

CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level
COMBINED SCIENCE
PAPER 1 Multiple Choice

5129/1

OCTOBER/NOVEMBER SESSION 2002

1 hour

Additional materials:

- Multiple Choice answer sheet
- Soft clean eraser
- Soft pencil (type B or HB is recommended)

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.

Write your name, Centre number and candidate number on the answer sheet in the spaces provided unless this has already 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.

INFORMATION FOR CANDIDATES

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 16.

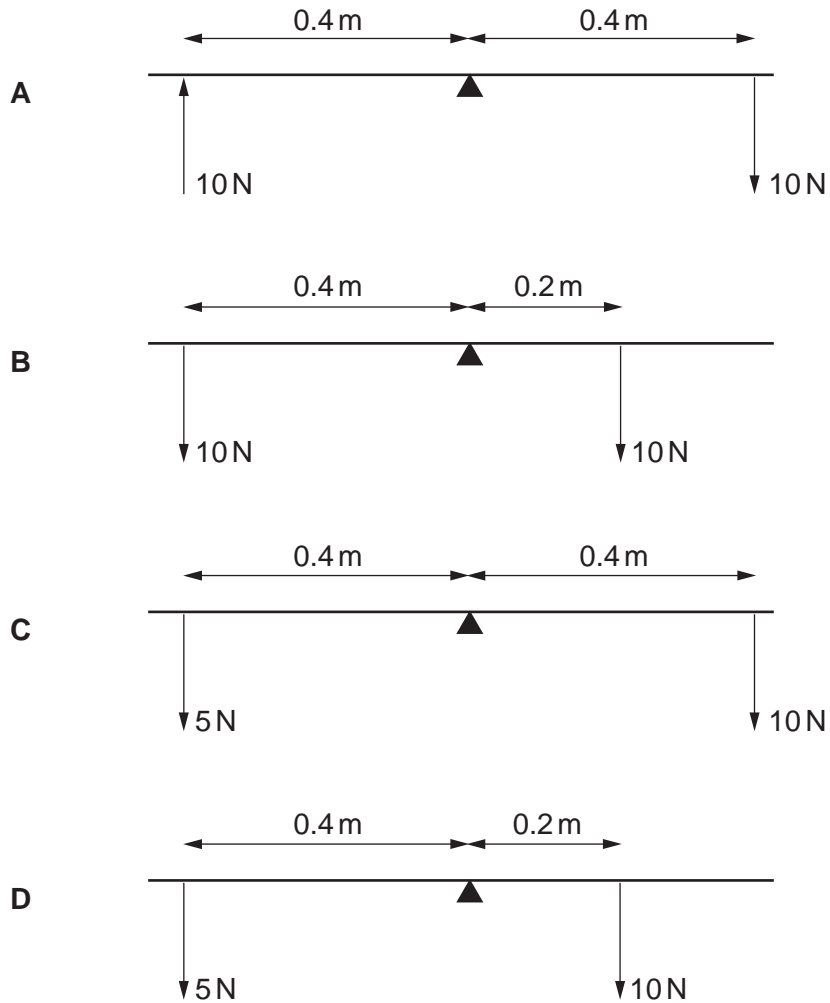
This question paper consists of 16 printed pages.



- 1 A stone is falling through the air. The acceleration of free fall is 10 m/s^2 .
Ignoring air resistance, what happens to the stone each second during its fall?
- A The acceleration of the stone increases by 10 m/s^2 .
 - B The speed of the stone increases by 10 m/s .
 - C The stone travels a distance of 10 m .
 - D The stone travels at a speed of 10 m/s .
- 2 Which property of a spacecraft is zero when it travels through outer space after leaving Earth's gravitational field?
- A its density
 - B its energy
 - C its mass
 - D its weight
- 3 Which of the following describes the density of a material?
- A the amount of matter in the material
 - B the mass per unit volume of the material
 - C the pull of gravity on the material
 - D the volume per unit mass of the material

4 Forces are applied to a beam pivoted at its centre.

Which example demonstrates the Principle of Moments?



5 An electric motor can lift a weight of 2000 N through a vertical height of 10 m in 20 s.

What is the power of the motor?

- A** 10 W **B** 1000 W **C** 4000 W **D** 400 000 W

6 Which surface is the best emitter of heat radiation?

- A** dull black
B dull white
C shiny black
D shiny white

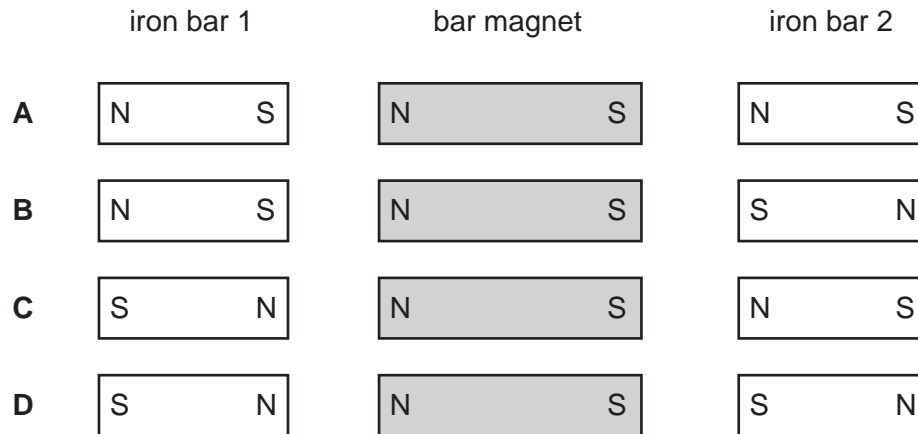
- 7 A VHF radio station broadcasts at a frequency of 60 MHz (6.0×10^7 Hz). The speed of radio waves is 3.0×10^8 m/s.

What is the wavelength of the waves broadcast by the station?

- A 5.0 m B 2.0 m C 0.5 m D 0.2 m

- 8 A bar magnet is placed between two iron bars.

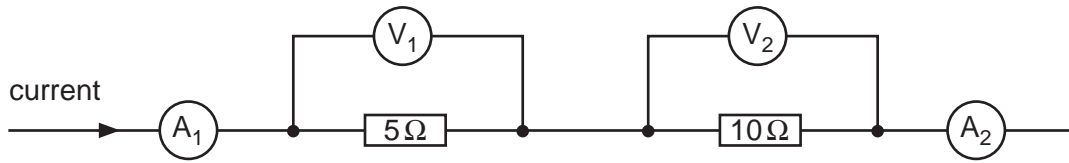
Which diagram correctly shows the poles induced in both iron bars?



- 9 Which of the following describes the e.m.f. of a cell?

- A the difference in energy between that needed to drive unit charge through the load resistors and through the cell
- B the energy used to drive unit charge through all the load resistors in the circuit
- C the energy used to drive charge through the resistance of the cell
- D the total energy used to drive unit charge round the complete circuit

- 10 A current flows in two resistors connected in series as shown. A_1 and A_2 are the readings on the ammeters. V_1 and V_2 are the readings on the voltmeters.

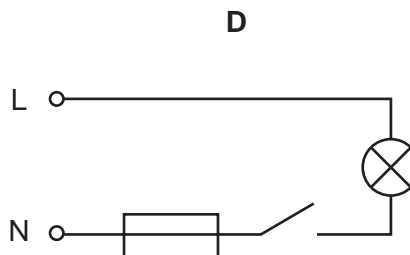
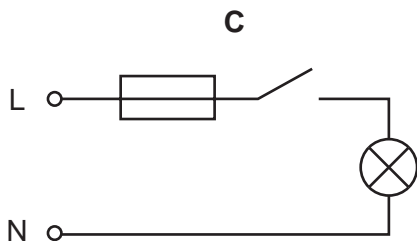
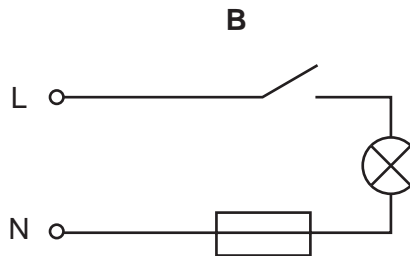
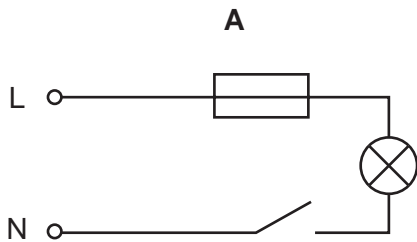


Which of the following correctly describes the ammeter and the voltmeter readings?

ammeter readings

voltmeter readings

- | | | |
|----------|-----------------------------|--------------------------|
| A | A_1 is equal to A_2 | V_1 is equal to V_2 |
| B | A_1 is equal to A_2 | V_1 is less than V_2 |
| C | A_1 is greater than A_2 | V_1 is equal to V_2 |
| D | A_1 is greater than A_2 | V_1 is less than V_2 |
- 11 Which circuit shows the correct positions for the fuse and switch in the lighting circuit of a house?

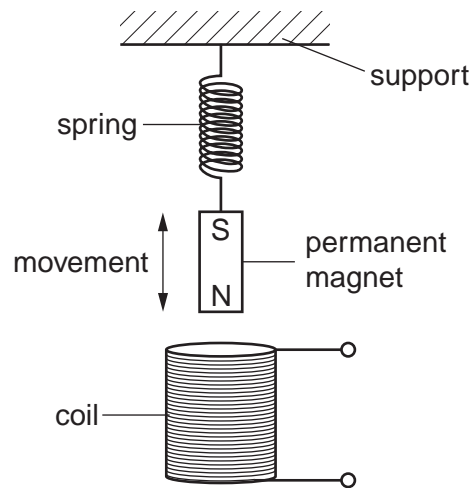


key

L = live wire

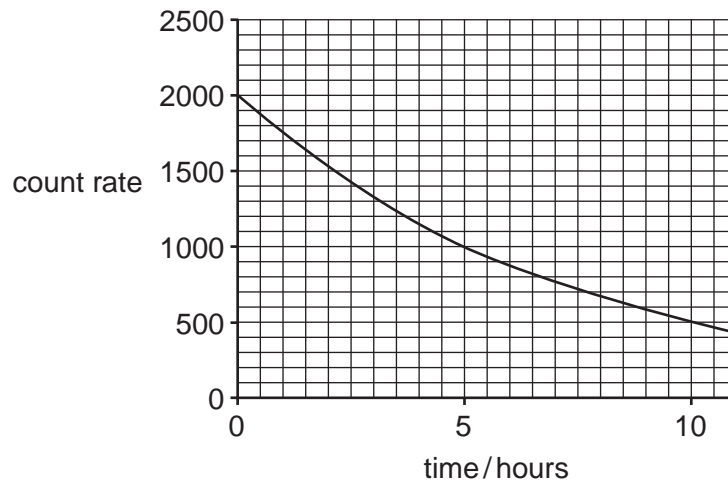
N = neutral wire

- 12 A permanent magnet moving up and down on the end of a spring induces an e.m.f. in a coil.



Which factor, on its own, would **decrease** the maximum value of the induced e.m.f.?

- A increasing the number of turns in the coil
 - B increasing the strength of the magnet
 - C raising the coil
 - D raising the support of the spring
- 13 The graph shows the count rate for a radioactive source over a few hours.



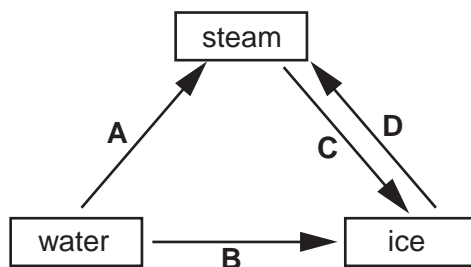
What will be the count rate after 20 hours?

- A 0
- B 62.5
- C 125
- D 250

14 What is the nucleon number (mass number) of a nuclide?

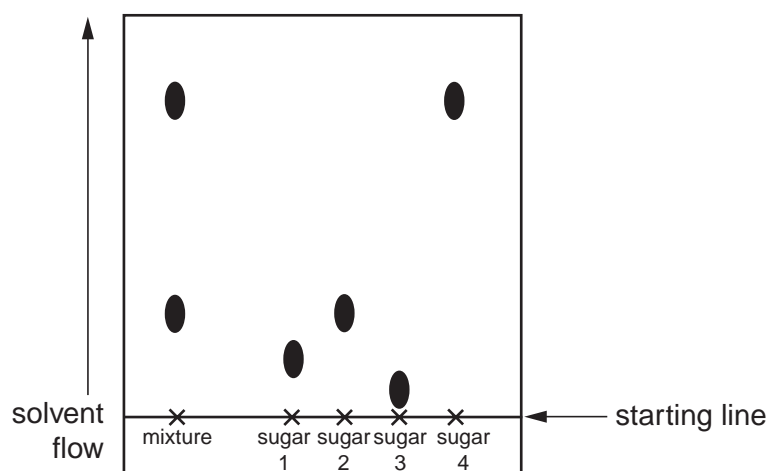
- A the number of neutrons
- B the number of protons
- C the number of neutrons and protons
- D the number of protons and electrons

15 Which change, **A**, **B**, **C**, or **D**, can involve both condensation and freezing?



16 A mixture of two sugars was compared with four different sugars using chromatography.

The results are shown in the diagram.



Which two sugars does this mixture contain?

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

- 17 The atoms of element **X** have the electronic configuration 2,8,6.

Which statement about element **X** is correct?

- A It forms an ionic compound with sodium.
- B It forms an ion of charge 2+.
- C It has 6 protons in the outer shell of an atom.
- D It only reacts with non-metals.

- 18 The elements X and Y form the compound X_2Y .

What is the correct electronic configuration of the atoms X and Y?

	electronic configuration	
	atom of X	atom of Y
A	2,1	2,7
B	2,2	2,7
C	2,1	2,6
D	2,2	2,6

- 19 The approximate pH values of aqueous solutions of four substances commonly used in cooking are shown.

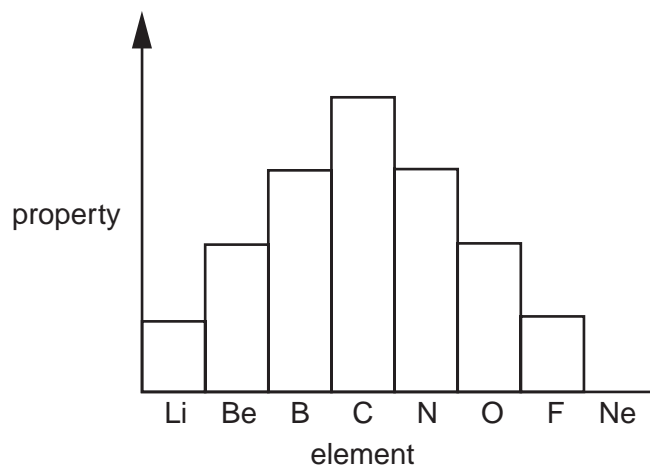
Which substance could be taken to neutralise excess acid in the stomach?

	substance	pH
A	baking soda	9
B	salt	7
C	lemon juice	4
D	vinegar	3

- 20 Which of the following does **not** react with dilute sulphuric acid?

- A magnesium hydroxide
- B magnesium metal
- C magnesium nitrate
- D magnesium oxide

21 The bar chart shows the period of elements from lithium to neon.



Which property of these elements is shown on the chart?

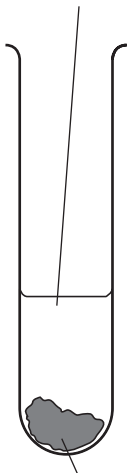
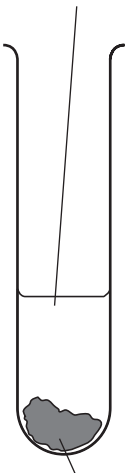
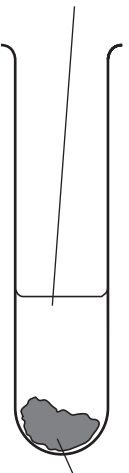
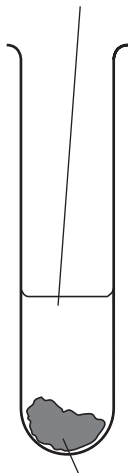
- A the number of electrons used in bonding
- B the number of orbits holding electrons
- C the proton (atomic) number
- D the relative atomic mass

22 The table shows some metals and their uses.

For which metal is the correct reason given for the stated use?

	metal	use	reason
A	aluminium	manufacture of aeroplane wings	strength and high density
B	copper	electrical wiring	good conductor of heat
C	iron	manufacturing stainless steel	rusts
D	zinc	galvanising iron	zinc is more reactive than iron

23 In which tube is hydrogen formed?

dilute hydrochloric acid	dilute sulphuric acid	dilute sulphuric acid	dilute hydrochloric acid
			
zinc	copper	copper(II) oxide	zinc carbonate
A	B	C	D

24 Carbon monoxide is a pollutant emitted from car exhausts.

Which of its properties makes it harmful to humans?

- A It has no colour, taste or smell.
- B It has a corrosive action on lung tissue.
- C It forms a stable compound with blood.
- D It combines with oxygen in the lungs.

25 Which statement about an homologous series is **not** correct?

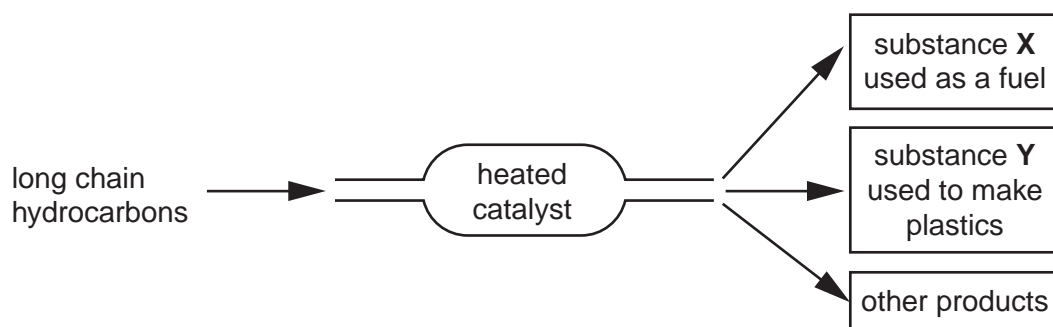
All the members of the series have the same

- A chemical reactions.
- B functional group.
- C general formula.
- D physical properties.

26 What product is formed when hydrogen reacts with an alkene?

- A an alcohol
- B an alkane
- C an organic acid
- D a polymer

27 The diagram shows how useful products can be obtained by cracking long chain hydrocarbons.



What are **X** and **Y**?

	substance X	substance Y
A	ethanol	propene
B	hydrogen	ethene
C	methane	ethane
D	steam	ethene

28 A new cell is being examined.

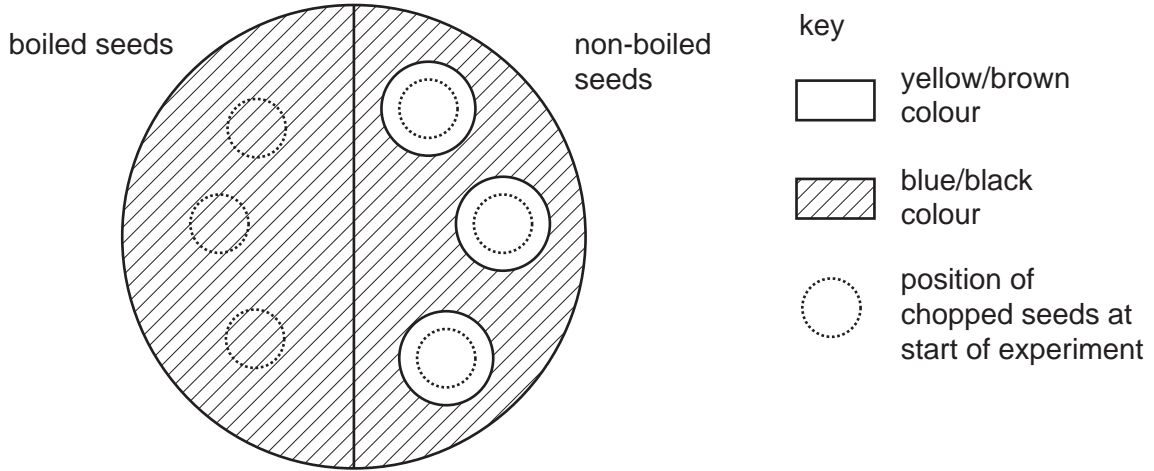
Which feature would enable you to identify it as a plant cell or an animal cell?

- A** The cell contains a single large sap vacuole space.
- B** The cell contains glucose and amino acids.
- C** The cell contains stored fat.
- D** The cell surface membrane is partially permeable.

29 Six bean seeds were soaked in water for 24 hours. Three of them were then boiled and cooled. The boiled and the non-boiled seeds were chopped up and then placed on the surface of agar jelly containing starch.

After two days, all the seeds were removed and the jelly was flooded with iodine solution.

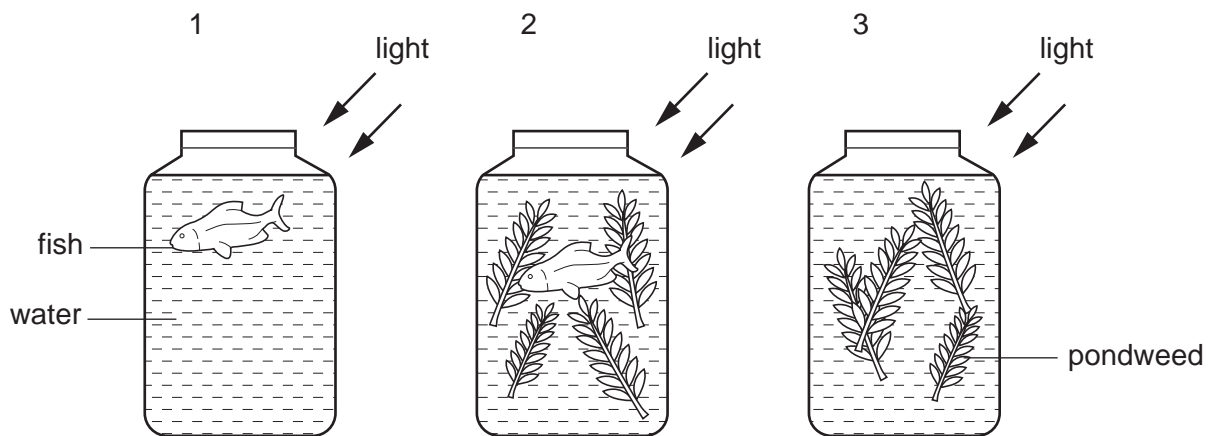
The diagram shows the result of the experiment.



What is the explanation for the results with the non-boiled bean seeds?

- A They absorb iodine.
- B They absorb starch.
- C They secrete acid.
- D They secrete amylase.

30 Three jars were set up as shown.



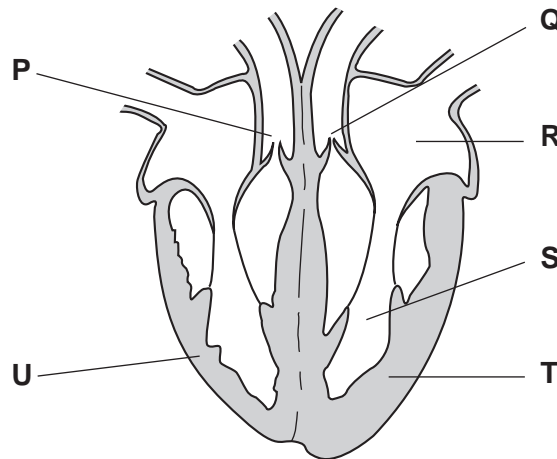
How will the concentration of dissolved carbon dioxide in the water of each jar change?

	jar 1	jar 2	jar 3
A	decreases	increases	no change
B	increases	increases	increases
C	increases	no change	decreases
D	no change	decreases	decreases

31 Why is it important to include fibre in the diet?

- A It gives energy to keep the body warm.
- B It helps food pass through the gut.
- C It increases growth in young children.
- D It is easy to digest.

32 The diagram shows a section through the human heart.



What feature suggests that the blood leaves the heart at different pressures, going to the lungs and to the body?

- A chambers **R** and **S** have different volumes
- B the walls of the atria are thinner than the walls of the ventricles
- C valve **P** is stronger than valve **Q**
- D wall **T** is more muscular than wall **U**

33 Which substance builds up in a muscle as a result of anaerobic respiration?

- A carbon dioxide
- B ethanol
- C lactic acid
- D water

34 A person is sitting in a dark room.

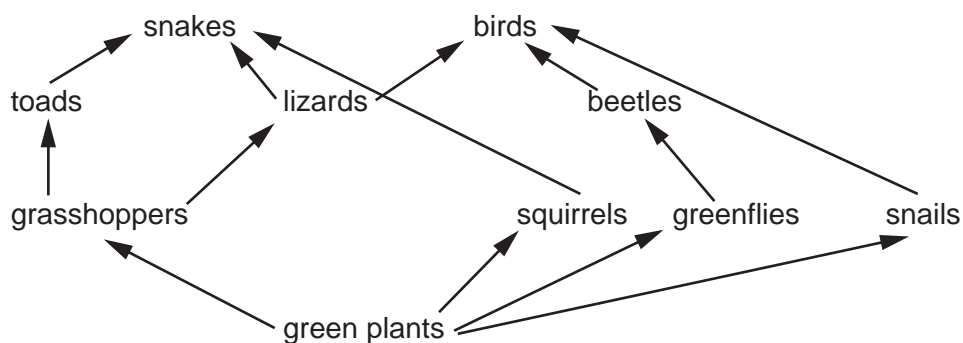
What happens in the eye when a light is switched on?

	circular muscle of iris	size of pupil
A	contracts	decreases
B	contracts	increases
C	relaxes	decreases
D	relaxes	increases

35 Which statement is true of both alcohol and heroin?

- A** Their use can lead to habitual criminal behaviour.
- B** They are stimulants.
- C** They are usually taken by injection.
- D** They produce only mild withdrawal symptoms.

36 The diagram shows a food web in woodland.



In this food web a beetle is

- A** a carnivore.
- B** a decomposer.
- C** a herbivore.
- D** a producer.

37 Which processes return carbon dioxide into the atmosphere?

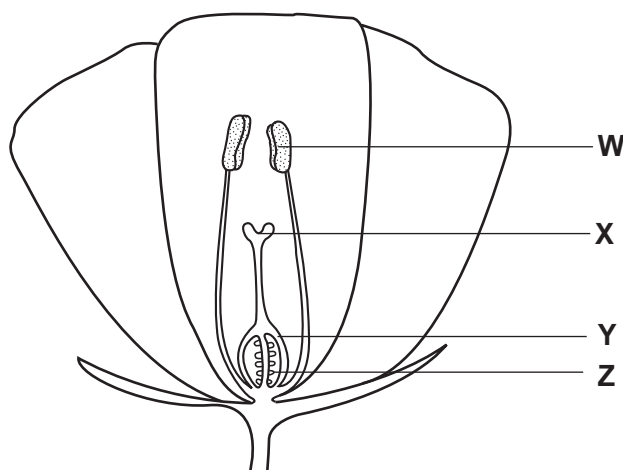
- A** combustion and feeding
- B** feeding and photosynthesis
- C** photosynthesis and respiration
- D** respiration and combustion

38 Rivers are often used to dispose of waste substances.

Which substance, when disposed of, pollutes the river for the shortest time?

- A hot water
- B insecticides
- C mercury
- D sewage

39 The diagram represents a section through a flower.



What are the names of the labelled structures?

	W	X	Y	Z
A	anther	stigma	ovary	ovule
B	anther	stigma	ovule	ovary
C	stigma	anther	ovary	ovule
D	stigma	anther	ovule	ovary

40 A woman ovulates on the 7th March.

In which week will her next menstrual period begin?

	March						
week	Sun	Mon	Tues	Weds	Thurs	Fri	Sat
	–	–	–	1	2	3	4
A	5	6	7	8	9	10	11
B	12	13	14	15	16	17	18
C	19	20	21	22	23	24	25
D	26	27	28	29	30	31	

DATA SHEET
The Periodic Table of the Elements

		Group																																				
I	II	III	IV	V	VI	VII	0					0																										
		1 H Hydrogen 1										4 He Helium 2																										
7 Li Lithium 3	9 Be Beryllium 4											20 Ne Neon 10																										
23 Na Sodium 11	24 Mg Magnesium 12											35.5 Cl Chlorine 17																										
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	101 Ru Ruthenium 44	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	190 Os Osmium 76	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	210 Po Polonium 84	210 At Astatine 85	210 Rn Radon 86																					
226 Ra Radium 88	227 Ac Actinium 89											227 Ac Actinium 89																										
*58-71 Lanthanoid series													†90-103 Actinoid series																									
<table border="1"> <tr> <td>a</td> <td>X</td> <td>b</td> </tr> </table>													a	X	b	a = relative atomic mass					X = atomic symbol			b = proton (atomic) number														
a	X	b																																				
<table border="1"> <tr> <td>140 Ce Cerium 58</td> <td>141 Pr Praseodymium 59</td> <td>144 Nd Neodymium 60</td> <td>150 Sm Samarium 62</td> <td>152 Eu Europium 63</td> <td>157 Gd Gadolinium 64</td> <td>159 Tb Terbium 65</td> <td>162 Dy Dysprosium 66</td> <td>165 Ho Holmium 67</td> <td>167 Er Erbium 68</td> <td>169 Tm Thulium 69</td> <td>173 Yb Ytterbium 70</td> <td>175 Lu Lutetium 71</td> </tr> <tr> <td>232 Th Thorium 90</td> <td>238 U Uranium 92</td> <td>238 U Uranium 92</td> <td>238 U Uranium 92</td> <td>238 U Uranium 92</td> <td>238 U Uranium 92</td> <td>238 U Uranium 92</td> <td>238 U Uranium 92</td> <td>238 U Uranium 92</td> <td>238 U Uranium 92</td> <td>238 U Uranium 92</td> <td>238 U Uranium 92</td> <td>238 U Uranium 92</td> </tr> </table>													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 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92
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 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92	238 U Uranium 92																										

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