

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.

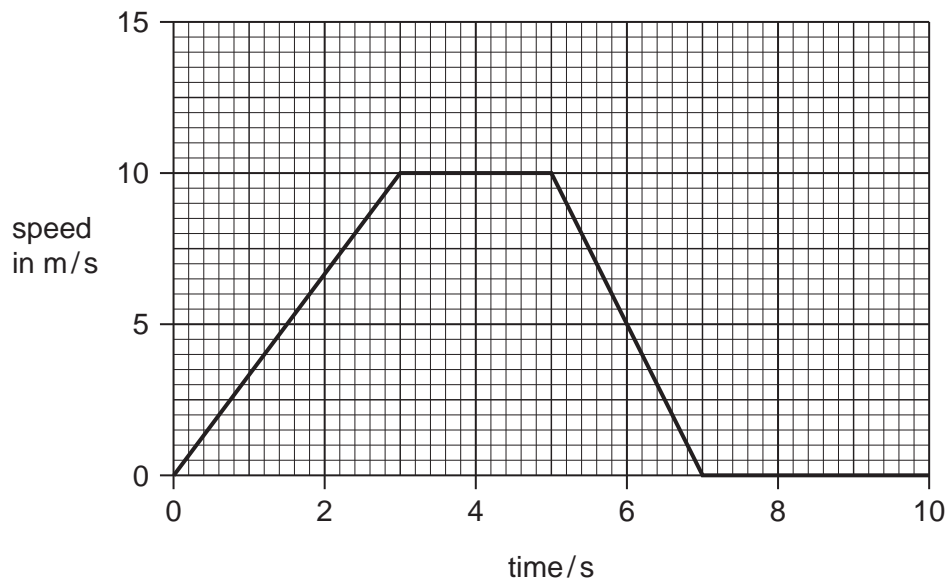
Any rough working should be done in this booklet.

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

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

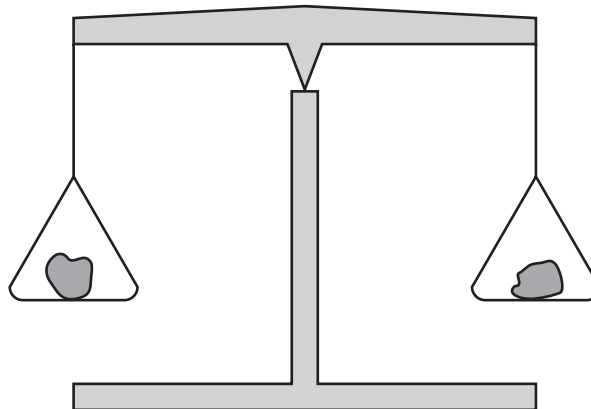


- 1 The graph shows the speed of a car over the first ten seconds of a journey.



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

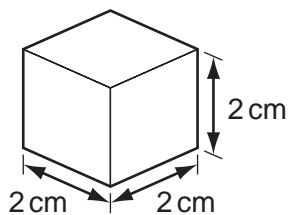
- A The acceleration decreases.
 - B The acceleration increases.
 - C The acceleration is zero.
 - D The acceleration is 10 m/s.
- 2 The diagram shows two objects on a beam balance in equilibrium.



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 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
A	300	4
B	400	5
C	500	10
D	600	15

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

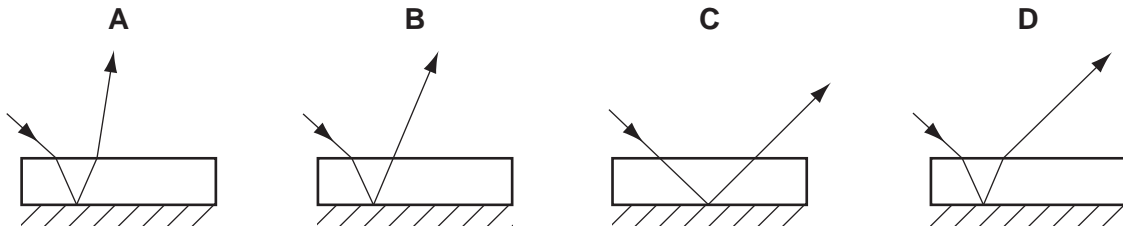
The temperature rise is the same for each material.

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
A	iron	not easily demagnetised	permanent magnet
B	iron	easily demagnetised	electromagnet
C	steel	not easily demagnetised	electromagnet
D	steel	easily demagnetised	permanent magnet

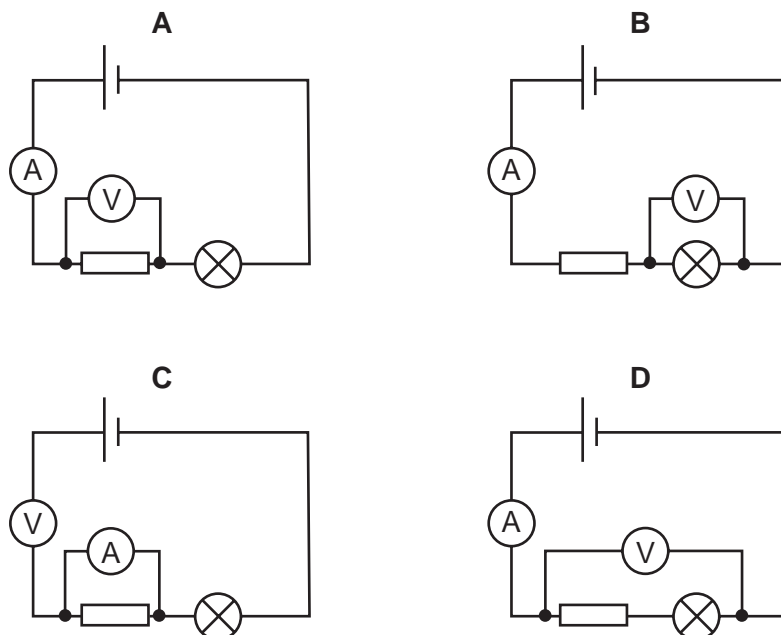
- 9 A current of 2A flows for 5 s through a lamp.

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?

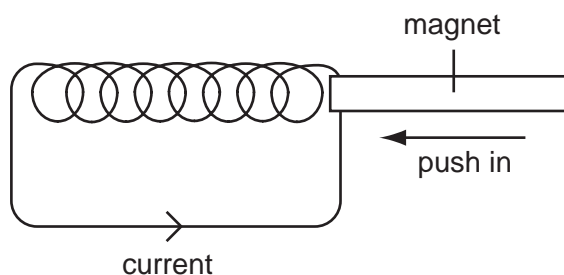


11 Electrical equipment should **not** be used in damp conditions.

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
A	reversed	decreased
B	unchanged	decreased
C	reversed	increased
D	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
A	92	235	92
B	92	143	92
C	143	92	235
D	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 cm^3 of a liquid.

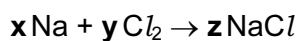
Which piece of apparatus would be used?

- 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

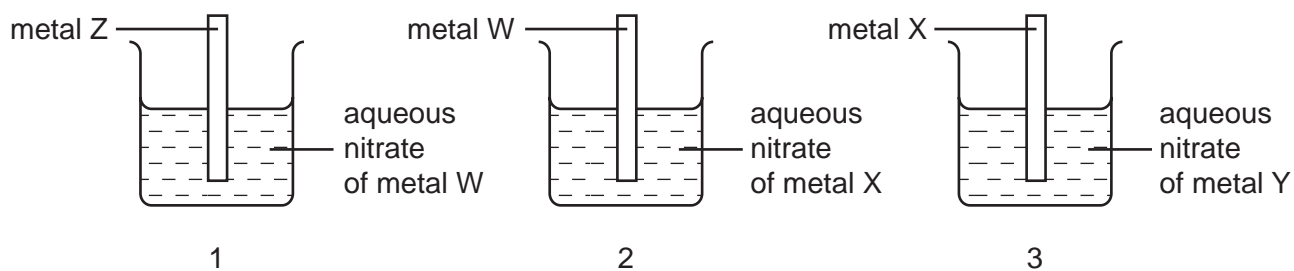
- acidic?
- amphoteric?
- basic?

	number of each type of oxide		
	acidic	amphoteric	basic
A	1	2	2
B	2	0	3
C	1	1	3
D	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			
A	W	X	Z	Y
B	X	Y	W	Z
C	Y	X	W	Z
D	Z	W	X	Y

22 A piece of calcium is added to cold water.

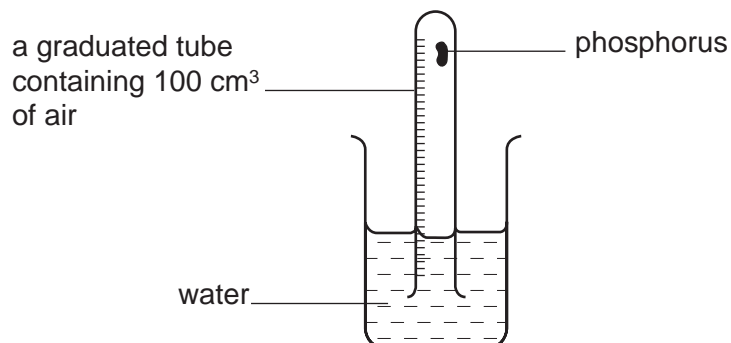
Which equation represents the reaction?

- 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.

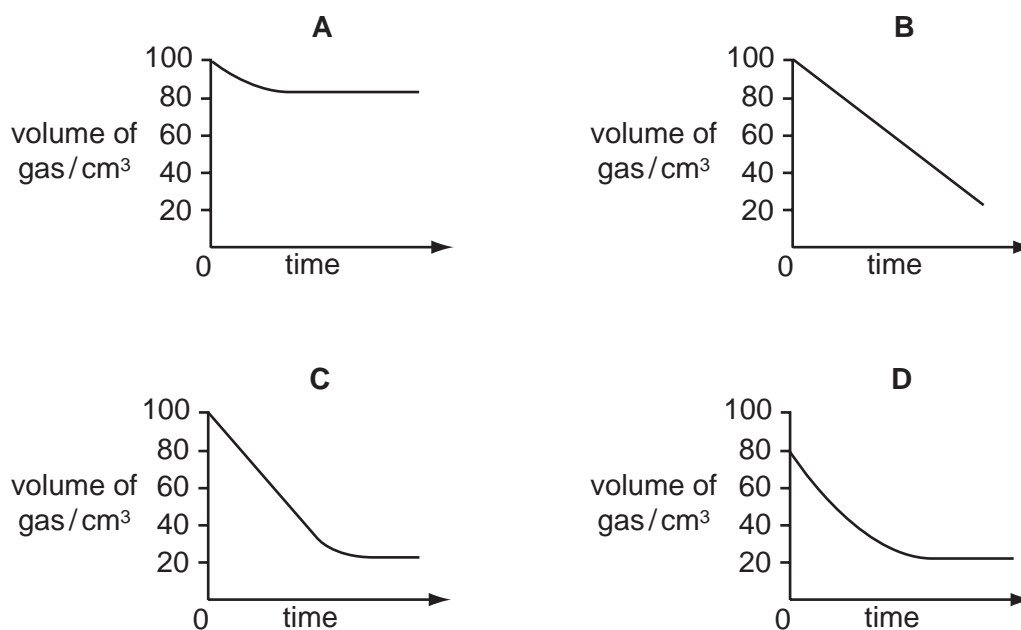
Phosphorus reacts with the oxygen in the air to form phosphorus(V) oxide.

Phosphorus(V) oxide dissolves in water.



The initial volume of the air in the tube is 100 cm^3 .

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.

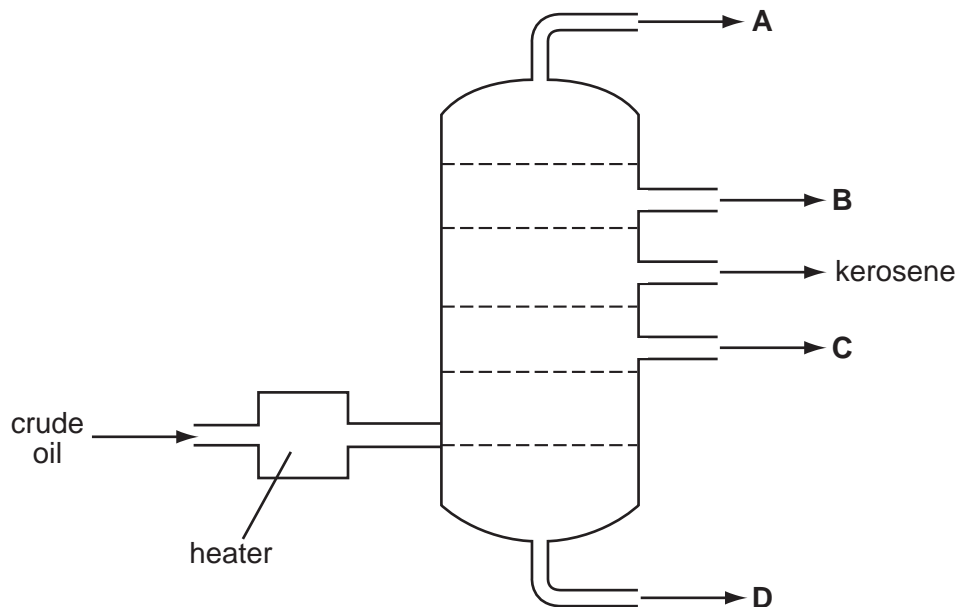
The table shows percentages by mass of these elements in four different fertilisers.

Which fertiliser should be used?

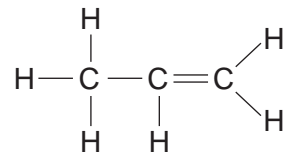
fertiliser	percentage by mass		
	N	P	K
A	29	13	0
B	29	5	5
C	13	13	20
D	9	0	20

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

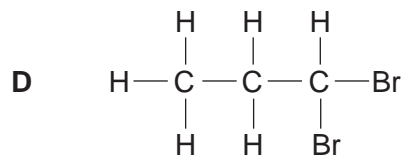
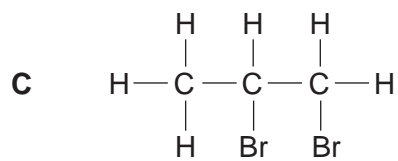
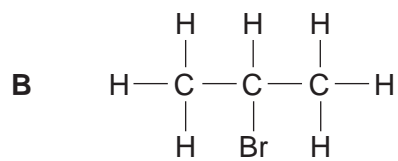
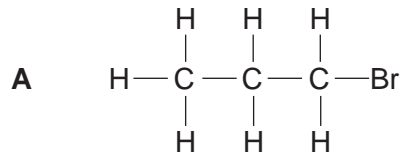
At which outlet is bitumen obtained?



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



What is produced when propene reacts with bromine?

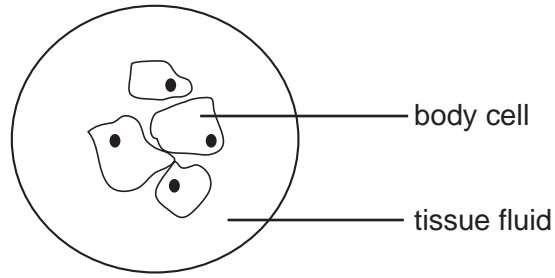


28 A mixed culture of living and non-living cells is placed in a red stain. Only non-living cells take up the stain.

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

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

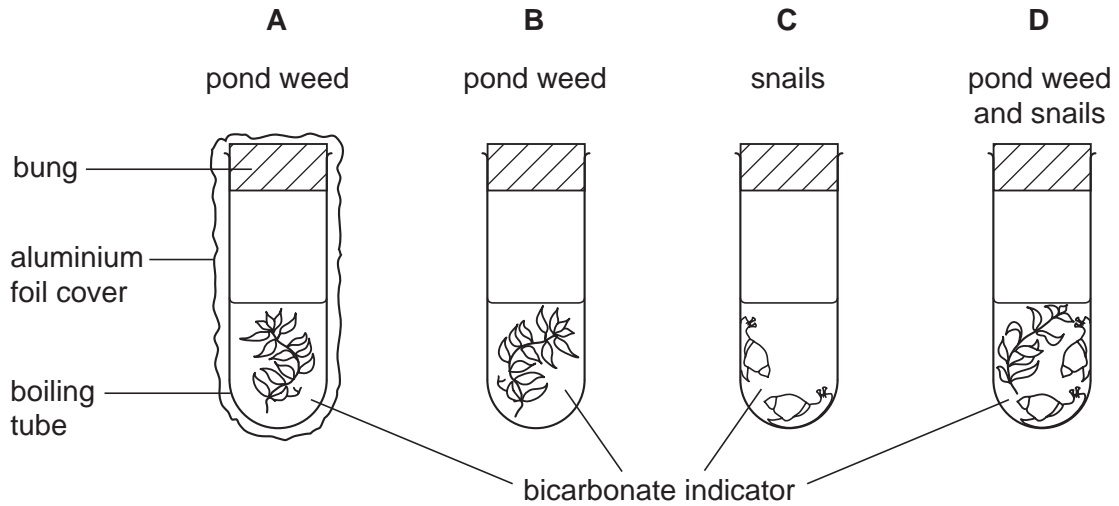
What are the conditions in which it works?

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

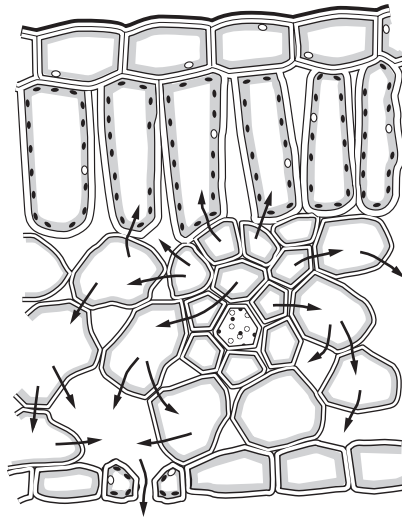
- 31 Four tubes are left in sunlight for one hour. The bicarbonate indicator in each tube is red at the start of the experiment.

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?



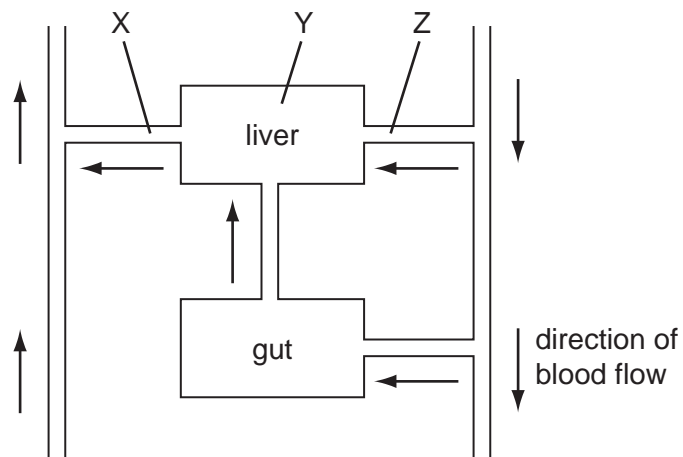
- 32 The diagram shows part of a green leaf in section.



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
A	X	Y	Z
B	Y	Z	X
C	Z	X	Y
D	Z	Y	X

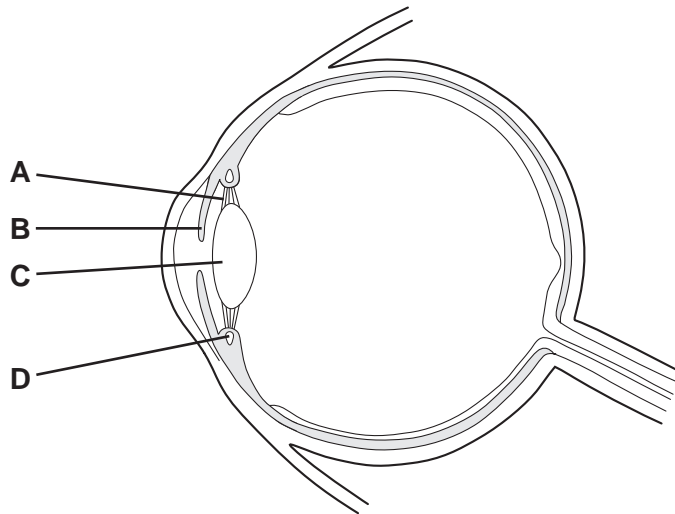
34 Urea is removed by the kidneys.

What is this called?

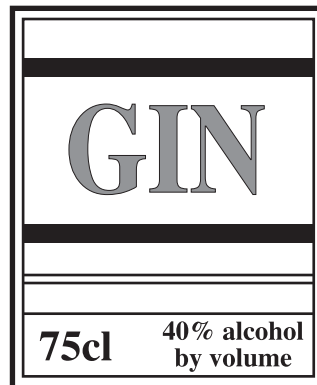
- A** dialysis
- B** diffusion
- C** egestion
- D** excretion

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?

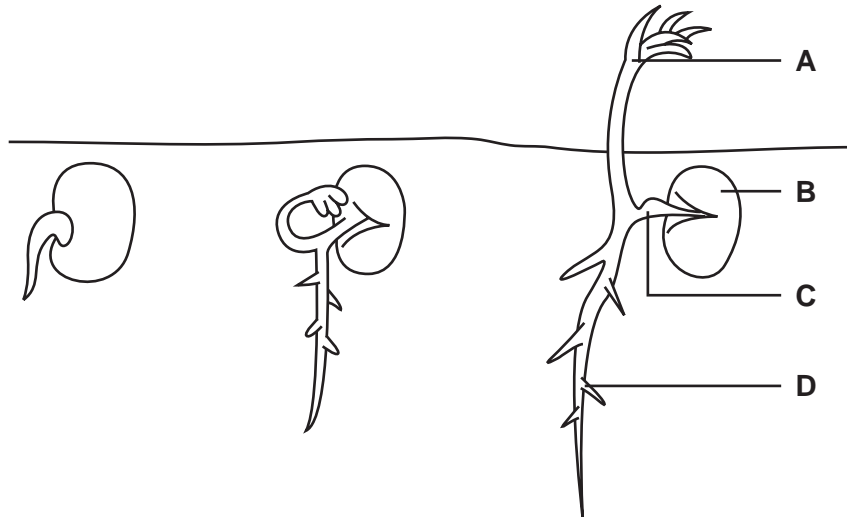
- A carnivore → herbivore → plant → Sun
- B plant → herbivore → carnivore → Sun
- C Sun → carnivore → herbivore → plant
- D Sun → plant → herbivore → carnivore

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

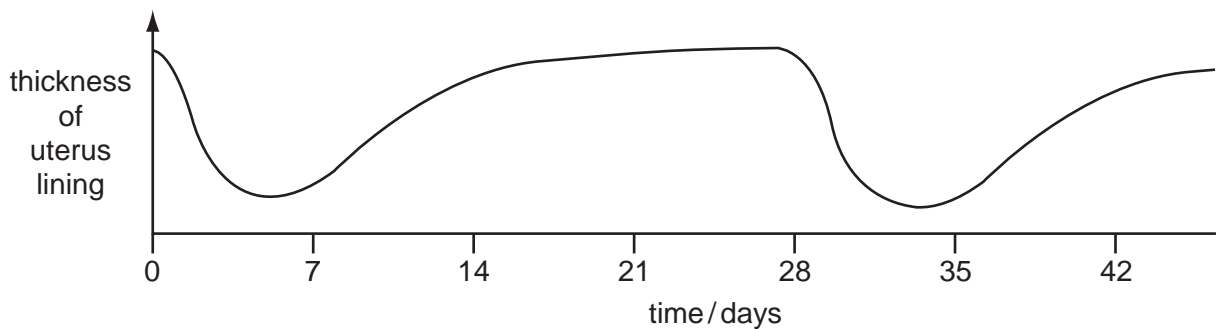
	process causing increase in carbon dioxide	process causing decrease in carbon dioxide
A	burning of fossil fuels	respiration of plants
B	photosynthesis in plants	respiration of bacteria
C	respiration of animals	photosynthesis in plants
D	respiration of bacteria	burning of fossil fuels

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

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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																		
23 Na Sodium 11	24 Mg Magnesium 12													14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10		
39 K Potassium 19	40 Ca Calcium 20	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	84 Kr Krypton 36	85.5 Br Bromine 35	86 Rn Radon 86			
85 Rb Rubidium 37	88 Sr Strontium 38	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	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	131 Xe Xenon 54	127 I Iodine 53				
133 Cs Caesium 55	137 Ba Barium 56	178 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	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	84 Po Polonium 84	85 At Astatine 85					
226 Ra Radium 88	227 Ac Actinium 89																		
		*58-71 Lanthanoid series																	
		90-103 Actinoid series																	
		140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	145 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	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				

*58-71 Lanthanoid series
90-103 Actinoid series

a	X
b	

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

Key

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