

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?

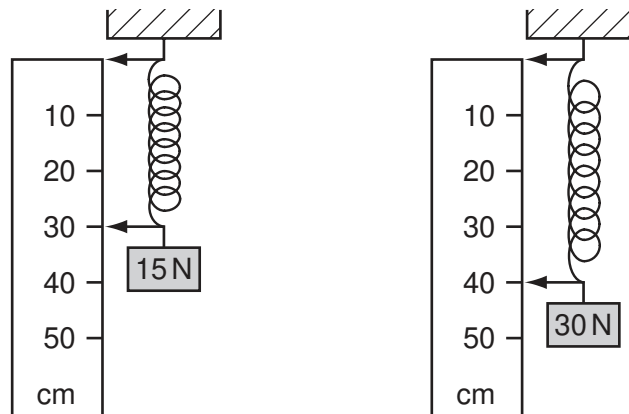
- A** The distance the stone falls in one second.
B The increase in speed of the stone.
C The increase in speed of the stone in one second.
D The time for the stone to reach maximum speed.

- 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?

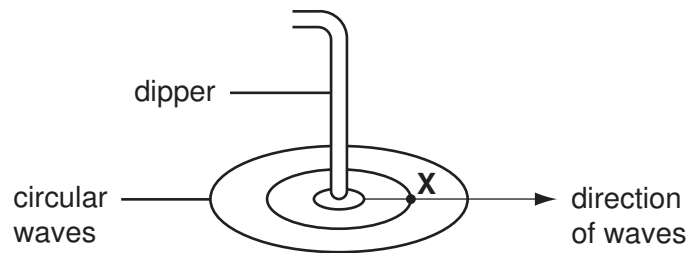
- A** 25 cm **B** 20 cm **C** 15 cm **D** 10 cm

- 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

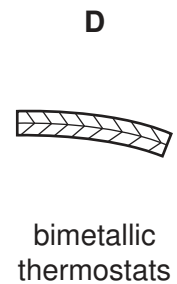
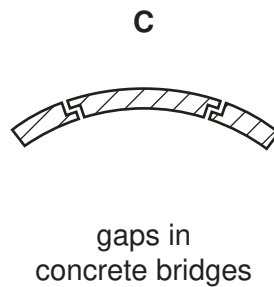
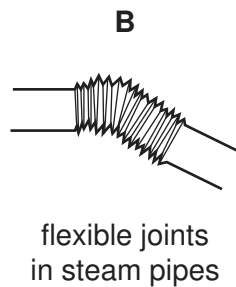
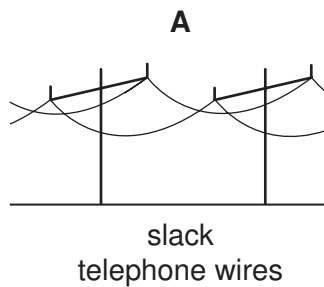
- 5 The diagram shows a dipper producing circular waves in a ripple tank.



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

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

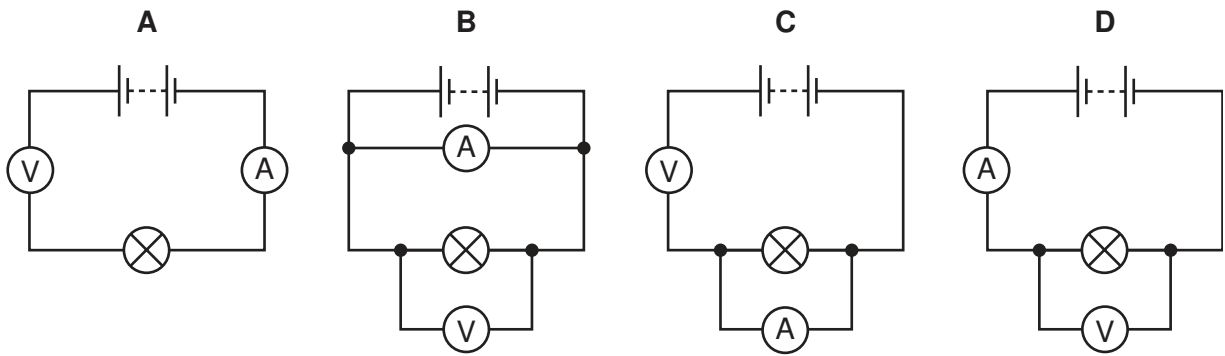
- 6 Which diagram shows a useful application of thermal expansion?



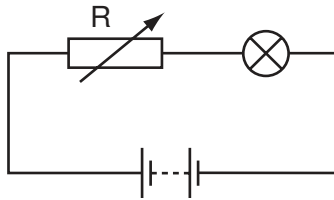
- 7 What is a property of all electromagnetic waves?

- 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.



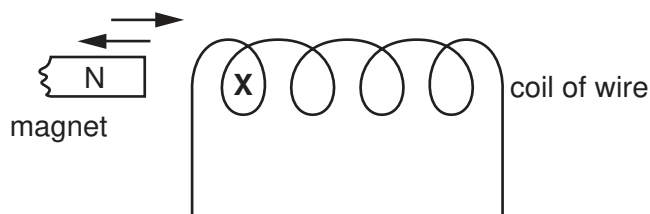
This is because varying the resistance changes

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

- 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.)

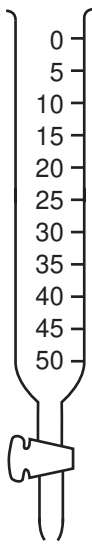
time / minutes	0	5	10	15	20	25	30	35	40
activity / counts per second	114	102	90	83	73	65	57	51	45

What is the half-life of the substance?

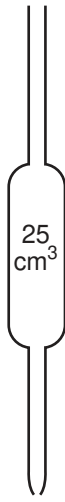
- A** 73 minutes
B 57 minutes
C 30 minutes
D 20 minutes
- 13 What particles are present in the nucleus of the oxygen nuclide $^{17}_8\text{O}$?

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

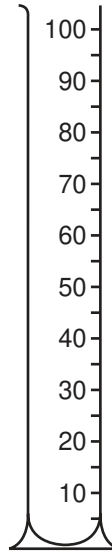
- 14 Which statement about the molecules in carbon dioxide gas is correct?
- A The molecules are close together.
 - B The molecules are diatomic.
 - C The molecules are in fixed positions.
 - D The molecules move randomly.
- 15 Which piece of apparatus would be most suitable to measure accurately the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



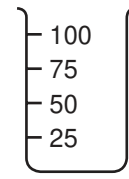
A



B

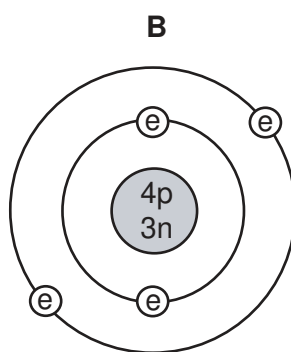
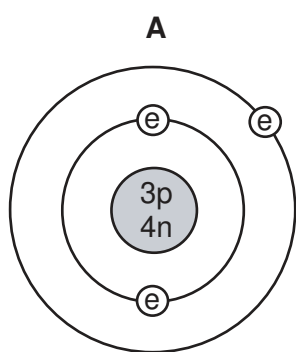


C

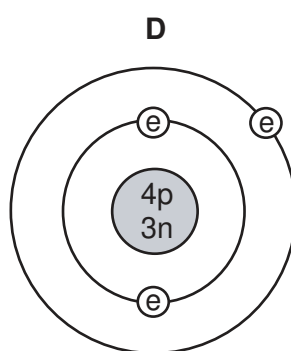
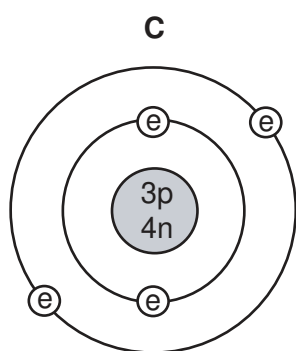


D

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.

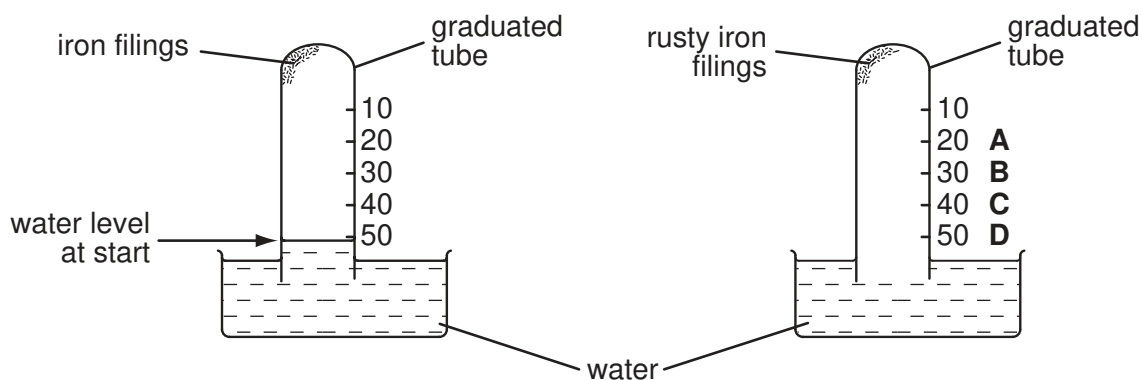
experiment	X	Y	Z
Does the metal liberate hydrogen from dilute hydrochloric acid?	yes	no	yes
Is the metal oxide reduced by heating with carbon?	yes	yes	no

What is the order of reactivity of the metals?

	most reactive	—————>	least reactive
A	X		Z
B	Y		Z
C	Z		Y
D	Z		Y

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

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



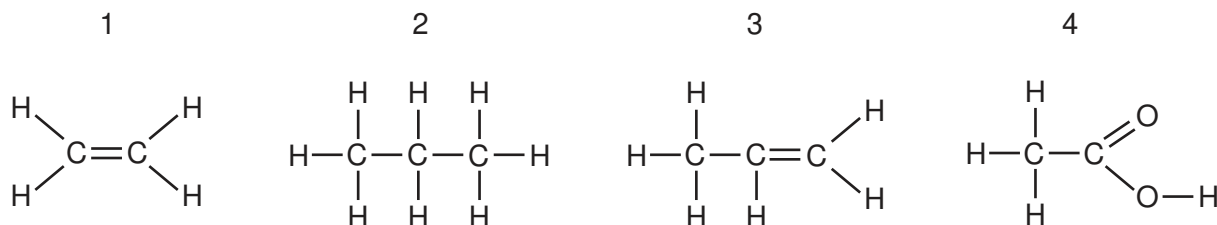
23 The following gases are present in car exhaust fumes.

- 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.

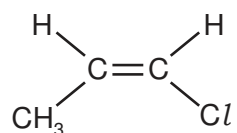
25 The structures of four organic compounds are shown.



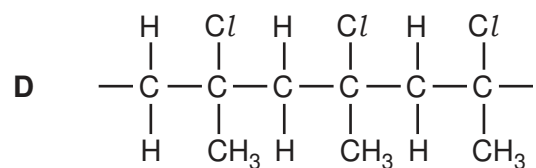
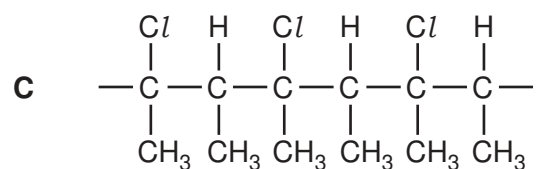
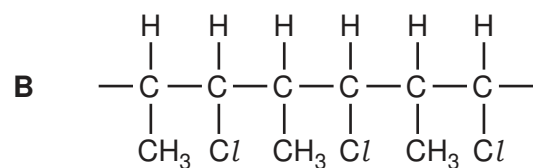
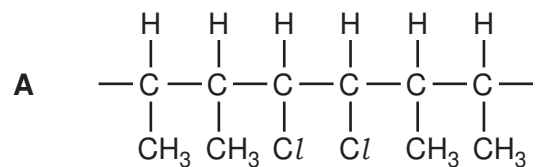
Which compounds decolourise aqueous bromine?

- 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.



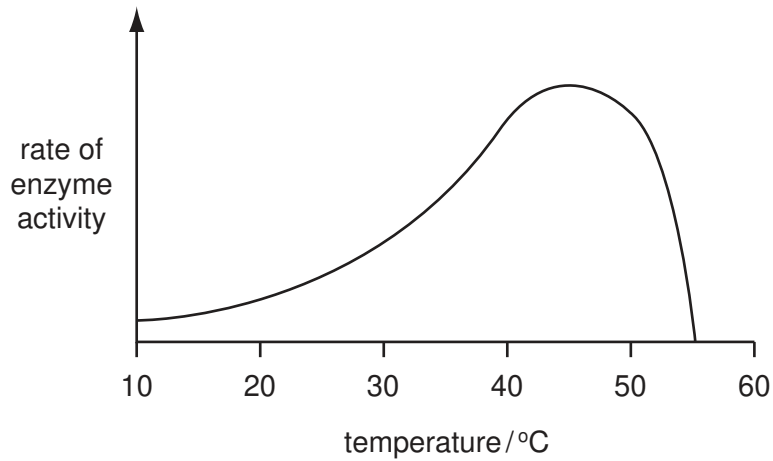
Which formula shows a part of the polymer chain formed from 3 molecules of the monomer?



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

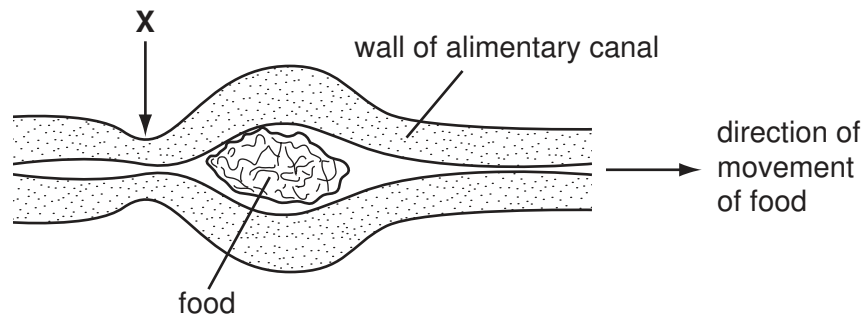
- 29 The graph shows the relationship between temperature and the activity of the enzyme amylase that breaks down starch to sugar.



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.

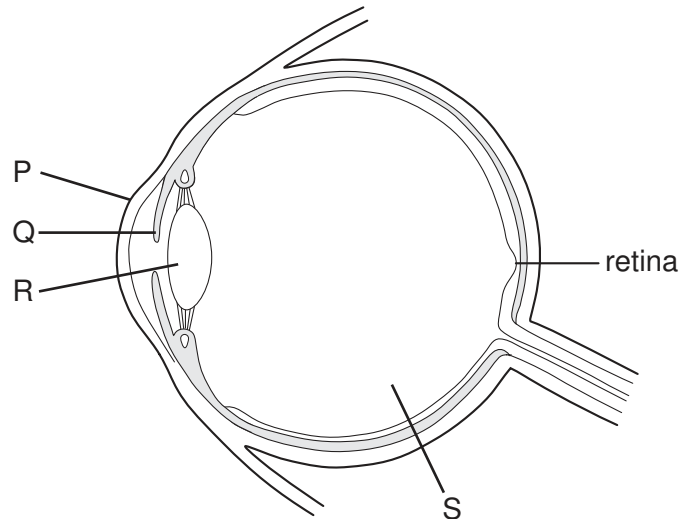
What would be the effect of this?

- 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

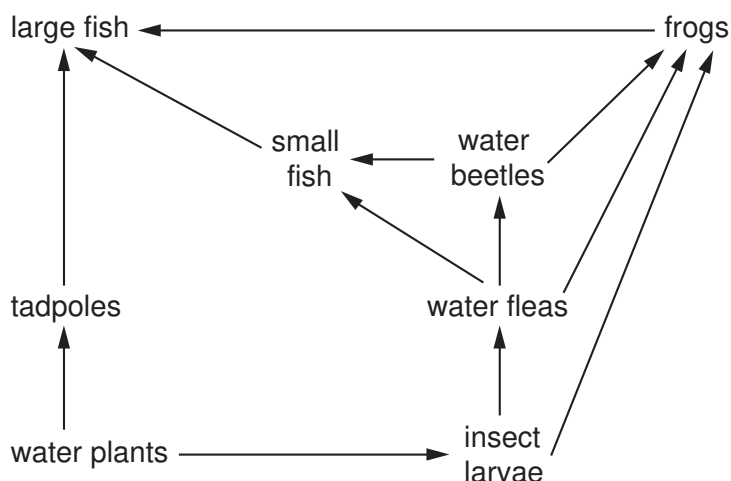
34 The diagram shows a section through the eye.



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.

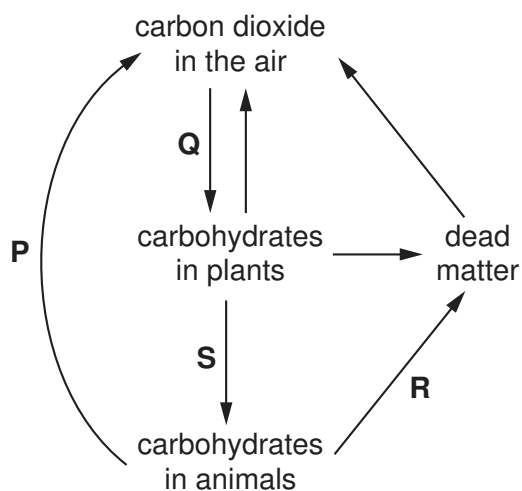
36 The diagram shows a food web from a freshwater pond.



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.



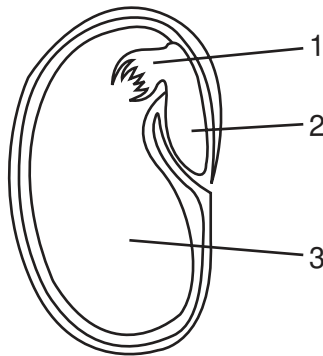
Which parts of the cycle form parts of food chains?

- 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	✓	✓	✗
B	✗	✓	✗
C	✓	✗	✓
D	✗	✓	✓

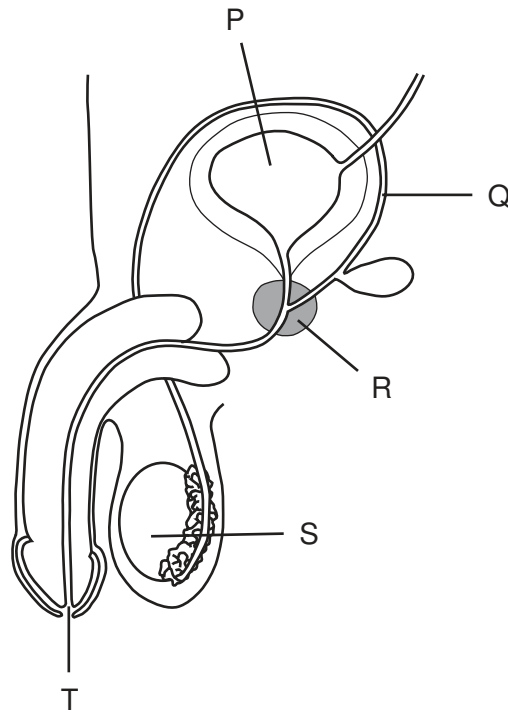
39 The diagram shows a section of a seed.



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												
7	3	Li Lithium 4	Be Beryllium 9	<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">H Hydrogen 1</td> </tr> </table>										1	H Hydrogen 1	B Boron 5	C Carbon 6	N Nitrogen 7	O Oxygen 8	F Fluorine 9	Ne Neon 10
1	H Hydrogen 1																				
23	11	Na Sodium 11	Mg Magnesium 12	Al Aluminium 13	Si Silicon 14	P Phosphorus 15	S Sulphur 16	Cl Chlorine 17	Ar Argon 18												
39	19	K Potassium 19	Ca Calcium 20	Sc Scandium 21	Ti Titanium 22	V Vanadium 23	Cr Chromium 24	Mn Manganese 25	Fe Iron 26	Ni Nickel 28	Co Cobalt 27	Zn Zinc 30	Ga Gallium 31	Ge Germanium 32	As Arsenic 33	Se Selenium 34	Br Bromine 35	Kr Krypton 36			
85	37	Rb Rubidium 37	Sr Strontium 38	Y Yttrium 39	Zr Zirconium 40	Nb Niobium 41	Mo Molybdenum 42	Tc Technetium 43	Ru Ruthenium 44	Pd Palladium 46	Ag Silver 47	Cd Cadmium 48	In Indium 49	Sn Tin 50	Sb Antimony 51	Te Tellurium 52	I Iodine 53	Xe Xenon 54			
133	55	Cs Caesium 55	Ba Barium 56	La Lanthanum 57	Hf Hafnium 72	Ta Tantalum 73	W Tungsten 74	Re Rhenium 75	Os Osmium 76	Pt Platinum 78	Au Gold 79	Hg Mercury 80	Tl Thallium 81	Pb Lead 82	Bi Bismuth 83	Po Polonium 84	At Astatine 85	Rn Radon 86			
226	87	Fr Francium 87	Ra Radium 88	Ac Actinium 89																	

*58-71 Lanthanoid series
90-103 Actinoid series

a	X	b
---	----------	---

Key

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.).