

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.

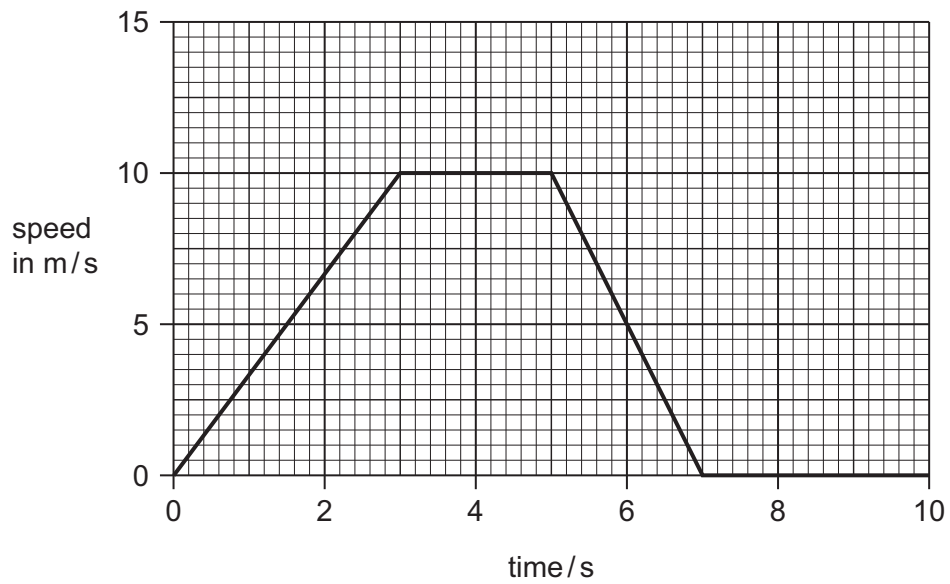
Any rough working should be done in this booklet.

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

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

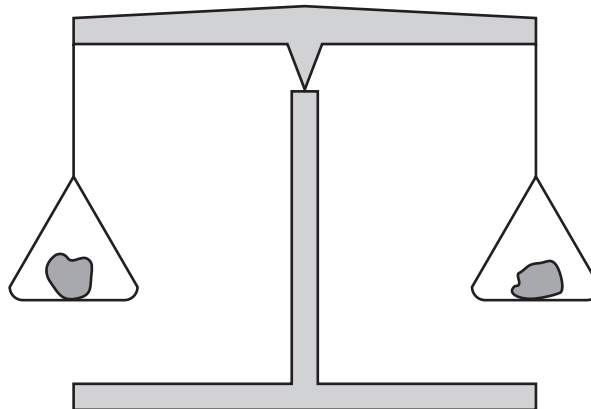


- 1 The graph shows the speed of a car over the first ten seconds of a journey.



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

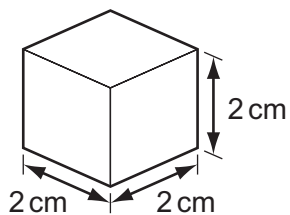
- A The acceleration decreases.
  - B The acceleration increases.
  - C The acceleration is zero.
  - D The acceleration is 10 m/s.
- 2 The diagram shows two objects on a beam balance in equilibrium.



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.

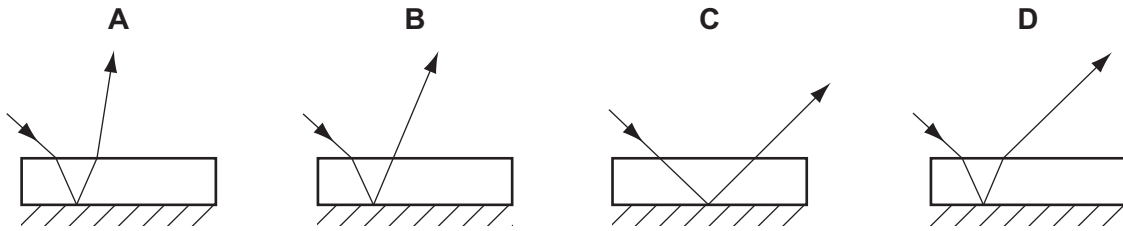
The temperature rise is the same for each material.

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

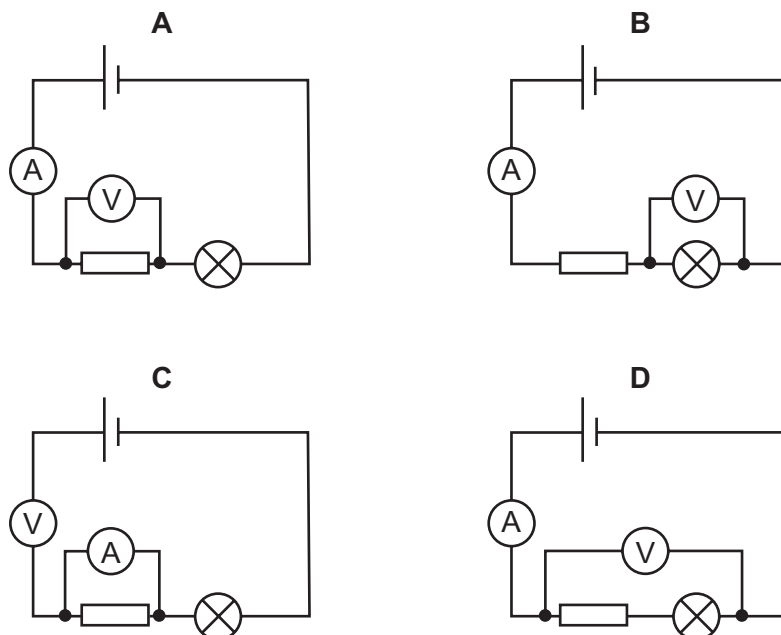
- 9 A current of 2A flows for 5 s through a lamp.

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?

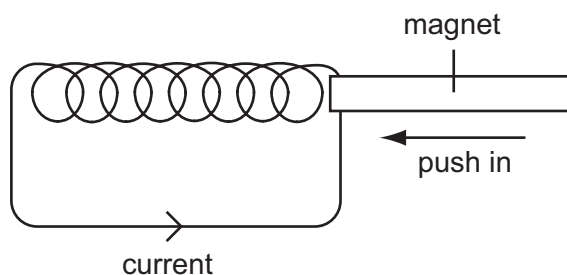


11 Electrical equipment should **not** be used in damp conditions.

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.

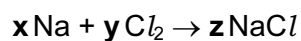
Which piece of apparatus would be used?

- 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

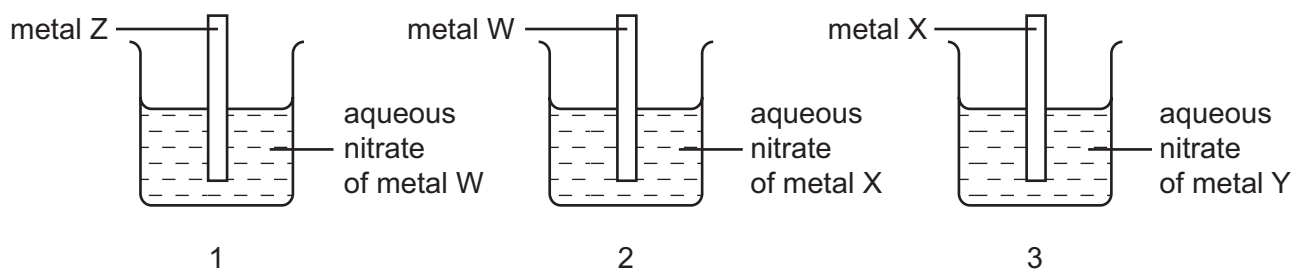
- acidic?
- amphoteric?
- basic?

	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?

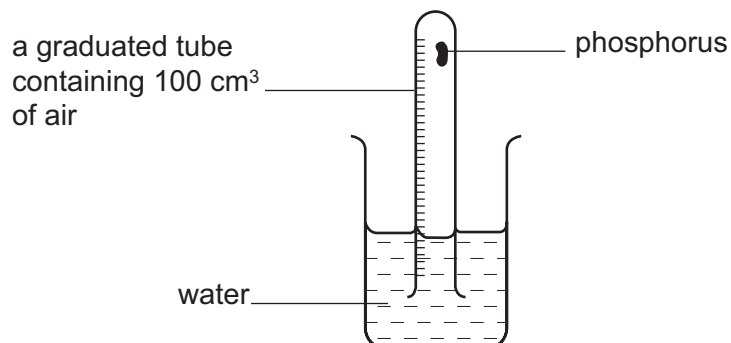
- A**  $\text{Ca} + \text{H}_2\text{O} \rightarrow \text{CaO} + \text{H}_2$
- B**  $\text{Ca} + 2\text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2 + \text{H}_2$
- C**  $2\text{Ca} + 2\text{H}_2\text{O} \rightarrow 2\text{CaOH} + \text{H}_2$
- D**  $\text{Ca}^{2+} + 2\text{H}_2\text{O} \rightarrow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



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

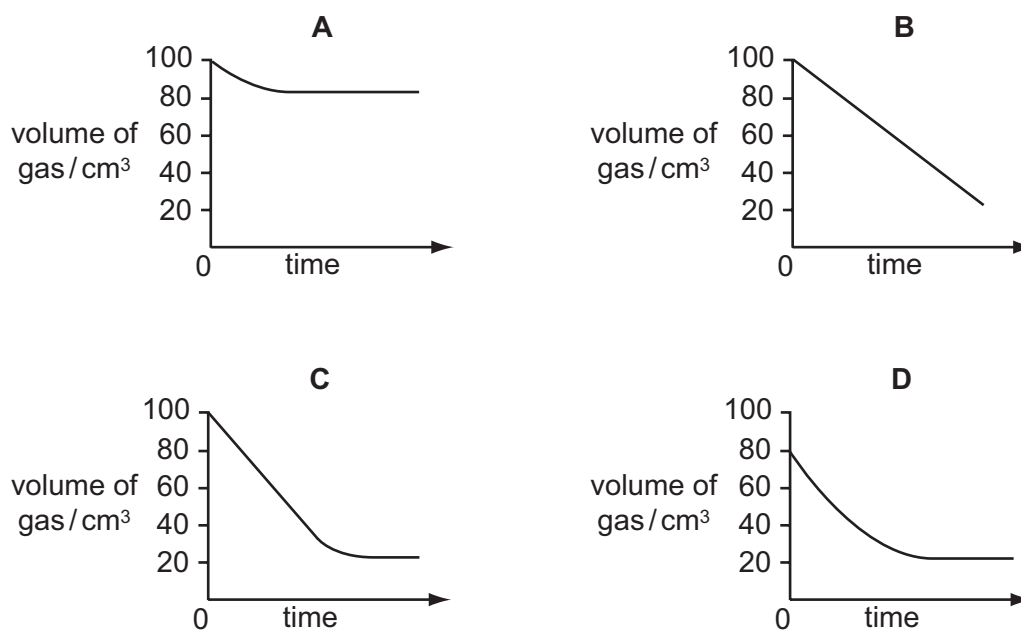
Phosphorus reacts with the oxygen in the air to form phosphorus(V) oxide.

Phosphorus(V) oxide dissolves in water.



The initial volume of the air in the tube is  $100 \text{ cm}^3$ .

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.

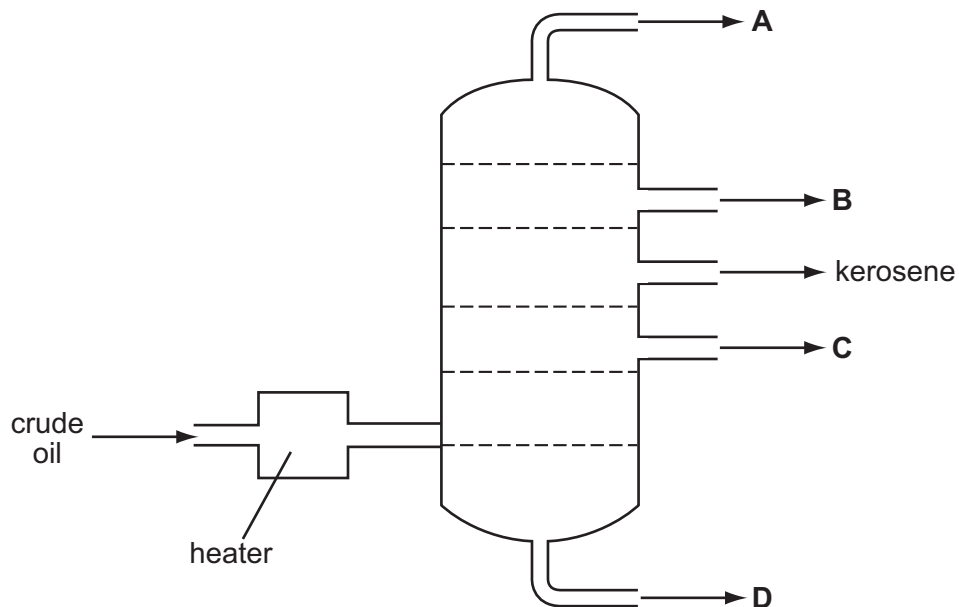
The table shows percentages by mass of these elements in four different fertilisers.

Which fertiliser should be used?

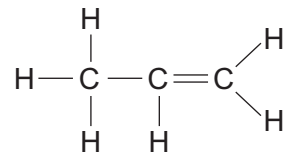
fertiliser	percentage by mass		
	N	P	K
<b>A</b>	29	13	0
<b>B</b>	29	5	5
<b>C</b>	13	13	20
<b>D</b>	9	0	20

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

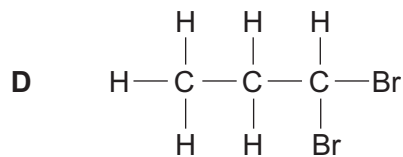
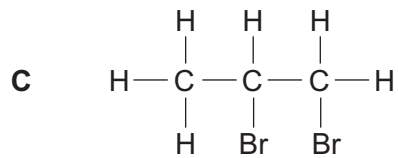
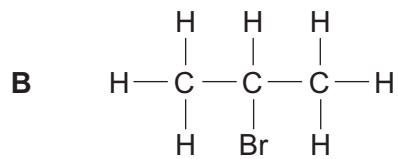
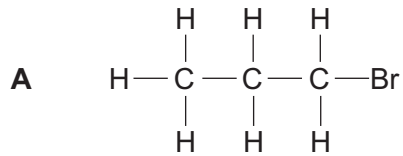
At which outlet is bitumen obtained?



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



What is produced when propene reacts with bromine?

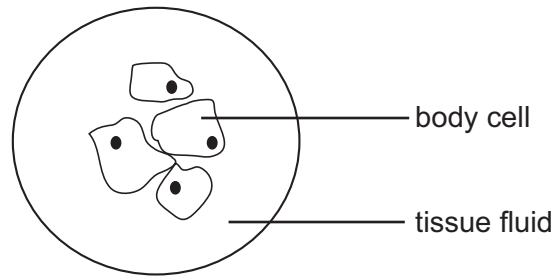


28 A mixed culture of living and non-living cells is placed in a red stain. Only non-living cells take up the stain.

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.

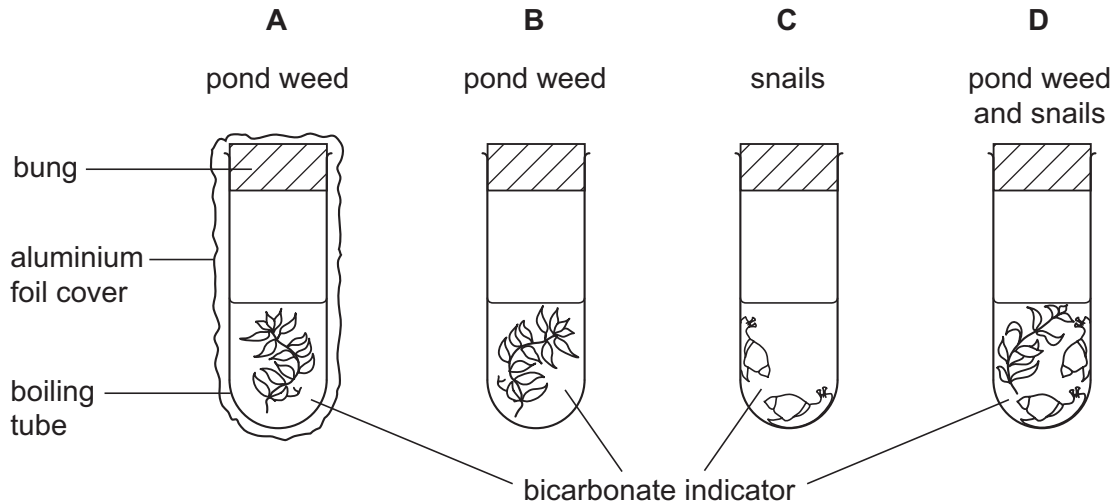
What are the conditions in which it works?

	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

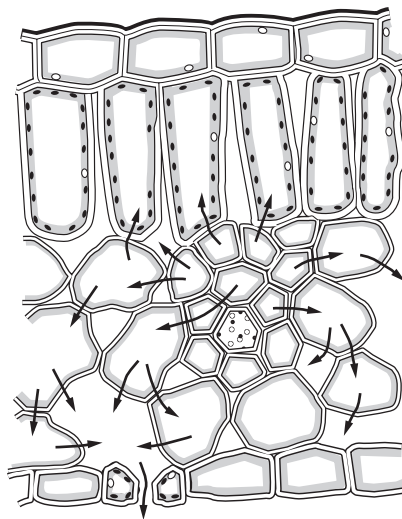
- 31 Four tubes are left in sunlight for one hour. The bicarbonate indicator in each tube is red at the start of the experiment.

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?



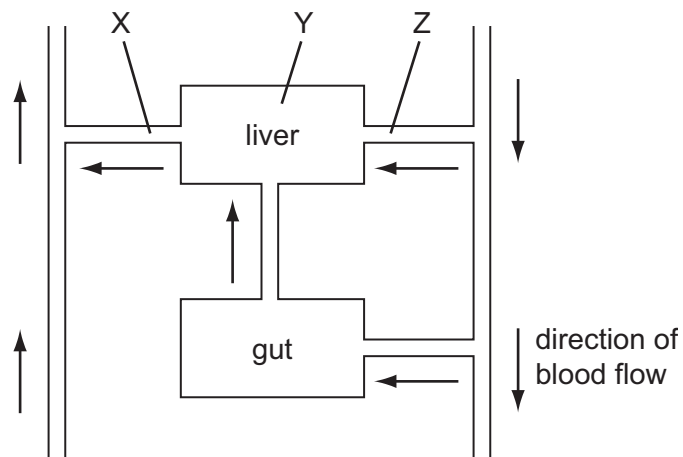
- 32 The diagram shows part of a green leaf in section.



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

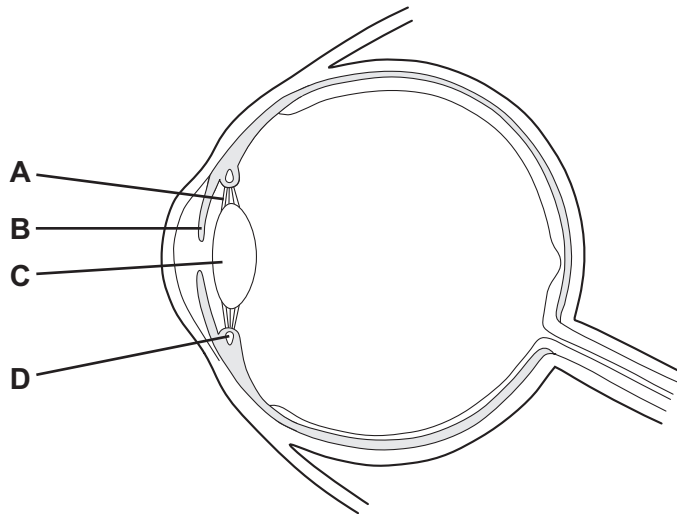
34 Urea is removed by the kidneys.

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?

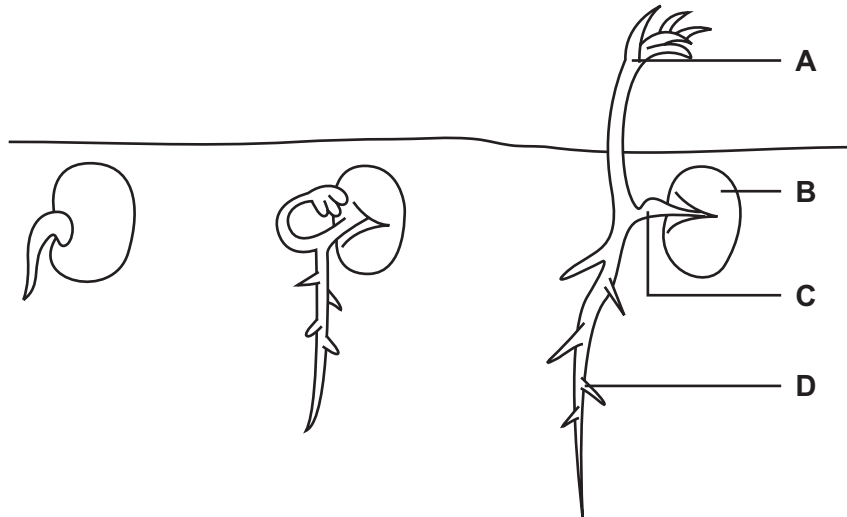
- A carnivore → herbivore → plant → Sun
- B plant → herbivore → carnivore → Sun
- C Sun → carnivore → herbivore → plant
- D Sun → plant → herbivore → carnivore

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

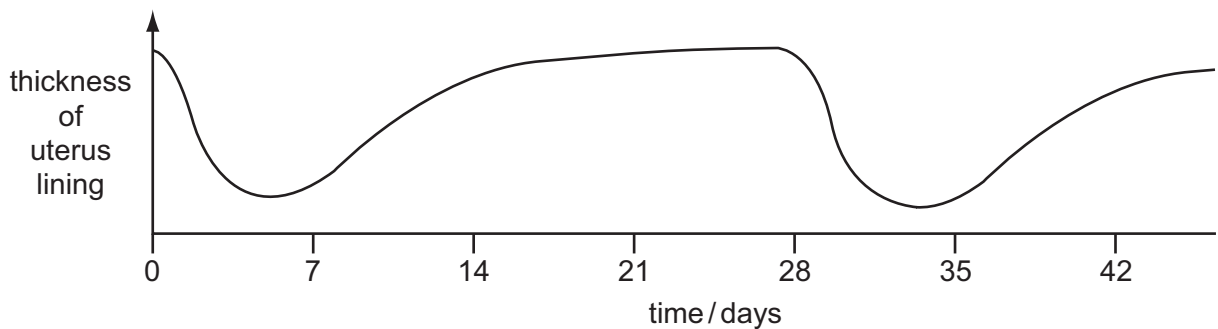
	process causing increase in carbon dioxide	process causing decrease in carbon dioxide
<b>A</b>	burning of fossil fuels	respiration of plants
<b>B</b>	photosynthesis in plants	respiration of bacteria
<b>C</b>	respiration of animals	photosynthesis in plants
<b>D</b>	respiration of bacteria	burning of fossil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







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**DATA SHEET**  
**The Periodic Table of the Elements**

		Group													
I	II	III	IV	V	VI	VII	0								
		1 <b>H</b> Hydrogen 1					4 <b>He</b> Helium 2								
7 <b>Li</b> Lithium 3	9 <b>Be</b> Beryllium 4		11 <b>B</b> Boron 5	12 <b>C</b> Carbon 6	14 <b>N</b> Nitrogen 7	16 <b>O</b> Oxygen 8	19 <b>F</b> Fluorine 9	20 <b>Ne</b> Neon 10							
23 <b>Na</b> Sodium 11	24 <b>Mg</b> Magnesium 12		27 <b>Al</b> Aluminium 13	28 <b>Si</b> Silicon 14	31 <b>P</b> Phosphorus 15	32 <b>S</b> Sulphur 16	35.5 <b>Cl</b> Chlorine 17	40 <b>Ar</b> Argon 18							
39 <b>K</b> Potassium 19	40 <b>Ca</b> Calcium 20		70 <b>Ga</b> Gallium 31	73 <b>Ge</b> Germanium 32	75 <b>As</b> Arsenic 33	79 <b>Se</b> Selenium 34	80 <b>Br</b> Bromine 35	84 <b>Kr</b> Krypton 36							
85 <b>Rb</b> Rubidium 37	88 <b>Sr</b> Strontium 38		115 <b>In</b> Indium 49	119 <b>Sn</b> Tin 50	122 <b>Sb</b> Antimony 51	128 <b>Te</b> Tellurium 52	127 <b>I</b> Iodine 53	131 <b>Xe</b> Xenon 54							
133 <b>Cs</b> Caesium 55	137 <b>Ba</b> Barium 56		204 <b>Tl</b> Thallium 81	207 <b>Pb</b> Lead 82	209 <b>Bi</b> Bismuth 83	210 <b>Po</b> Polonium 84	210 <b>At</b> Astatine 85	210 <b>Rn</b> Radon 86							
226 <b>Ra</b> Radium 88	227 <b>Ac</b> Actinium 89														
<p>*58-71 Lanthanoid series 90-103 Actinoid series</p>															
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; width: 20px; text-align: center;">a</td> <td style="border: 1px solid black; width: 20px; text-align: center;"><b>X</b></td> <td style="width: 20px;"></td> <td style="border: 1px solid black; width: 20px; text-align: center;">b</td> </tr> </table> <p>Key      a = relative atomic mass             X = atomic symbol             b = proton (atomic) number</p>												a	<b>X</b>		b
a	<b>X</b>		b												
			159 <b>Tb</b> Terbium 65	162 <b>Dy</b> Dysprosium 66	165 <b>Ho</b> Holmium 67	169 <b>Tm</b> Thulium 69	173 <b>Yb</b> Ytterbium 70	175 <b>Lu</b> Lutetium 71							
			150 <b>Sm</b> Samarium 62	152 <b>Eu</b> Europium 63	157 <b>Gd</b> Gadolinium 64	162 <b>Dy</b> Dysprosium 66	165 <b>Ho</b> Holmium 67	169 <b>Tm</b> Thulium 69	173 <b>Yb</b> Ytterbium 70	175 <b>Lu</b> Lutetium 71					
			140 <b>Ce</b> Cerium 58	141 <b>Pr</b> Praseodymium 59	144 <b>Nd</b> Neodymium 60	150 <b>Sm</b> Samarium 62	152 <b>Eu</b> Europium 63	157 <b>Gd</b> Gadolinium 64	162 <b>Dy</b> Dysprosium 66	165 <b>Ho</b> Holmium 67					
			232 <b>Th</b> Thorium 90	238 <b>Pa</b> Protactinium 91	238 <b>U</b> Uranium 92	238 <b>Np</b> Neptunium 93	238 <b>Pu</b> Plutonium 94	238 <b>Am</b> Americium 95	238 <b>Cm</b> Curium 96	238 <b>Bk</b> Berkelium 97					
			140 <b>Ce</b> Cerium 58	141 <b>Pr</b> Praseodymium 59	144 <b>Nd</b> Neodymium 60	150 <b>Sm</b> Samarium 62	152 <b>Eu</b> Europium 63	157 <b>Gd</b> Gadolinium 64	162 <b>Dy</b> Dysprosium 66	165 <b>Ho</b> Holmium 67					
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			167 <b>Er</b> Erbium 68	167 <b>Er</b> Erbium 68	167 <b>Er</b> Erbium 68	167 <b>Er</b> Erbium 68	167 <b>Er</b> Erbium 68	167 <b>Er</b> Erbium 68	167 <b>Er</b> Erbium 68	167 <b>Er</b> Erbium 68					
			100 <b>Fm</b> Fermium 100	100 <b>Fm</b> Fermium 100	100 <b>Fm</b> Fermium 100	100 <b>Fm</b> Fermium 100	100 <b>Fm</b> Fermium 100	100 <b>Fm</b> Fermium 100	100 <b>Fm</b> Fermium 100	100 <b>Fm</b> Fermium 100					

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