

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education Ordinary Level

**COMBINED SCIENCE**

**5129/01**

Paper 1 Multiple Choice

May/June 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.

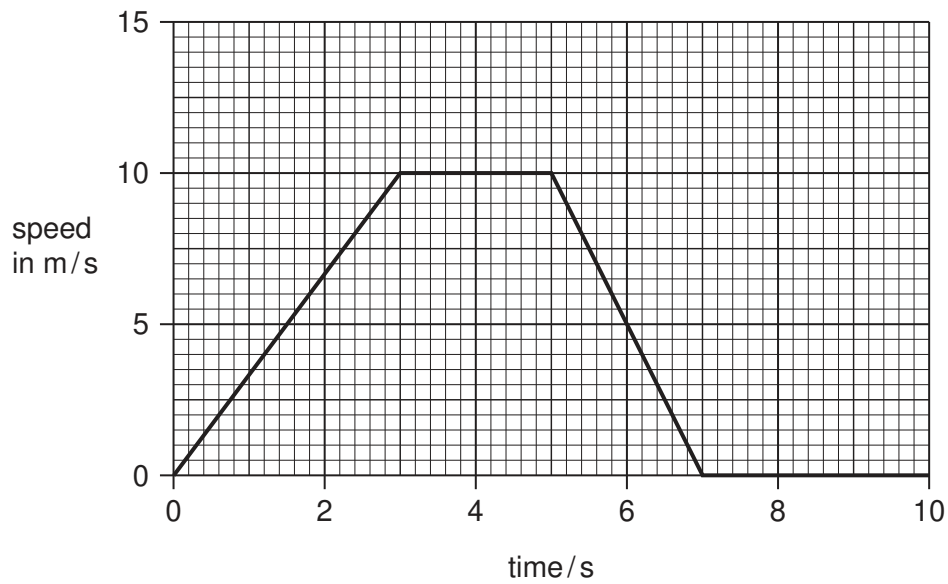
Any rough working should be done in this booklet.

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

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

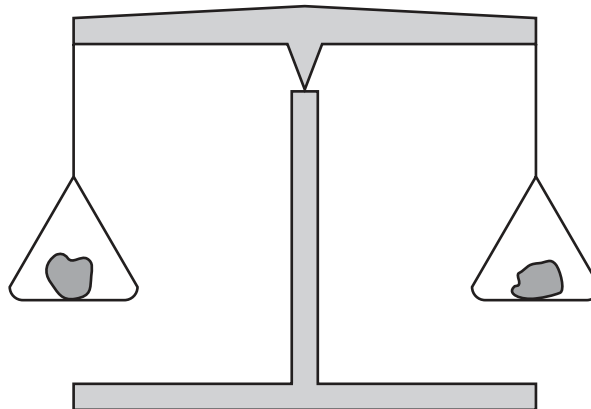


- 1 The graph shows the speed of a car over the first ten seconds of a journey.



Which statement about the acceleration of the car between 3 s and 5 s is true?

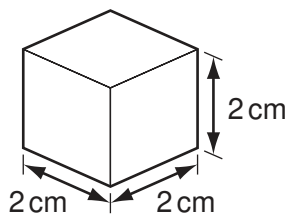
- A The acceleration decreases.
  - B The acceleration increases.
  - C The acceleration is zero.
  - D The acceleration is 10 m/s.
- 2 The diagram shows two objects on a beam balance in equilibrium.



Which property of the objects need **not** be the same?

- A the mass
- B the moment about the pivot
- C the volume
- D the weight

- 3 A cube with sides 2 cm long is made from a material of density  $8 \text{ g/cm}^3$ .



What is the mass of the cube?

- A 1g                      B 4g                      C 16g                      D 64g
- 4 A horseshoe can be made from a piece of metal by first heating and then hammering the metal.

Which property of the metal changes during the hammering action?

- A density  
 B mass  
 C shape  
 D volume
- 5 Four people run up the same steps.

Which person produces the largest power?

	weight of person / N	time taken / s
<b>A</b>	300	4
<b>B</b>	400	5
<b>C</b>	500	10
<b>D</b>	600	15

- 6 Equal volumes of four materials are heated at atmospheric pressure.

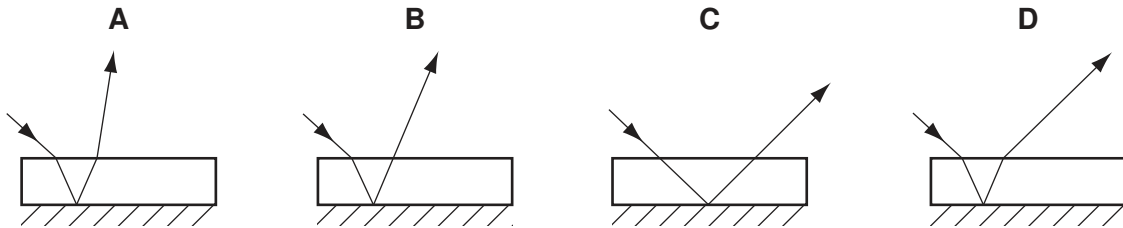
The temperature rise is the same for each material.

Which material expands the most?

- A air  
 B mercury  
 C steel  
 D water

- 7 The bottom surface of a glass block is silvered to act as a mirror.

Which diagram represents the path of a light ray that enters this block through the top surface?



- 8 Which material is correctly described?

	material	property	use
<b>A</b>	iron	not easily demagnetised	permanent magnet
<b>B</b>	iron	easily demagnetised	electromagnet
<b>C</b>	steel	not easily demagnetised	electromagnet
<b>D</b>	steel	easily demagnetised	permanent magnet

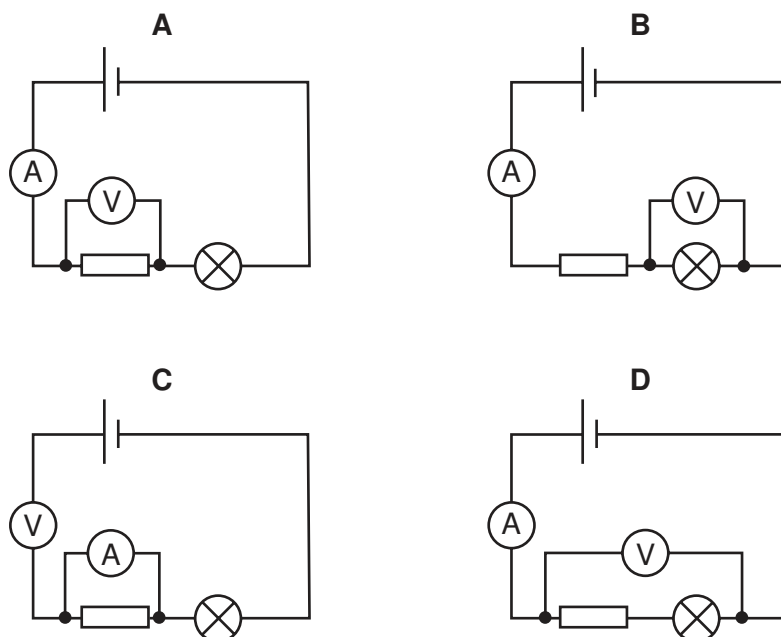
- 9 A current of 2A flows for 5 s through a lamp.

How much charge flows through the lamp?

- A** 0.4C      **B** 2.5C      **C** 7.0C      **D** 10.0C

- 10 A student wishes to measure the current in a lamp and the p.d. across the lamp.

In which circuit are the ammeter and voltmeter correctly placed?

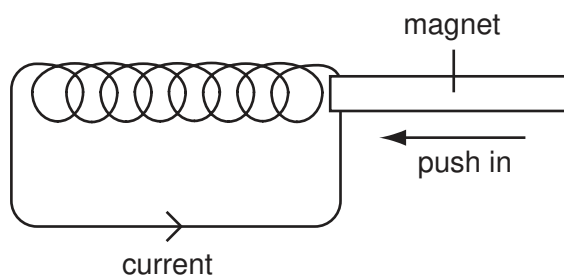


- 11 Electrical equipment should **not** be used in damp conditions.

What is the main hazard?

- A The equipment becomes too hot.
- B The fuse keeps 'blowing'.
- C The insulation becomes damaged.
- D The risk of an electric shock.

- 12 A magnet is pushed slowly into a coil and a current flows in the coil in the direction shown.



The magnet is then pulled out quickly from the same end of the coil.

What happens to the direction and size of current?

	direction	current
<b>A</b>	reversed	decreased
<b>B</b>	unchanged	decreased
<b>C</b>	reversed	increased
<b>D</b>	unchanged	increased

- 13 Uranium has a nuclide  ${}_{92}^{235}\text{U}$ .

Which of the following correctly shows the arrangement of particles in the nuclide?

	protons	neutrons	electrons
<b>A</b>	92	235	92
<b>B</b>	92	143	92
<b>C</b>	143	92	235
<b>D</b>	235	92	143

- 14 Which statement about the particles in a gas is **not** correct?
- A They spread throughout the vessel in which they are contained.
- B They are able to move randomly.
- C They are arranged in regular patterns.
- D There are large spaces between the particles.

- 15 A student wishes to measure out  $25.65 \text{ cm}^3$  of a liquid.

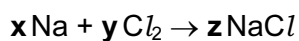
Which piece of apparatus would be used?

- A burette
- B measuring cylinder
- C pipette
- D syringe
- 16 What is the nucleon number of a sodium atom  ${}_{11}^{23}\text{Na}$ ?
- A 11
- B 12
- C 23
- D 34

- 17 What is the correct 'dot and cross' diagram for a molecule of nitrogen?  
[only the outer electrons are shown]



- 18 A chemical equation is shown.



Which numbers will correctly balance this equation?

	x	y	z
A	1	1	2
B	1	2	2
C	2	1	1
D	2	1	2

19 The formulae of some oxides are shown.



How many of these oxides are

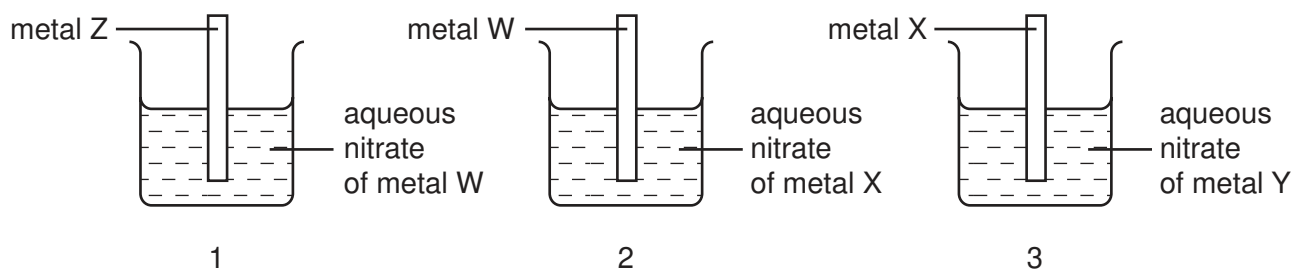
- acidic?
- amphoteric?
- basic?

	number of each type of oxide		
	acidic	amphoteric	basic
<b>A</b>	1	2	2
<b>B</b>	2	0	3
<b>C</b>	1	1	3
<b>D</b>	2	1	2

20 Which statement about an element, with seven electrons in its outer shell, is correct?

- A** It is monatomic.
- B** It forms a covalent compound with hydrogen.
- C** It forms a positive ion.
- D** It forms covalent compounds with Group I elements.

21 Three different reactions were set up as shown.



In beaker 1 metal W is displaced from solution.

In beaker 2 metal X is displaced from solution.

In beaker 3 metal Y is displaced from solution.

What is the order of reactivity of these four metals?

	most reactive $\longrightarrow$ least reactive			
<b>A</b>	W	X	Z	Y
<b>B</b>	X	Y	W	Z
<b>C</b>	Y	X	W	Z
<b>D</b>	Z	W	X	Y

22 A piece of calcium is added to cold water.

Which equation represents the reaction?

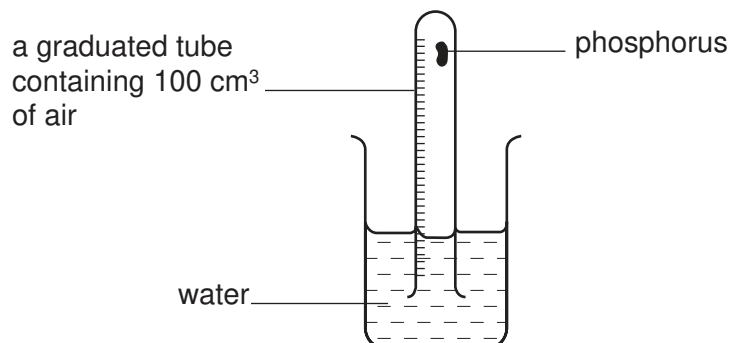
- A**  $\text{Ca} + \text{H}_2\text{O} \rightarrow \text{CaO} + \text{H}_2$
- B**  $\text{Ca} + 2\text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2 + \text{H}_2$
- C**  $2\text{Ca} + 2\text{H}_2\text{O} \rightarrow 2\text{CaOH} + \text{H}_2$
- D**  $\text{Ca}^{2+} + 2\text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2 + 2\text{H}^+$



- 23 The diagram shows an apparatus used to measure the percentage composition of the atmosphere.

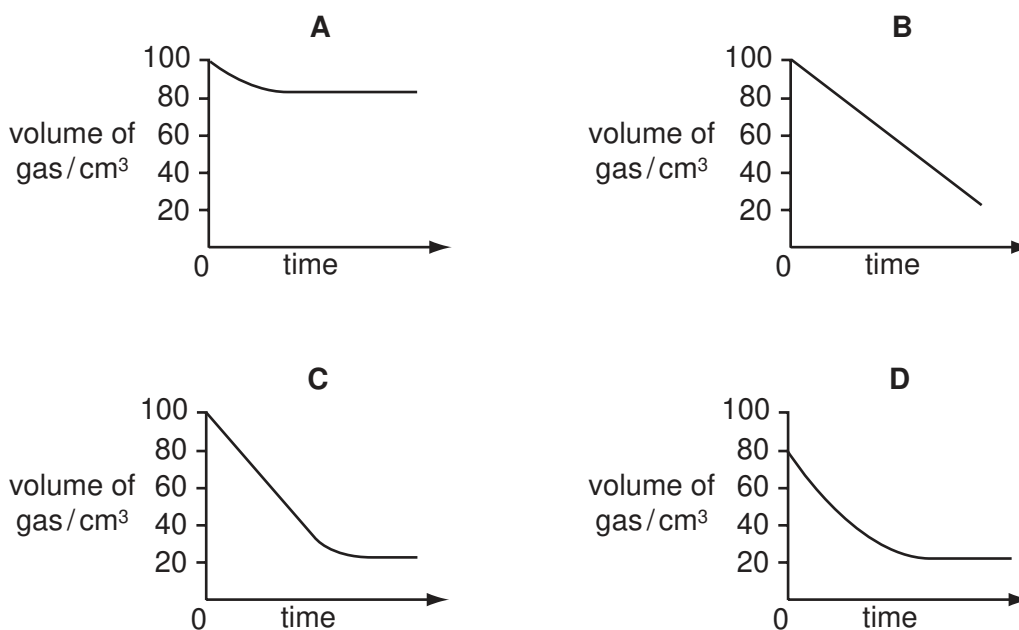
Phosphorus reacts with the oxygen in the air to form phosphorus(V) oxide.

Phosphorus(V) oxide dissolves in water.



The initial volume of the air in the tube is 100 cm<sup>3</sup>.

Which graph shows how the volume of gas remaining in the apparatus changes?



- 24 Which two gases are both pollutants of the atmosphere?

- A carbon monoxide and oxygen
- B carbon monoxide and sulphur dioxide
- C nitrogen and oxygen
- D nitrogen and sulphur dioxide

25 A balanced fertiliser must contain nitrogen, N, phosphorus, P, and potassium, K.

To grow potatoes, a balanced fertiliser that is high in potassium is needed.

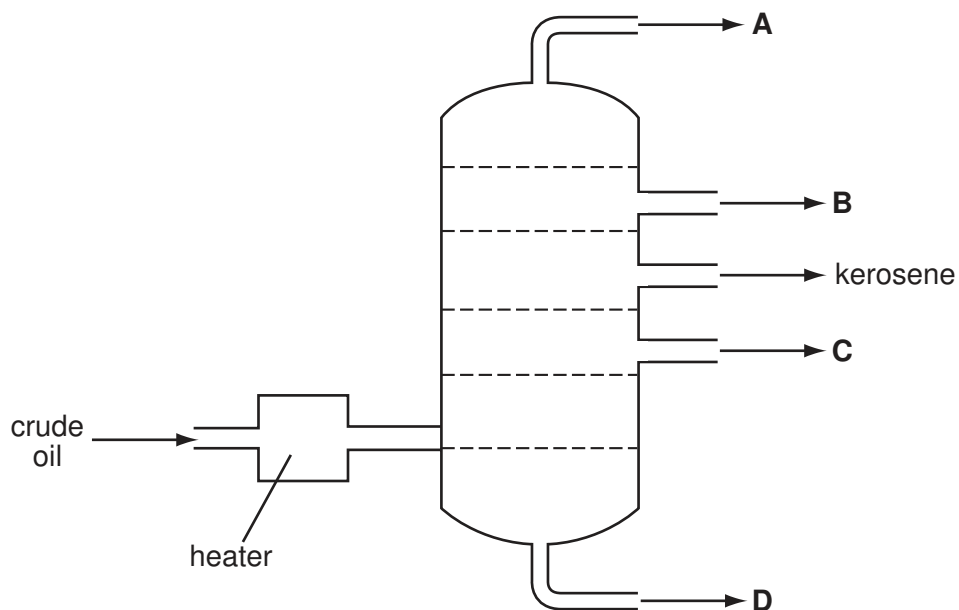
The table shows percentages by mass of these elements in four different fertilisers.

Which fertiliser should be used?

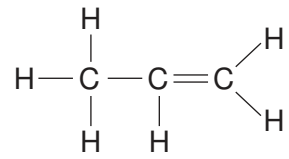
fertiliser	percentage by mass		
	N	P	K
<b>A</b>	29	13	0
<b>B</b>	29	5	5
<b>C</b>	13	13	20
<b>D</b>	9	0	20

26 The diagram represents the process of fractional distillation of petroleum.

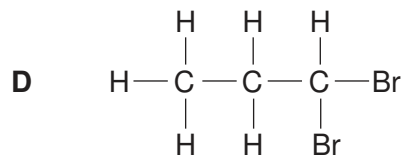
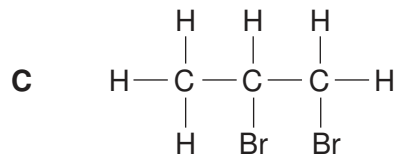
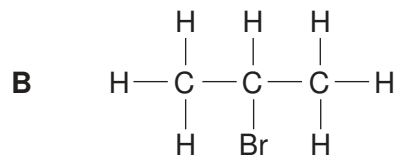
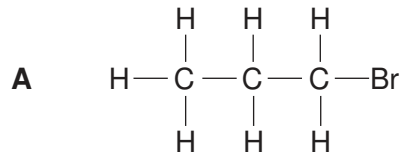
At which outlet is bitumen obtained?



27 Propene is an unsaturated hydrocarbon. Its structure is shown.



What is produced when propene reacts with bromine?

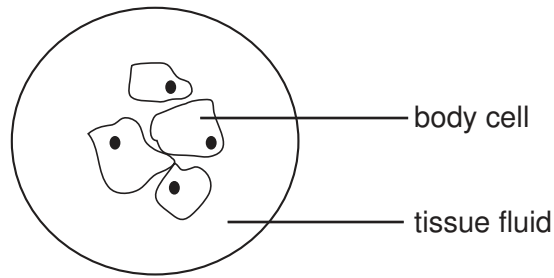


28 A mixed culture of living and non-living cells is placed in a red stain. Only non-living cells take up the stain.

Which structure prevents the stain entering the living cells?

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

29 The diagram shows a group of body cells surrounded by tissue fluid.



Which conditions cause the body cells to take in water?

	concentration of <b>water</b> in the tissue fluid	concentration of <b>water</b> in the cytoplasm of body cells
<b>A</b>	high	high
<b>B</b>	high	low
<b>C</b>	low	high
<b>D</b>	low	low

30 Pepsin is the enzyme that digests proteins in the stomach.

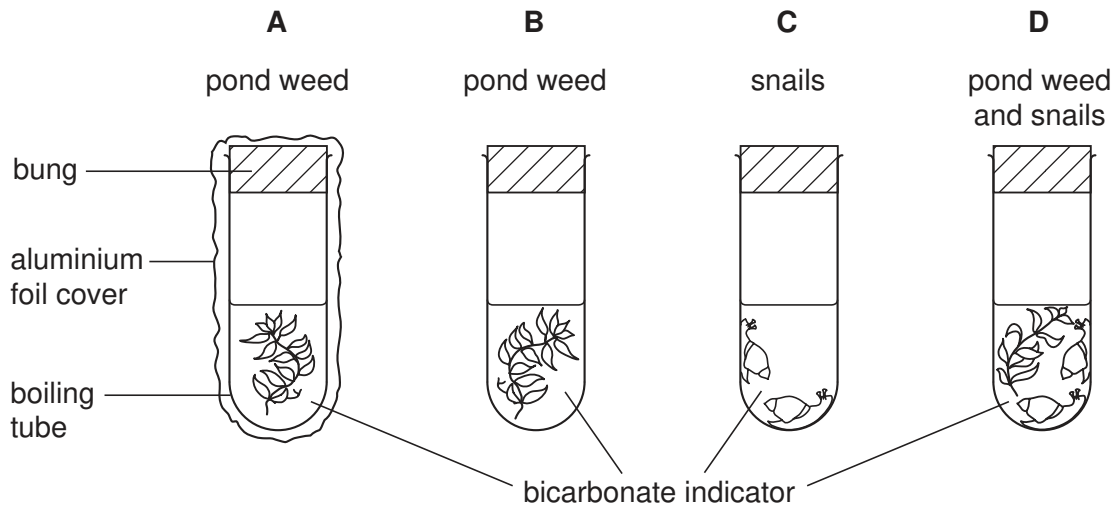
What are the conditions in which it works?

	temperature / °C	pH
<b>A</b>	25 – 30	2
<b>B</b>	25 – 30	7
<b>C</b>	35 – 40	2
<b>D</b>	35 – 40	7

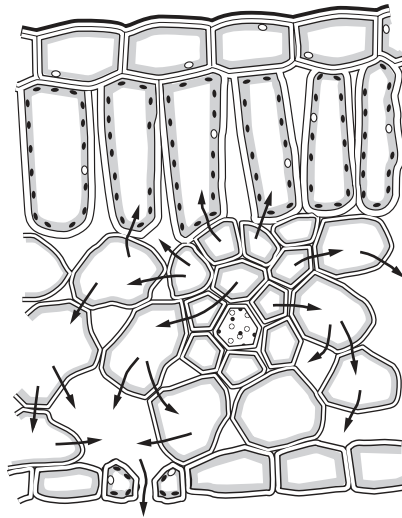
- 31 Four tubes are left in sunlight for one hour. The bicarbonate indicator in each tube is red at the start of the experiment.

Bicarbonate indicator stays red if there is no change in carbon dioxide concentration. The indicator goes yellow if carbon dioxide concentration increases and purple if the concentration decreases.

In which tube does the colour change to purple?



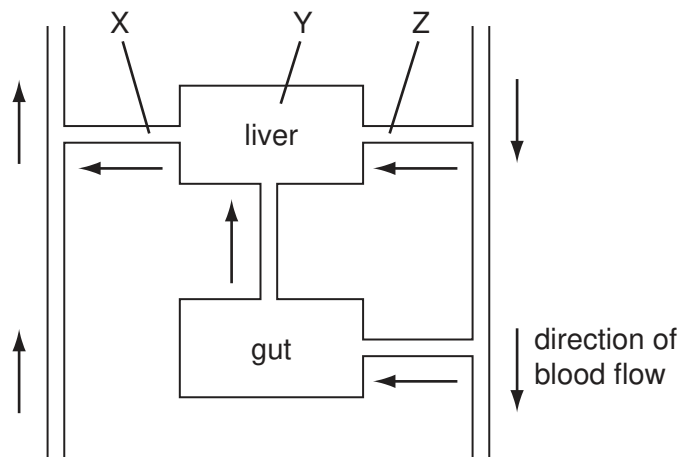
- 32 The diagram shows part of a green leaf in section.



The arrows represent the movement of

- A carbon dioxide during respiration.
- B oxygen during photosynthesis.
- C sugars during photosynthesis.
- D water during transpiration.

33 The diagram shows the path of blood through the liver and gut.



Where are the artery, capillaries and vein?

	artery	capillaries	vein
<b>A</b>	X	Y	Z
<b>B</b>	Y	Z	X
<b>C</b>	Z	X	Y
<b>D</b>	Z	Y	X

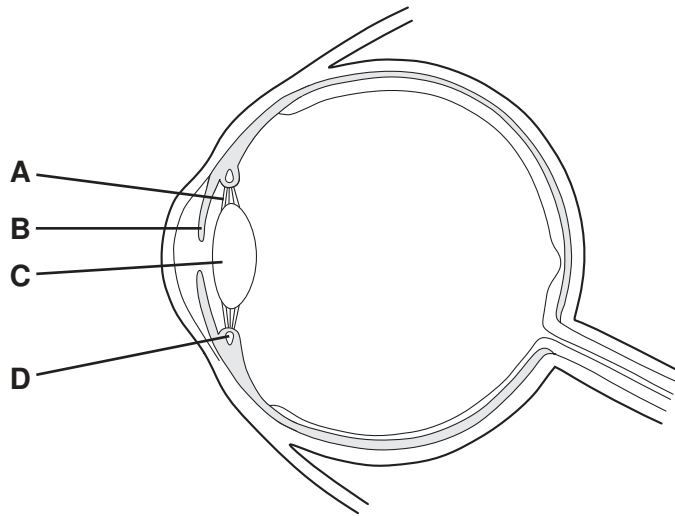
34 Urea is removed by the kidneys.

What is this called?

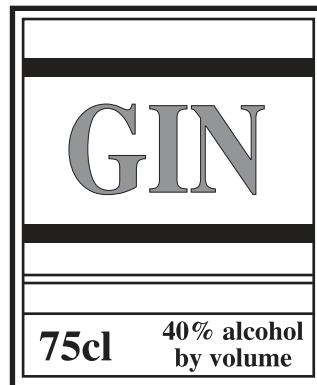
- A** dialysis
- B** diffusion
- C** egestion
- D** excretion

35 The diagram shows a section through a human eye.

Which structure contains muscle fibres that contract in response to sudden changes in light intensity?



36 The diagram shows the label from a bottle of gin.



What will happen, during the next few hours, after a person drinks a large amount of gin?

- A Their judgement of distance will improve.
- B Their muscle control will be reduced.
- C Their reaction time will decrease.
- D Their urine output will decrease.

37 Which sequence describes the flow of energy in an ecosystem?

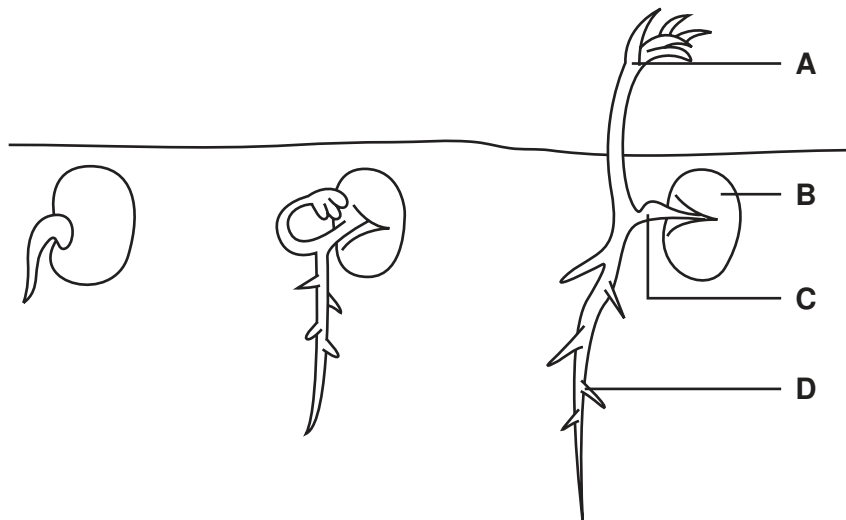
- A carnivore → herbivore → plant → Sun
- B plant → herbivore → carnivore → Sun
- C Sun → carnivore → herbivore → plant
- D Sun → plant → herbivore → carnivore

38 Which processes increase and decrease the amount of carbon dioxide in the air?

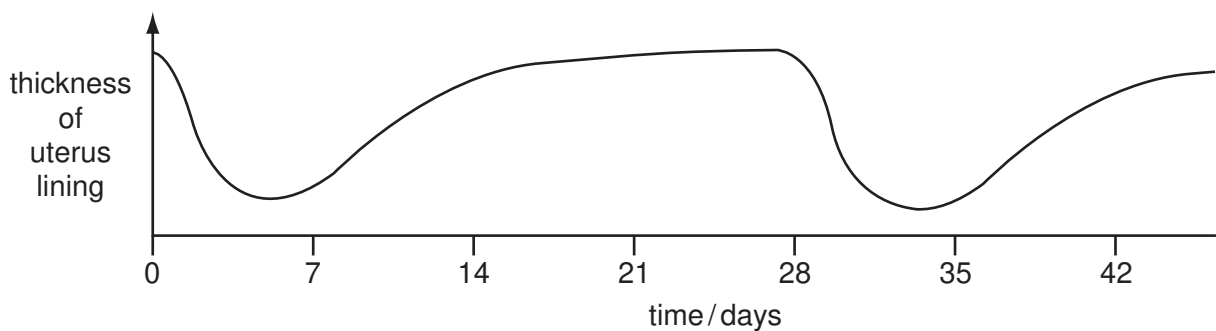
	process causing increase in carbon dioxide	process causing decrease in carbon dioxide
<b>A</b>	burning of fossil fuels	respiration of plants
<b>B</b>	photosynthesis in plants	respiration of bacteria
<b>C</b>	respiration of animals	photosynthesis in plants
<b>D</b>	respiration of bacteria	burning of fossil fuels

39 The diagram shows three stages in the germination of a seedling.

Which part develops from the plumule?



40 The diagram shows changes in the lining of the uterus during a typical menstrual cycle.



On which day would sexual intercourse be most likely to lead to pregnancy?

- A** day 7      **B** day 14      **C** day 21      **D** day 28









## 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											20 Ne Neon 10																			
23 Na Sodium 11	24 Mg Magnesium 12	11 B Boron 5	12 C Carbon 6	13 Al Aluminium 13	14 Si Silicon 14	15 P Phosphorus 15	16 S Sulphur 16	17 Cl Chlorine 17	18 Ar Argon 18																						
39 K Potassium 19	40 Ca Calcium 20	41 Sc Scandium 21	42 Ti Titanium 22	43 V Vanadium 23	44 Cr Chromium 24	45 Mn Manganese 25	46 Fe Iron 26	47 Co Cobalt 27	48 Ni Nickel 28	49 Cu Copper 29	50 Zn Zinc 30	51 Ga Gallium 31	52 Ge Germanium 32	53 As Arsenic 33	54 Se Selenium 34	55 Br Bromine 35	56 Kr Krypton 36														
85 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	90 Zr Zirconium 40	91 Nb Niobium 41	92 Mo Molybdenum 42	93 Tc Technetium 43	94 Ru Ruthenium 44	95 Rh Rhodium 45	96 Pd Palladium 46	97 Ag Silver 47	98 Cd Cadmium 48	99 In Indium 49	100 Sn Tin 50	101 Sb Antimony 51	102 Te Tellurium 52	103 I Iodine 53	104 Xe Xenon 54														
133 Cs Caesium 55	137 Ba Barium 56	138 La Lanthanum 57	139 Ce Cerium 58	140 Pr Praseodymium 59	141 Nd Neodymium 60	142 Pm Promethium 61	143 Sm Samarium 62	144 Eu Europium 63	145 Gd Gadolinium 64	146 Tb Terbium 65	147 Dy Dysprosium 66	148 Ho Holmium 67	149 Er Erbium 68	150 Tm Thulium 69	151 Yb Ytterbium 70	152 Lu Lutetium 71	153 Hf Hafnium 72	154 Ta Tantalum 73	155 W Tungsten 74	156 Re Rhenium 75	157 Os Osmium 76	158 Ir Iridium 77	159 Pt Platinum 78	160 Au Gold 79	161 Hg Mercury 80	162 Tl Thallium 81	163 Pb Lead 82	164 Bi Bismuth 83	165 Po Polonium 84	166 At Astatine 85	167 Rn Radon 86
226 Fr Francium 87	227 Ra Radium 88											228 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																													
140 Ce Cerium 58	141 Pr Praseodymium 59	142 Nd Neodymium 60	143 Pm Promethium 61	144 Sm Samarium 62	145 Eu Europium 63	146 Gd Gadolinium 64	147 Tb Terbium 65	148 Dy Dysprosium 66	149 Ho Holmium 67	150 Er Erbium 68	151 Tm Thulium 69	152 Yb Ytterbium 70	153 Lu Lutetium 71	154 Th Thorium 90	155 Pa Protactinium 91	156 U Uranium 92	157 Np Neptunium 93	158 Pu Plutonium 94	159 Am Americium 95	160 Cm Curium 96	161 Bk Berkelium 97	162 Cf Californium 98	163 Es Einsteinium 99	164 Fm Fermium 100	165 Md Mendelevium 101	166 No Nobelium 102	167 Lr Lawrencium 103				

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