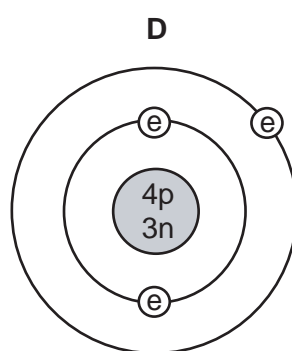
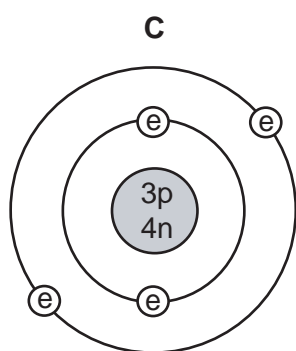


D

16 Which diagram shows the structure of a ${}^7_3\text{Li}$ atom?



key
p = proton
n = neutron
e = electron



17 Which statement describes the formation of a chloride ion from a chlorine atom?

- A The atom gains one electron.
- B The atom gains two electrons.
- C The atom loses one electron.
- D The atom loses two electrons.

18 Which mass of oxygen combines with 12g of magnesium?

- A 4g
- B 8g
- C 16g
- D 32g

19 Which salt can be prepared by the reaction between a soluble metal hydroxide and dilute sulphuric acid?

- A copper(II) sulphate
- B iron(II) sulphate
- C lead(II) sulphate
- D potassium sulphate

- 20 Many crops will not grow well in an acidic soil.

Which type of chemical reaction takes place when farmers add calcium hydroxide to the soil?

- A decomposition
- B fertilisation
- C neutralisation
- D reduction

- 21 Experiments are carried out to arrange metals X, Y and Z in order of decreasing reactivity.

The table shows the results.

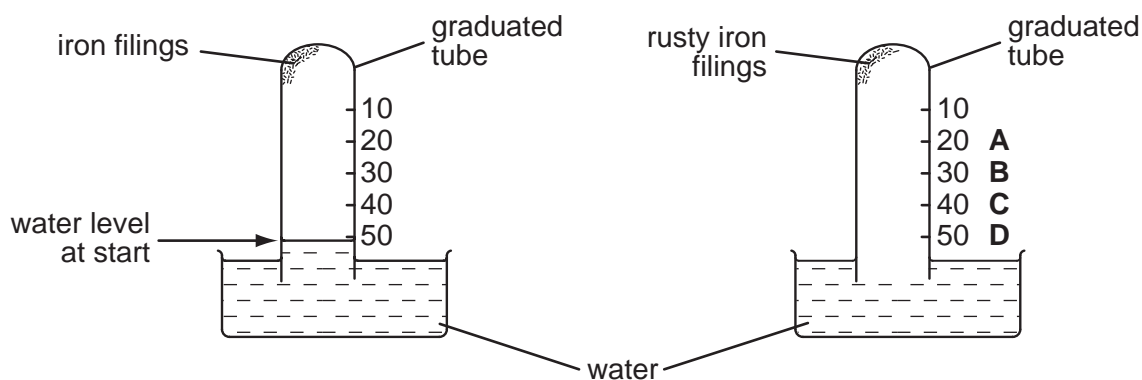
experiment	X	Y	Z
Does the metal liberate hydrogen from dilute hydrochloric acid?	yes	no	yes
Is the metal oxide reduced by heating with carbon?	yes	yes	no

What is the order of reactivity of the metals?

	most reactive	→	least reactive
A	X		Z Y
B	Y		X Z
C	Z		X Y
D	Z		Y X

- 22 Iron filings are left to rust in the apparatus shown.

Which letter indicates the water level when all the oxygen has reacted?



23 The following gases are present in car exhaust fumes.

- carbon dioxide
- carbon monoxide
- nitrogen
- nitrogen dioxide
- water vapour

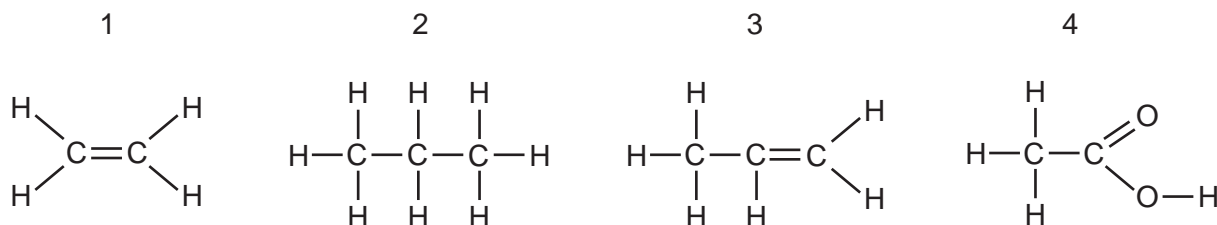
Which of these gases is also present in unpolluted air?

- A** nitrogen only
- B** nitrogen and water vapour only
- C** nitrogen, carbon dioxide and water vapour only
- D** nitrogen, carbon monoxide, carbon dioxide and water vapour only

24 Which statement about the homologous series of alcohols is **not** true?

- A** They all contain oxygen.
- B** They can be represented by a general formula.
- C** They exhibit a gradual change in physical properties.
- D** They have the same empirical formula.

25 The structures of four organic compounds are shown.



Which compounds decolourise aqueous bromine?

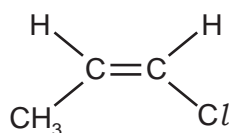
- A** 1 and 2 **B** 1 and 3 **C** 2 and 4 **D** 3 and 4

26 Methane is used as a fuel.

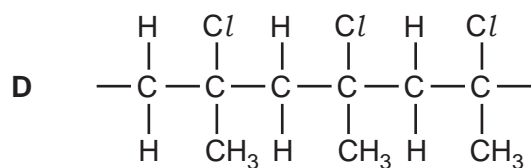
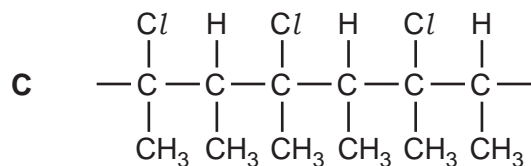
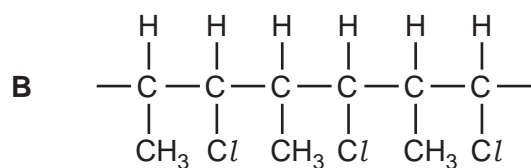
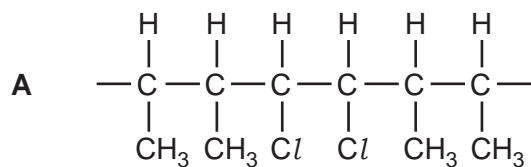
Which property is essential for this use?

- A** It burns exothermically.
- B** It is a gas.
- C** It is odourless.
- D** It has a low boiling point.

27 The following formula represents a monomer.



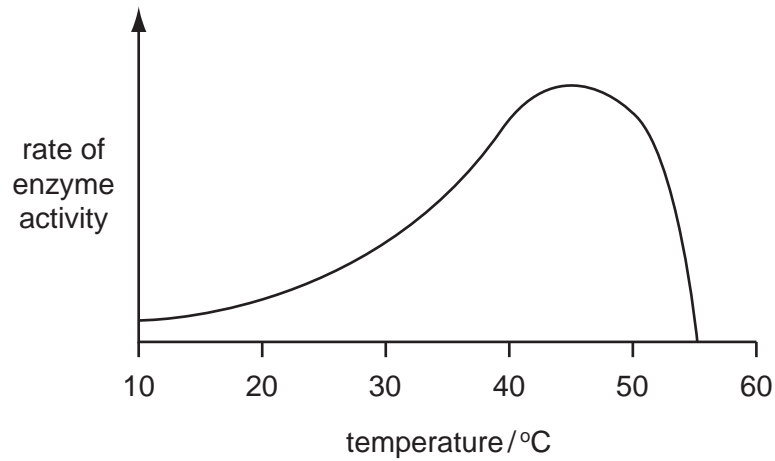
Which formula shows a part of the polymer chain formed from 3 molecules of the monomer?



28 Which feature of a root hair cell indicates that it is from a plant and not from an animal?

- A** cell membrane
- B** cell wall
- C** chloroplast
- D** cytoplasm

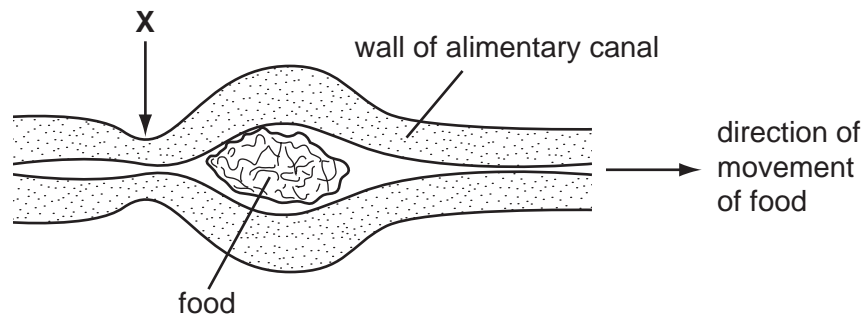
- 29 The graph shows the relationship between temperature and the activity of the enzyme that breaks down starch to sugar.



From the graph, which statement is correct?

- A Amylase works best at 55°C.
 - B Starch will not be broken down below 10°C.
 - C Sugar is produced most rapidly at 45°C.
 - D The higher the temperature, the faster the amylase works.
- 30 What is the correct equation for photosynthesis?
- A carbohydrate + oxygen → water + carbon dioxide
 - B carbohydrate + carbon dioxide → oxygen + water
 - C carbon dioxide + oxygen → carbohydrate + water
 - D carbon dioxide + water → carbohydrate + oxygen

31 The diagram shows some food moving along the alimentary canal by peristalsis.



What are the muscles in the wall of the alimentary canal doing at point **X**?

	circular muscles	longitudinal muscles
A	contracting	contracting
B	contracting	relaxing
C	relaxing	contracting
D	relaxing	relaxing

32 A woman has fewer red blood cells than normal.

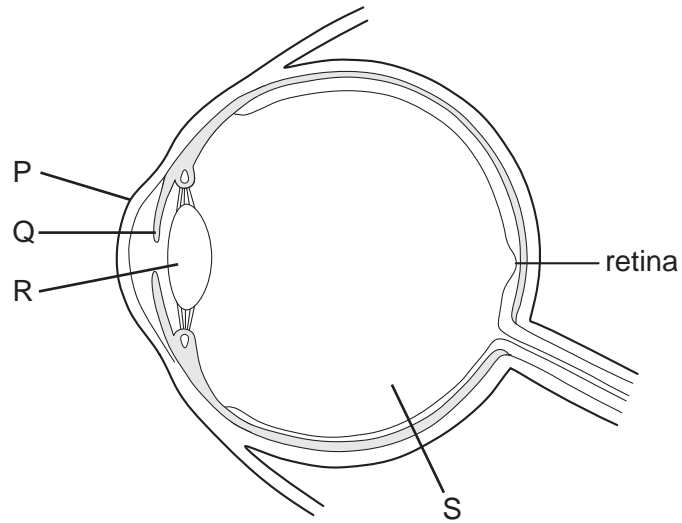
What would be the effect of this?

- A** Her blood contains high levels of urea.
- B** Her blood does not clot properly.
- C** Her body cells do not get enough oxygen.
- D** She cannot fight off infections.

33 What are the conditions in the muscles when lactic acid is produced?

	concentration of carbon dioxide	supply of oxygen
A	high	less than oxygen demand
B	high	more than oxygen demand
C	low	less than oxygen demand
D	low	more than oxygen demand

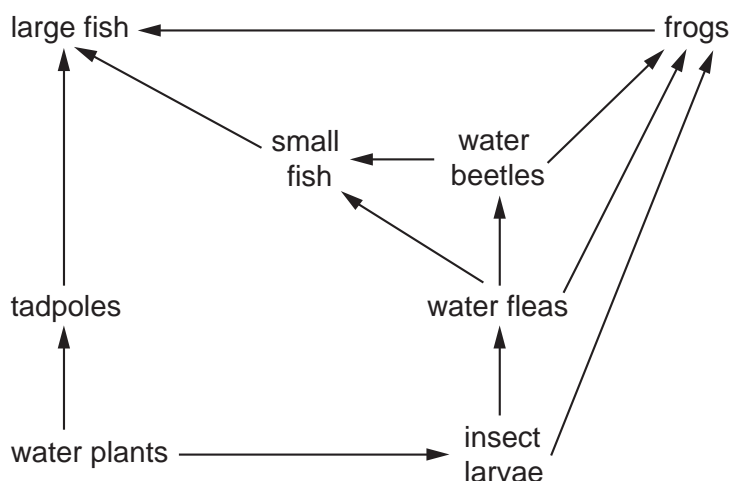
34 The diagram shows a section through the eye.



Which pair of structures focus light rays onto the retina?

- A P and Q
 - B P and R
 - C Q and R
 - D Q and S
- 35 What may happen to a heroin addict 48 hours after the drug is withdrawn?
- A Desire for the drug is reduced.
 - B The addiction is cured.
 - C Tolerance to the drug increases.
 - D Vomiting, sweating and cramp occur.

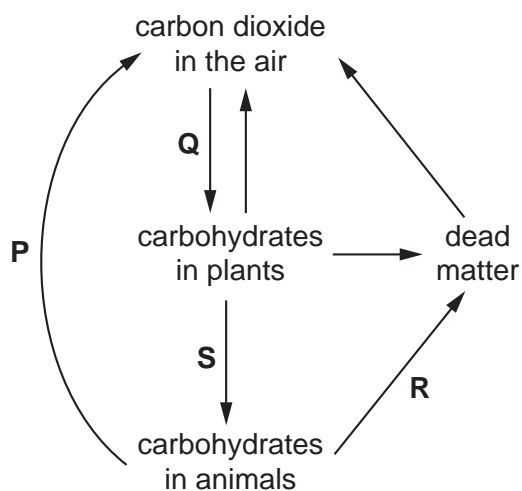
36 The diagram shows a food web from a freshwater pond.



Which organisms are herbivores and which are carnivores?

	herbivores	carnivores
A	small fish	large fish
B	tadpoles	frogs
C	water fleas	insect larvae
D	water plants	water beetles

37 The diagram shows the carbon cycle.



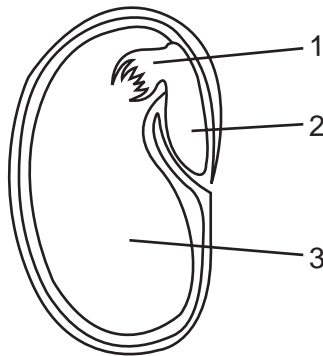
Which parts of the cycle form parts of food chains?

- A** P and Q
- B** P and S
- C** Q and R
- D** R and S

38 What conditions are needed for the germination of most seeds?

	light	oxygen	water
A	✓	✓	x
B	x	✓	x
C	✓	x	✓
D	x	✓	✓

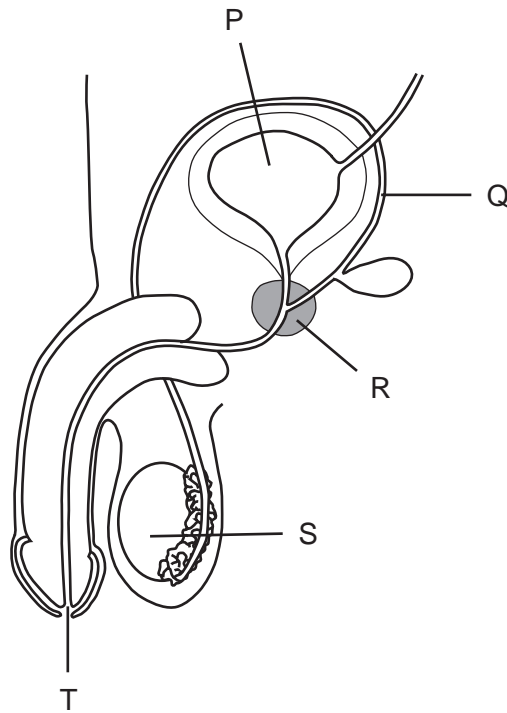
39 The diagram shows a section of a seed.



What are the numbered parts?

	1	2	3
A	cotyledon	plumule	radicle
B	plumule	cotyledon	radicle
C	plumule	radicle	cotyledon
D	radicle	plumule	cotyledon

40 The diagram shows part of the male reproductive system.



Which structures produce seminal fluid and sperm?

	seminal fluid	sperm
A	P	Q
B	Q	R
C	R	S
D	S	T

DATA SHEET The Periodic Table of the Elements

		Group																									
	I	II	III	IV	V	VI	VII	0																			
	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px;">1 H Hydrogen 1</div> </div>																										
3	7 Li Lithium 4	9 Be Beryllium 4																									
11	23 Na Sodium 11	24 Mg Magnesium 12																									
19	39 K Potassium 19	40 Ca Calcium 20	45 Sc Scandium 21	48 Ti Titanium 22	51 V Vanadium 23	52 Cr Chromium 24	55 Mn Manganese 25	56 Fe Iron 26	59 Co Cobalt 27	59 Ni Nickel 28	64 Cu Copper 29	65 Zn Zinc 30	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36									
37	85 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	101 Ru Ruthenium 44	106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	127 I Iodine 53	131 Xe Xenon 54												
55	133 Cs Caesium 55	137 Ba Barium 56	139 La Lanthanum 57	178 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	190 Os Osmium 76	195 Pt Platinum 78	197 Au Gold 79	201 Hg Mercury 80	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	210 Po Polonium 84	210 At Astatine 85	222 Rn Radon 86											
87	87 Fr Francium 87	88 Ra Radium 88	227 Ac Actinium 89																								
												*58-71 Lanthanoid series		90-103 Actinoid series													
												<div style="display: flex; align-items: center; gap: 10px;"> <div style="border: 1px solid black; padding: 2px;">a</div> <div style="font-weight: bold; font-size: 1.2em;">X</div> <div style="border: 1px solid black; padding: 2px;">b</div> </div>		a = relative atomic mass		X = atomic symbol		b = proton (atomic) number									
												140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	159 Tb Terbium 65	162 Dy Dysprosium 66	165 Ho Holmium 67	167 Er Erbium 68	169 Tm Thulium 69	173 Yb Ytterbium 70	175 Lu Lutetium 71			
												232 Th Thorium 90	238 Pa Protactinium 91	238 U Uranium 92	238 Np Neptunium 93	238 Pu Plutonium 94	238 Am Americium 95	238 Cm Curium 96	238 Bk Berkelium 97	238 Cf Californium 98	238 Es Einsteinium 99	238 Fm Fermium 100	238 Md Mendelevium 101	238 No Nobelium 102	238 Lr Lawrencium 103		

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