UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

SCIENCE (CHEMISTRY, BIOLOGY) **5126/01**

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 printed on page 20.

1 Which statement about the molecules in carbon dioxide gas is correct?

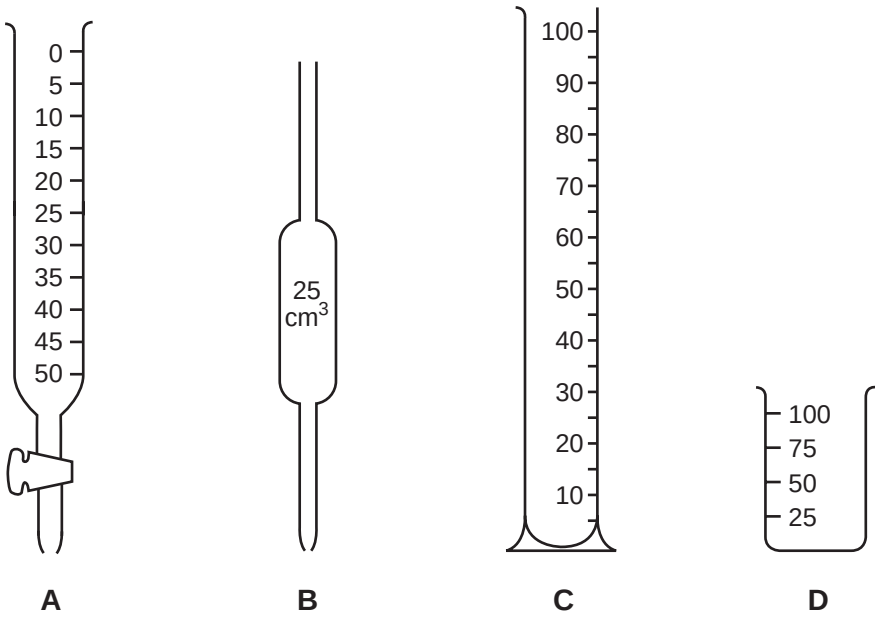
A The molecules are close together.

B The molecules are diatomic.

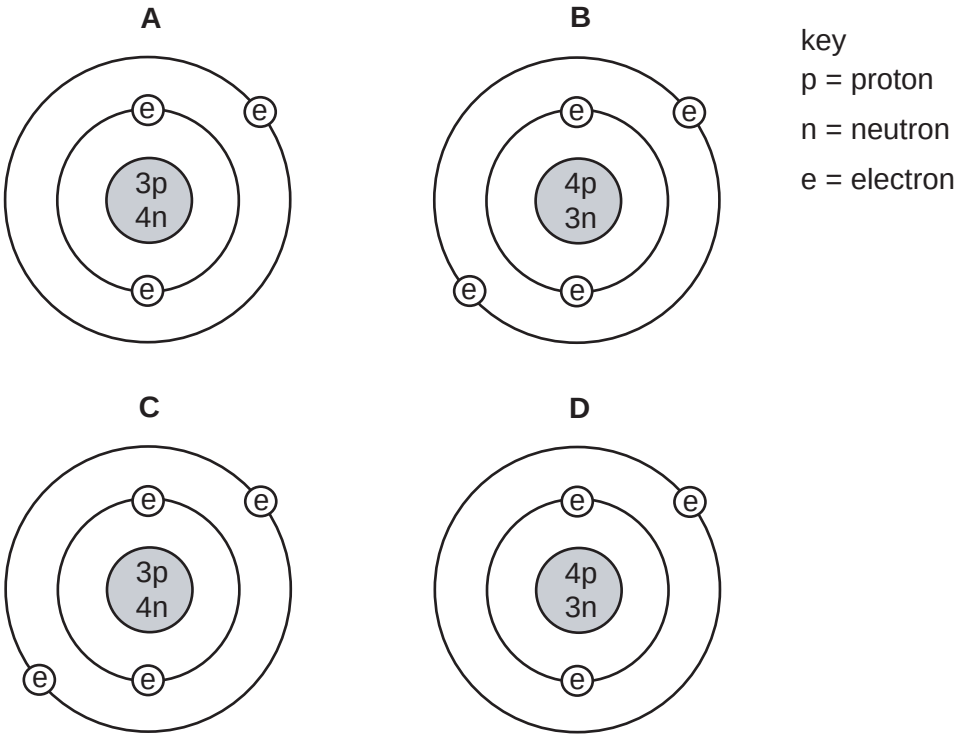
C The molecules are in fixed positions.

D The molecules move randomly.

2 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?



3 Which diagram shows the structure of a $^{7}_{3}Li$ atom?



4 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.

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

A 4 g

B 8 g

C 16 g

D 32 g

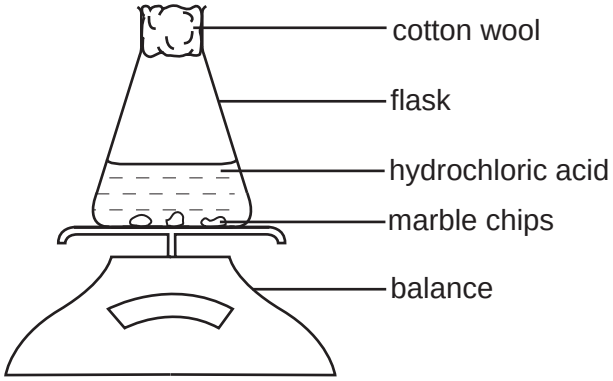
6 Which volume of sulphur dioxide (at r.t.p.) is formed when 9.7 g of zinc sulphide is heated in air?

$$2ZnS + 3O_2 \rightarrow 2ZnO + 2SO_2$$

A 1.2 dm^3 **B** 2.4 dm^3 **C** 3.6 dm^3 **D** 4.8 dm^3

[Turn over

7 Two experiments were carried out using the apparatus as shown.

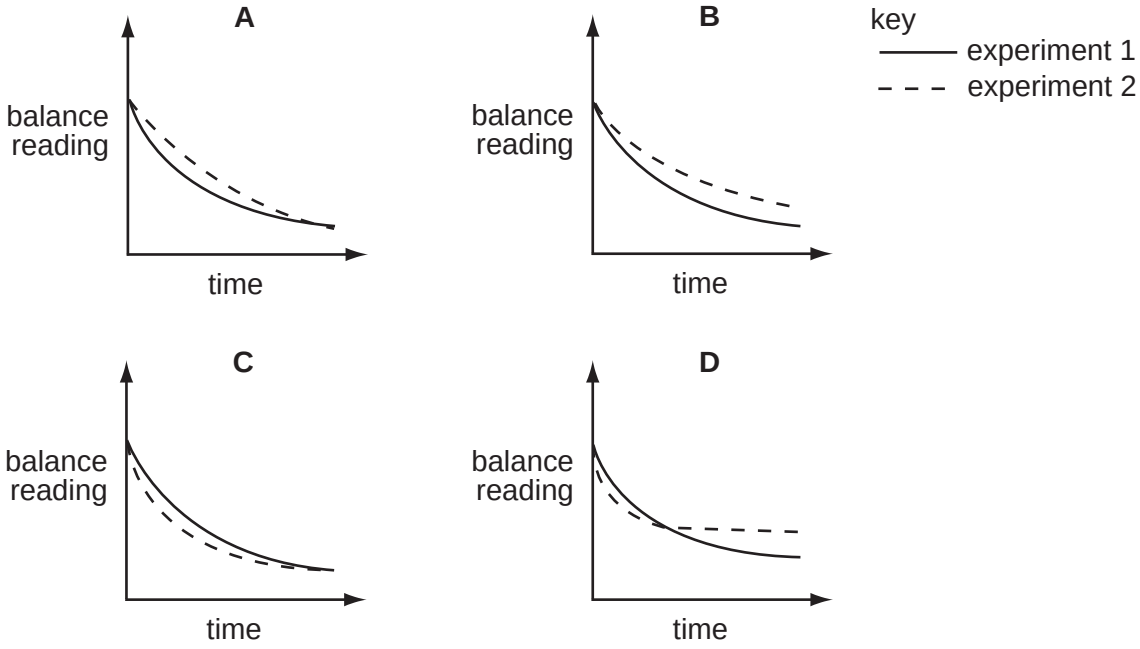


In experiment 1, dilute hydrochloric acid was used.

In experiment 2, concentrated hydrochloric acid was used.

All other conditions were the same and in both experiments all the marble chips had completely reacted.

Which diagram shows the results obtained?



8 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

9 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

10 Which element in the table is a metal?

element	melting point in °C	density in g / cm^3
A	-7	3.10
B	44	1.82
C	113	2.07
D	1083	8.92

11 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

12 Different forms of steel contain differing amounts of carbon.

Steel **P** contains a high proportion of carbon.

Steel **Q** contains a low proportion of carbon.

Which statement is correct?

A **P** is stronger but more brittle than **Q**

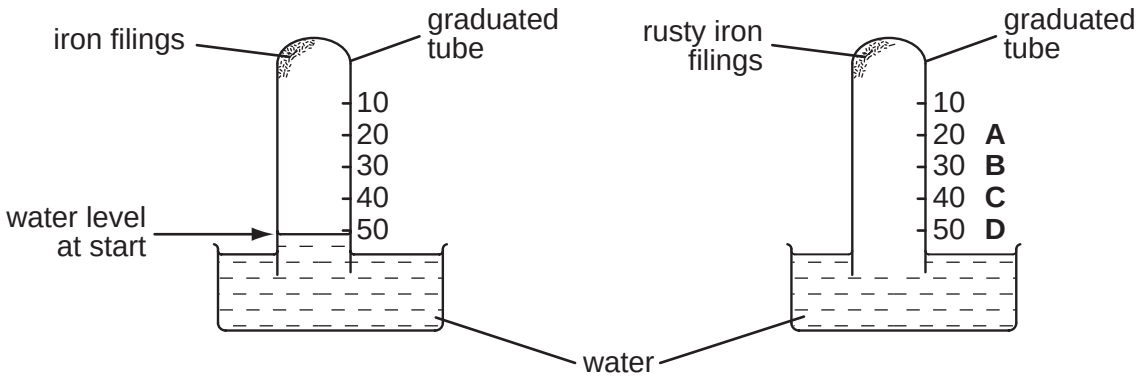
B **P** is stronger but less brittle than **Q**

C **P** is less strong but more brittle than **Q**

D **P** is less strong but less brittle than **Q**

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

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



14 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

15 Desalination is the removal of sodium chloride from sea water.

Which method is used in the laboratory to desalinate sea water?

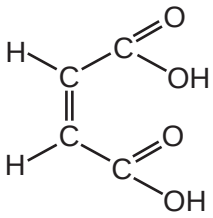
A chromatography

B crystallisation

C distillation

D filtration

16 A compound, **X**, has the molecular structure as shown.



How can **X** be described?

A both as an alkane and as an acid

B both as an alkene and as an acid

C both as an alkane and as an alcohol

D both as an alkene and as an alcohol

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

A They all contain oxygen.

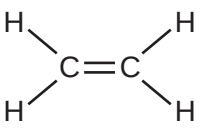
B They can be represented by a general formula.

C They exhibit a gradual change in physical properties.

D They have the same empirical formula.

18 The structures of four organic compounds are shown.

1



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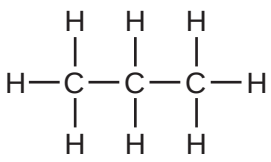

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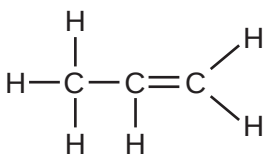

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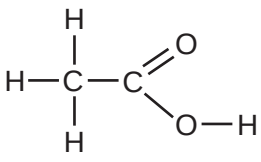


Which compounds decolourise aqueous bromine?

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

19 Methane is used as a fuel.

Which property is essential for this use?

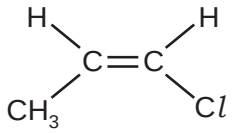
A It burns exothermically.

B It is a gas.

C It is odourless.

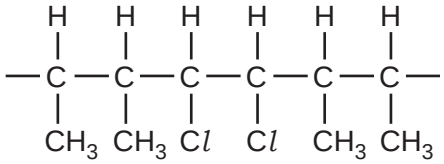
D It has a low boiling point.

20 The following formula represents a monomer.

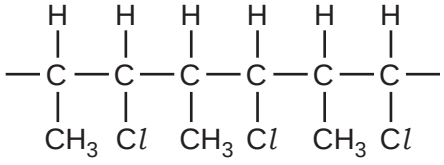


Which formula shows a part of the polymer chain formed from 3 molecules of the monomer?

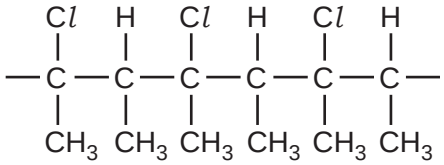
A



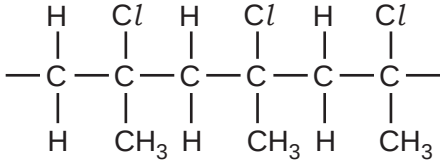
B



C



D



21 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

22 Which cell is biconcave in shape?

A red blood cell

B root hair cell

C white blood cell

D xylem cell

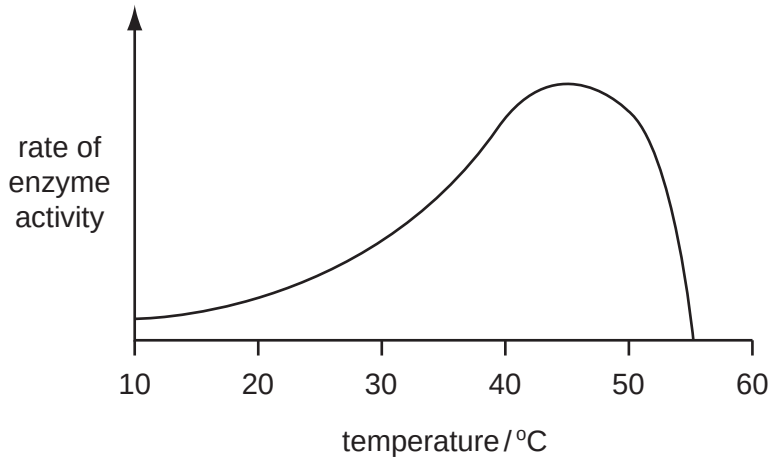
23 The sentence describes the uptake of water by a plant.

Water moves into the root hairs of a plant by osmosis through a .....**X**..... permeable cell membrane, ……**Y**…… a water potential gradient.

Which words complete spaces **X** and **Y**?

	X	Y
A	fully	up
B	fully	down
C	partially	up
D	partially	down

24 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.

25 What is the correct equation for photosynthesis?

A carbohydrate + oxygen → water + carbon dioxide

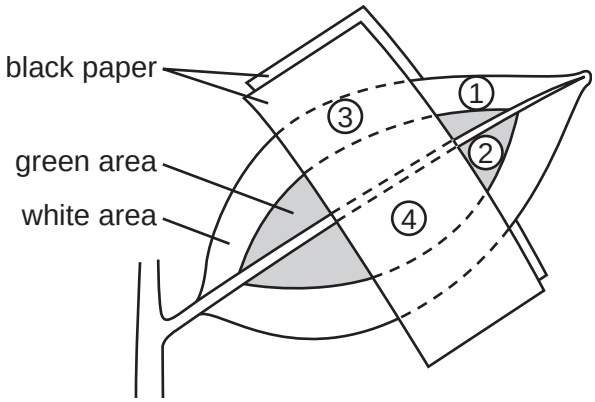
B carbohydrate + carbon dioxide → oxygen + water

C carbon dioxide + oxygen → carbohydrate + water

D carbon dioxide + water → carbohydrate + oxygen

26 A plant has leaves that are partly green and partly white. The plant is destarched, and a leaf is partly covered by black paper.

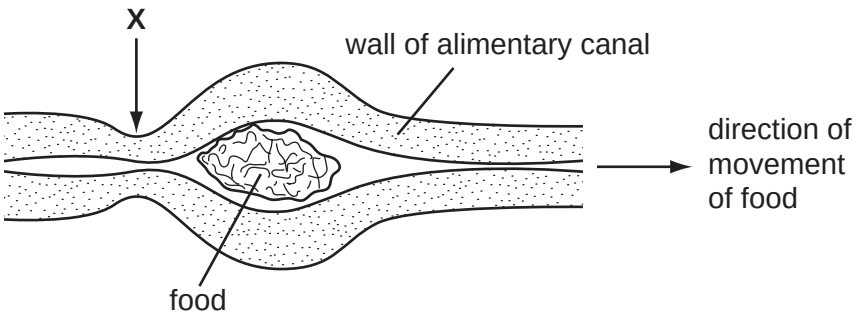
The plant is placed in bright light for several hours. Four discs are then cut from the leaf in the positions shown and are tested for starch.



Which discs contain starch?

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

27 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

28 Which substance, released into the alimentary canal, contains no enzymes but speeds up fat digestion?

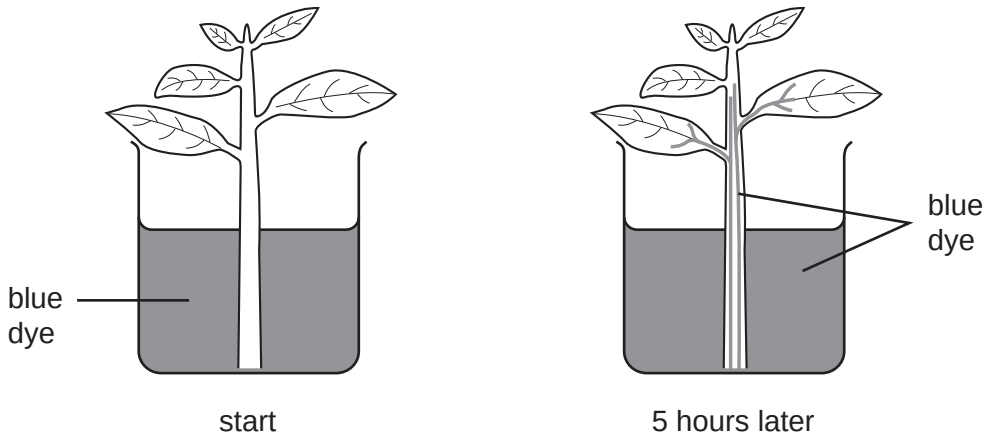
A bile

B intestinal juice

C pancreatic juice

D saliva

29 A piece of a plant with a transparent stem was placed in a beaker containing a blue dye and then examined 5 hours later.



Which explains the change in appearance?

A Blue dye diffuses through the cells of the plant.

B Blue dye moves up the stem by osmosis.

C Blue dye moves up through the xylem.

D Blue dye stains cells in the leaves.

30 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.

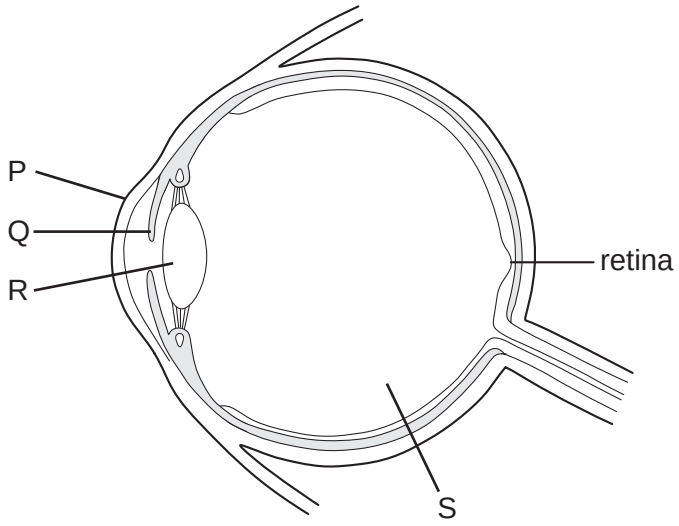
C Her body cells do not get enough oxygen.

D She cannot fight off infections.

31 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

32 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

33 What may happen to a heroin addict 48 hours after the drug is withdrawn?

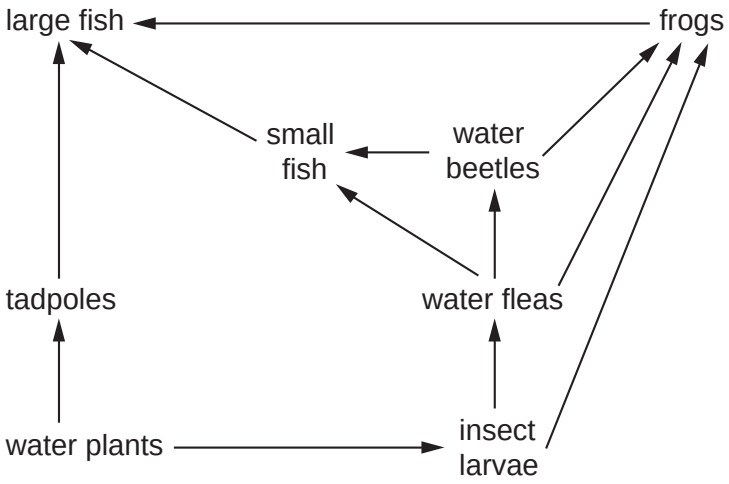
A Desire for the drug is reduced.

B The addiction is cured.

C Tolerance to the drug increases.

D Vomiting, sweating and cramp occur.

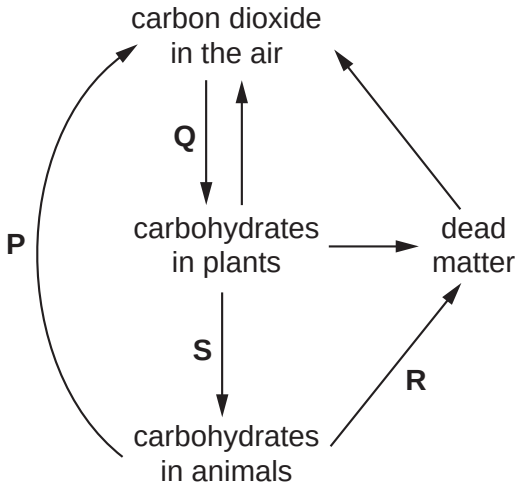
34 The diagram shows a food web from a freshwater pond.



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

35 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**

36 Which property of modern insecticides helps to keep environmental pollution at the **lowest** level?

A They accumulate in the bodies of predators.

B They are broken down by soil bacteria.

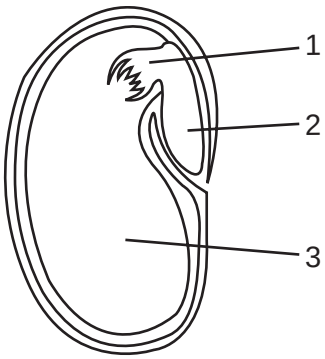
C They are easily washed into lakes and rivers.

D They are taken up by plant roots.

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

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

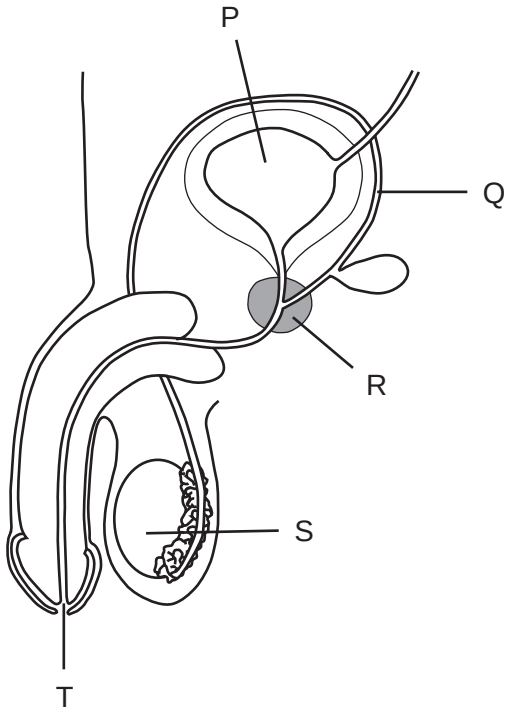
38 The diagram shows a section of a seed.



What are the numbered parts?

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

39 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

40 In peas, the allele **S** for smooth seeds is dominant over **s** for wrinkled seeds.

200 plants with the genotype **Ss** are self-pollinated and 1500 smooth seeds are collected.

How many wrinkled seeds are collected?

A 4500 **B** 2000 **C** 1500 **D** 500

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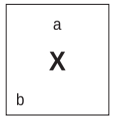
DATA SHEET
The Periodic Table of the Elements

Group																	
I	II										III	IV	V	VI	VII	0
							1 H Hydrogen 1									4 He Helium 2
7 Li Lithium 3	9 Be Beryllium 4										11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10
23 Na Sodium 11	24 Mg Magnesium 12										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
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
85 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	Tc Technetium 43	101 Ru Ruthenium 44	103 Rh Rhodium 45	106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54
133 Cs Caesium 55	137 Ba Barium 56	139 La Lanthanum 57 *	178 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	186 Re Rhenium 75	190 Os Osmium 76	192 Ir Iridium 77	195 Pt Platinum 78	197 Au Gold 79	201 Hg Mercury 80	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	Po Polonium 84	At Astatine 85	Rn Radon 86
Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89															

140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	Pm Promethium 61	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	Pa Protactinium 91	238 U Uranium 92	Np Neptunium 93	Pu Plutonium 94	Am Americium 95	Cm Curium 96	Bk Berkelium 97	Cf Californium 98	Es Einsteinium 99	Fm Fermium 100	Md Mendelevium 101	No Nobelium 102	Lr Lawrencium 103

*58-71 Lanthanoid series
90-103 Actinoid series

Key



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

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