



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

COMBINED SCIENCE

5129/01

Paper 1 Multiple Choice

October/November 2008

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.

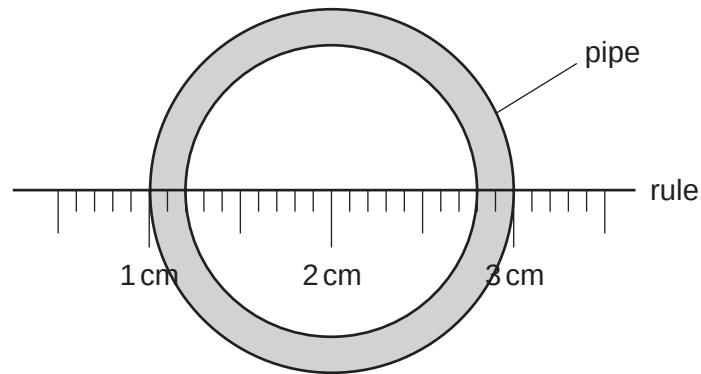
A copy of the Periodic Table is printed on page 20.

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



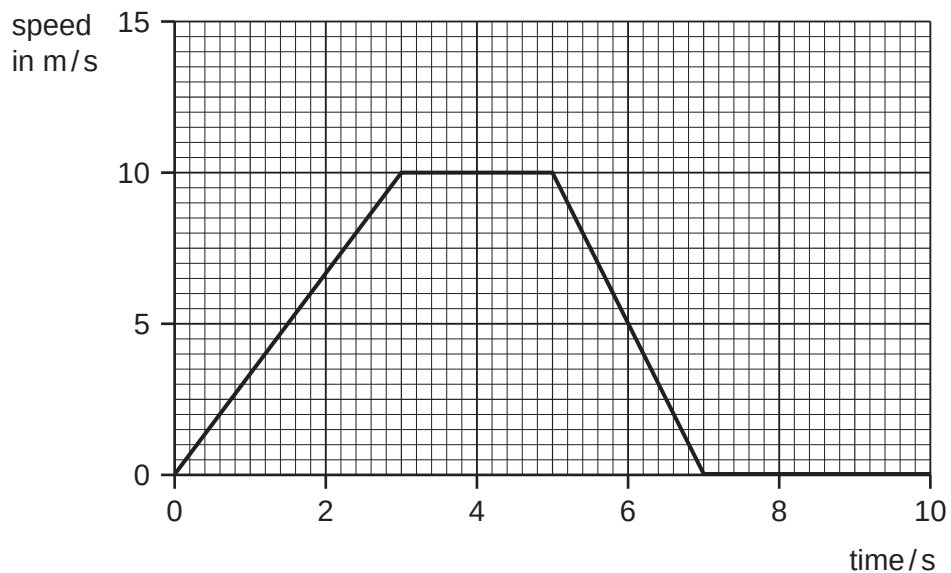
2

- 1 A rule is used to measure the internal diameter of a pipe.



What is the internal diameter of the pipe?

- A** 1.6 cm **B** 1.8 cm **C** 2.0 cm **D** 2.6 cm
- 2 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.
- 3 A container is filled with 5 kg of paint. The density of the paint is 2 g/cm³.

Which volume of container is needed?

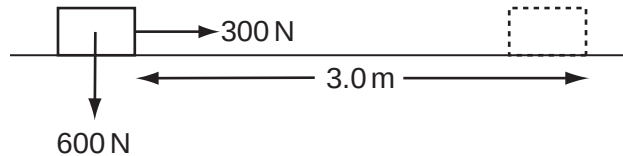
- A** 10 cm³ **B** 400 cm³ **C** 2500 cm³ **D** 10 000 cm³

3

4 Which object will experience an **elastic** deformation?

- A a car damaged in a collision
- B a football being kicked
- C a log hit by an axe
- D a target hit by an arrow

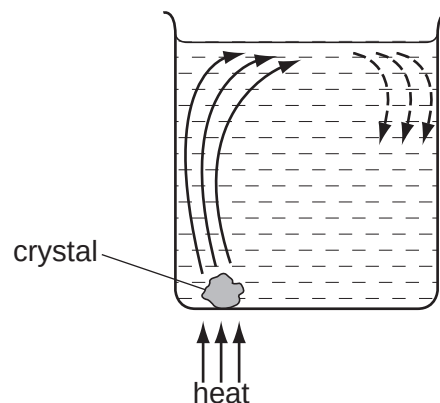
5 When a 300 N force is applied to a box weighing 600 N, the box moves 3.0 m horizontally in 20 s.



What is the average power?

- A 45 W B 90 W C 900 W D 1800 W

6 The diagram shows a coloured crystal being heated in a beaker of water. The crystal dissolves showing how the water circulates around the beaker.

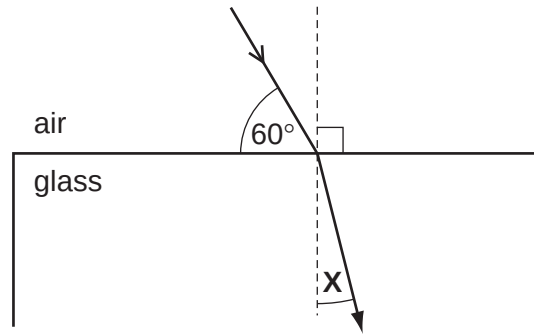


What is happening to cause the water above the crystal to rise?

- A The water contracts and its density decreases.
- B The water contracts and its density increases.
- C The water expands and its density decreases.
- D The water expands and its density increases.

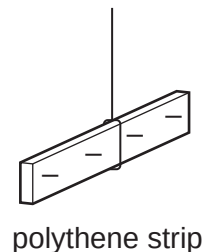
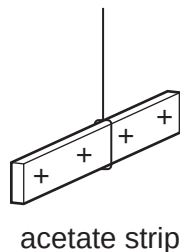
4

- 7 A ray of light passes into a glass block of refractive index 1.5.



What is the value of the angle marked **X**?

- A** 19.5° **B** 25.0° **C** 35.0° **D** 48.5°
- 8 The diagram shows a positively charged acetate strip and a negatively charged polythene strip that are freely suspended.



Two rods **X** and **Y** are brought up in turn to these two strips.
 Rod **X** attracts the acetate strip but repels the polythene strip.
 Rod **Y** does not repel either the acetate strip or the polythene strip.

Which type of charge is on each rod?

	rod X	rod Y
A	negative	positive
B	negative	uncharged
C	positive	negative
D	positive	uncharged

- 9 A current of 2 A flows through a lamp for 1 minute.

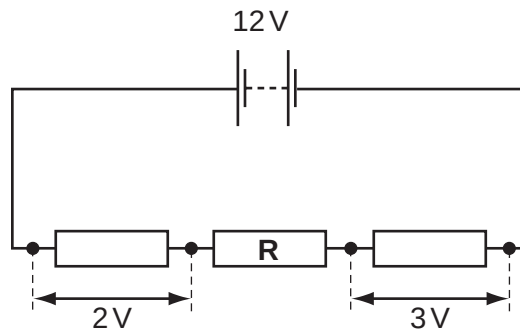
How much charge passes through the lamp?

- A** 2 C **B** 30 C **C** 60 C **D** 120 C

5

- 10 A battery of e.m.f. 12 V is connected in series with three resistors.

The p.d. across two of the resistors is shown.



What is the p.d. across the third resistor, R ?

- A** 3.5 V **B** 5 V **C** 7 V **D** 10 V

- 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 nuclide of sodium contains 11 protons and 12 neutrons.

How many electrons are in a neutral atom of this sodium nuclide?

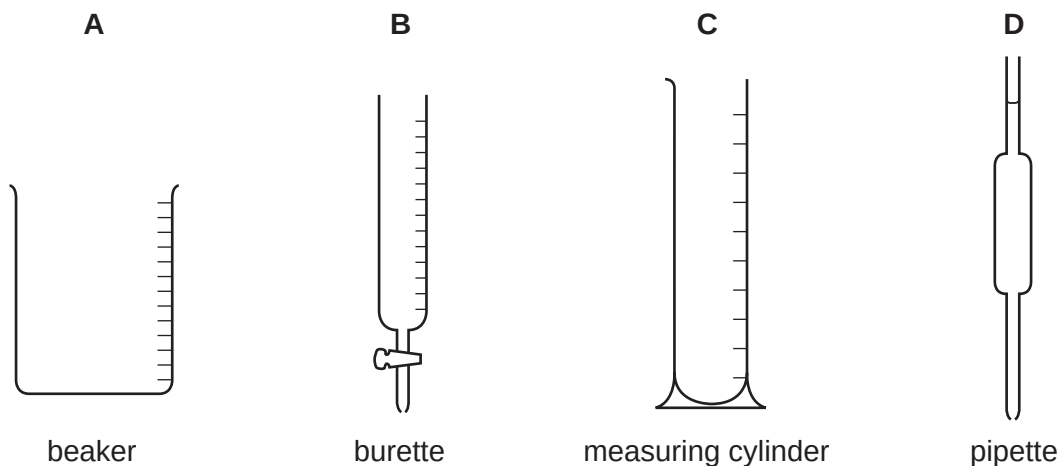
- A** 1 **B** 11 **C** 12 **D** 23

- 13 A radioactive chemical is used to investigate possible damage within a patient's body. The chemical is injected into the patient's body and the radiation detected outside.

Which source of radiation is the most suitable?

	radiation from source	half-life of source
A	beta only	long
B	beta only	short
C	gamma only	long
D	gamma only	short

14 Which piece of apparatus is used to measure **exactly** 22.5 cm^3 of a liquid?



15 An atom of element X is represented by ${}^7_3\text{X}$.

Which statement about this atom of X is correct?

- A It is in Group III of the Periodic Table.
- B It is in Group VII of the Periodic Table.
- C The total number of protons and electrons is 6.
- D The total number of protons and neutrons is 10.

16 Element Q has 2 outer shell electrons in its atoms.

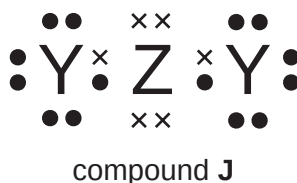
Element R has 7 outer shell electrons in its atoms.

Which ions will be present in the compound formed when Q and R react?

- A Q^+ and R^-
- B Q^{2+} and R^-
- C Q^- and R^+
- D Q^{2-} and R^+

17 The outer electronic structure of compound J is shown.

Y and Z are different elements.



Which formula could represent compound J?

- A Cl_2O
- B CO_2
- C H_2O
- D SiO_2

18 The formula of an oxide of uranium is UO_2 .

What is the formula of the corresponding chloride?

- A UCl_2 B UCl_4 C U_2Cl D U_4Cl

19 Aluminium chloride dissolves in water to form a solution with a pH less than 7.

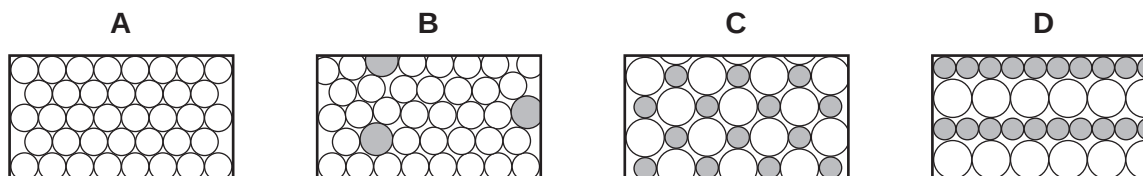
Which ion in the solution makes the solution have a pH less than 7?

- A aluminium
B chloride
C hydrogen
D hydroxide

20 Which arrangement of electrons is that of a gas normally used to fill light bulbs?

- A 2 B 2, 6 C 2, 8, 2 D 2, 8, 8

21 Which diagram represents the structure of an alloy?



22 The metals iron, lead and zinc can be manufactured by the reduction of their oxides with coke.

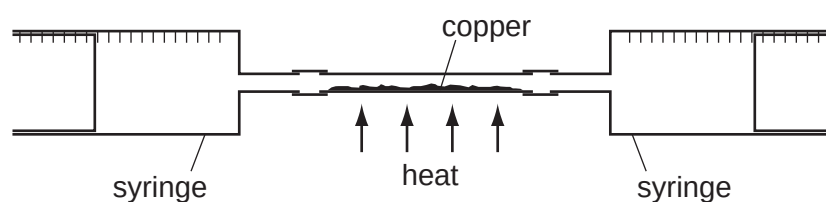
What is the correct order of the ease of reduction of the metal oxides?

	oxides becoming more difficult to reduce →
A	iron → lead → zinc
B	iron → zinc → lead
C	lead → iron → zinc
D	zinc → iron → lead

23 Which reaction occurring in the blast furnace is an acid base reaction?

- A $\text{C} + \text{CO}_2 \rightarrow 2\text{CO}$
 B $\text{C} + \text{O}_2 \rightarrow \text{CO}_2$
 C $\text{CaCO}_3 + \text{SiO}_2 \rightarrow \text{CaSiO}_3 + \text{CO}_2$
 D $\text{Fe}_2\text{O}_3 + 3\text{CO} \rightarrow 2\text{Fe} + 3\text{CO}_2$

24 In the apparatus shown, 100 cm^3 of air are passed backwards and forwards between the two syringes until reaction is complete.



What is the final volume of gas after cooling to the original temperature?

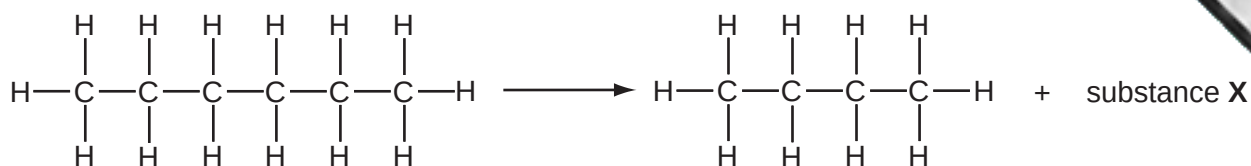
- A 20 cm^3 B 28 cm^3 C 32 cm^3 D 80 cm^3

25 The table shows the names of four fractions from petroleum and their uses.

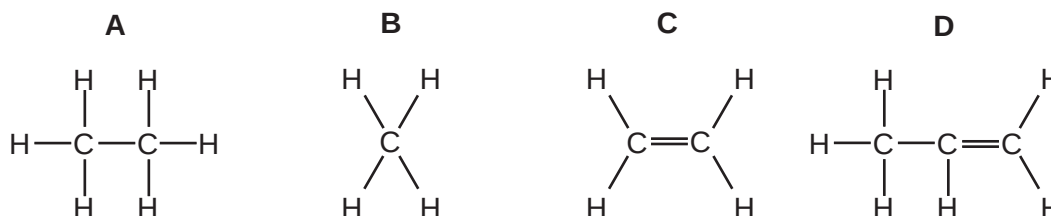
Which fraction is paired correctly with its use?

	fraction	use
A	lubricating oil	source of polishes and waxes
B	kerosene	lubricant
C	diesel	making road surfaces
D	gasoline	feedstock for the chemical industry

- 26 The equation shows a molecule of hexane being cracked into two smaller molecules at a high temperature.



What is likely to be the structure of substance **X**?

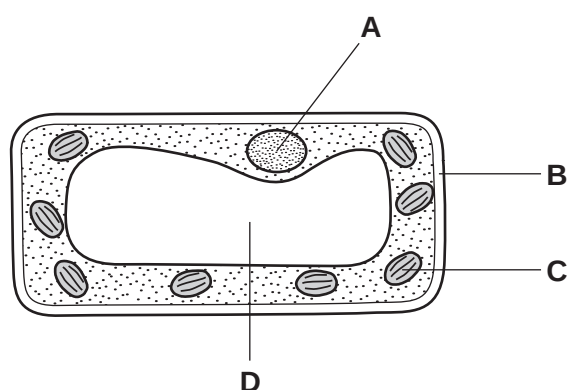


- 27 Yeast is used to convert simple sugars to

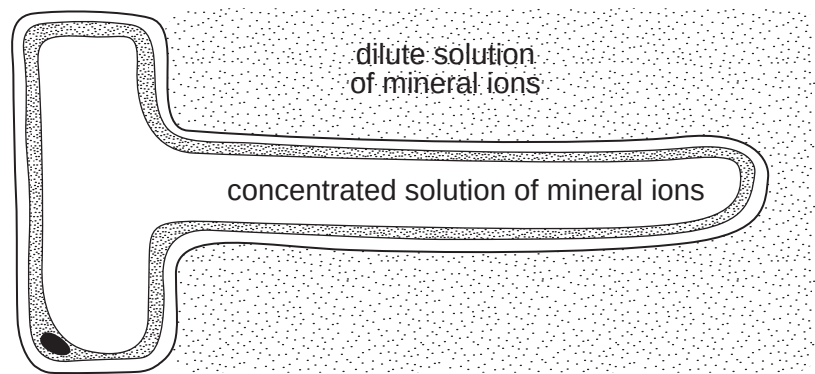
- A** ethanoic acid and oxygen.
- B** ethanol and carbon dioxide.
- C** ethanol and oxygen.
- D** starch and carbon dioxide.

- 28 A plant is grown in bright sunshine. After a few hours, a leaf from this plant is stained with iodine solution. The diagram shows what is seen when a cell from this leaf is placed under a microscope.

Which structure will be stained blue/black?

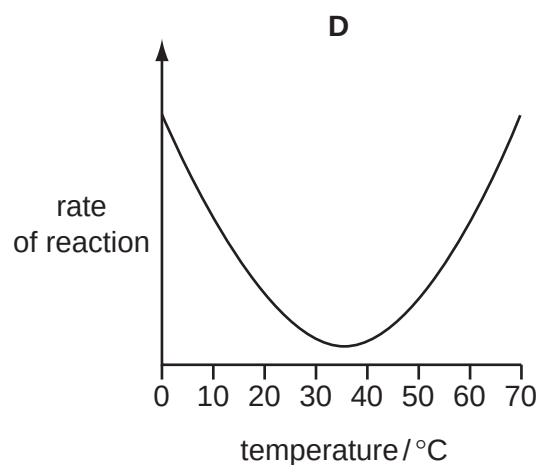
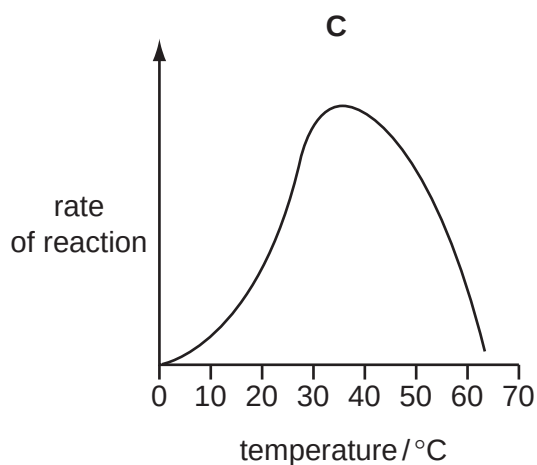
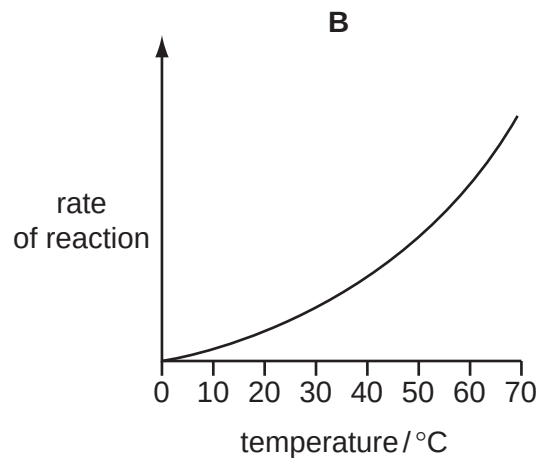
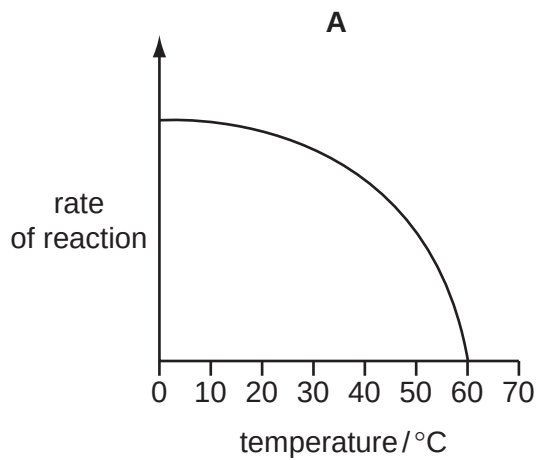


- 29 The diagram shows a root hair, surrounded by a dilute solution of mineral ions.

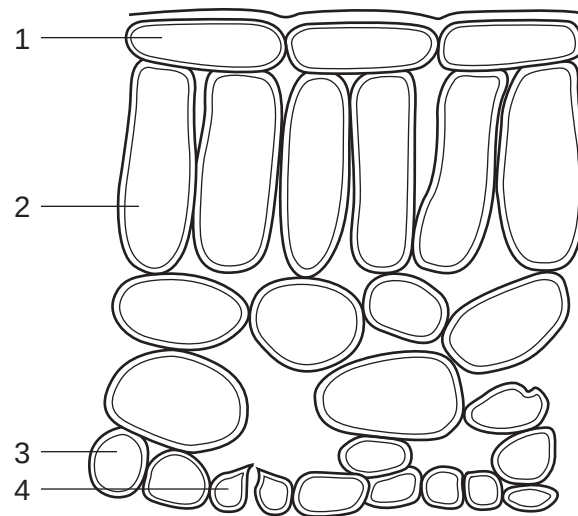


Which statement describes what happens?

- A** Water molecules move into the root hair because their concentration is lower inside.
B Water molecules move into the root hair because their concentration is lower outside.
C Water molecules move out of the root hair because their concentration is lower inside.
D Water molecules move out of the root hair because their concentration is lower outside.
- 30 Which graph shows how an enzyme catalysed reaction in the alimentary canal varies with temperature?



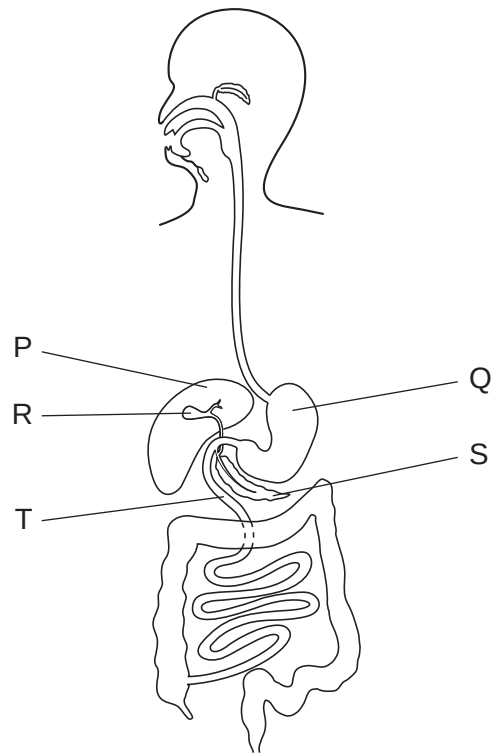
- 31 The diagram shows the arrangement of cells inside the leaf of a green plant. (No cell contents are shown.)



Which cells normally contain chloroplasts?

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

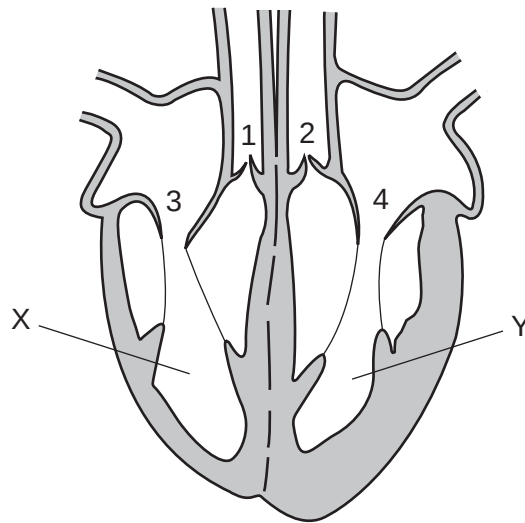
32 The diagram shows the human gut.



Where is bile made, where is it stored and where does it act?

	where it is made	where it is stored	where it acts
A	P	Q	R
B	P	R	T
C	Q	S	P
D	Q	T	S

33 The diagram shows a section through the heart.



While chambers X and Y are emptying, which valves are open and which are closed?

	valves 1 and 2	valves 3 and 4
A	closed	closed
B	closed	open
C	open	closed
D	open	open

34 What are the products of aerobic and anaerobic respiration in muscle tissue?

	aerobic respiration	anaerobic respiration
A	carbon dioxide and water	ethanol
B	carbon dioxide and water	lactic acid
C	ethanol	carbon dioxide and water
D	lactic acid	carbon dioxide and water

35 Which organ excretes most carbon dioxide from the human body?

- A** kidney
- B** lung
- C** rectum
- D** skin

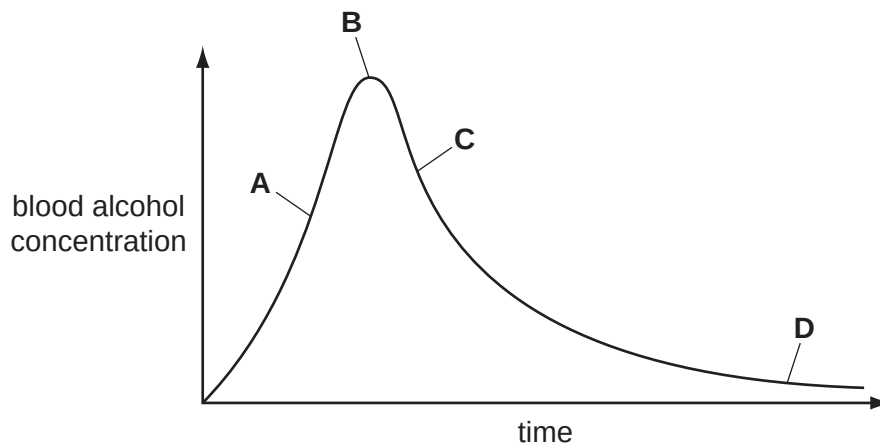
36 What happens in the eye when a person walks from a dark room into sunlight?

	radial muscles of the iris	circular muscles of the iris	pupil size
A	contract	relax	decreases
B	contract	relax	increases
C	relax	contract	decreases
D	relax	contract	increases

37 Samples of blood are taken every half hour from a person who has been drinking alcohol.

The graph shows the amount of alcohol in the person's blood.

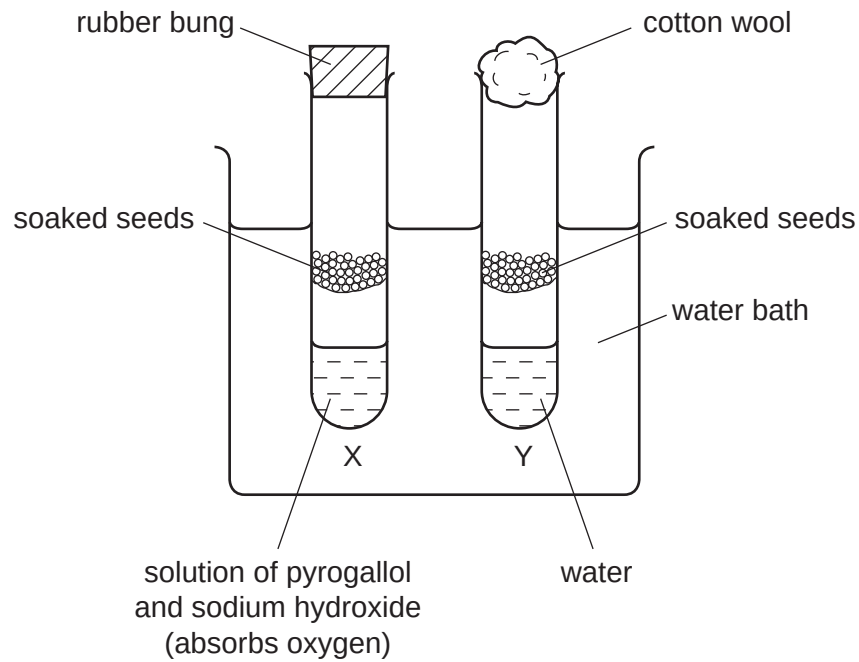
During which period is alcohol removed fastest from the blood?



38 What happens to energy after it has flowed through a food chain?

- A** It is lost as heat.
- B** It is recycled.
- C** It is stored as carbohydrate.
- D** It is used to power metabolic processes.

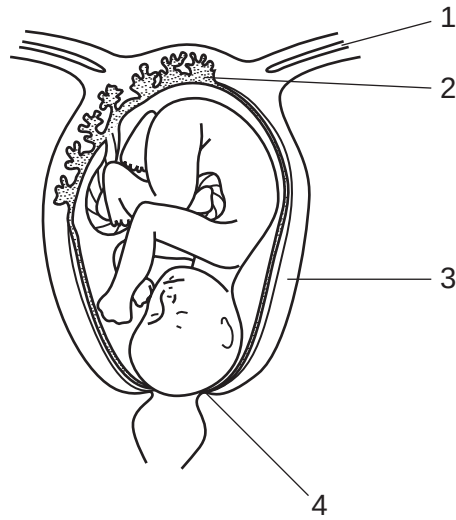
39 The diagram shows an experiment to find out if seeds need oxygen to germinate.



Which change should be made for tube Y to be an effective control?

- A** Add soda lime at the bottom of tube Y.
- B** Do not soak the seeds in tube Y.
- C** Replace the cotton wool in tube Y with a rubber bung.
- D** Replace the soaked seeds in tube Y with seeds that have been boiled.

40 Where are the uterus and the cervix?



	uterus	cervix
A	1	2
B	2	1
C	3	4
D	4	3

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	101 Ru Ruthenium 44	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	210 Po Polonium 84	210 At Astatine 85	210 Rn Radon 86							
Fr Francium 87	Ra Radium 88	Ac Actinium 89																						
58-71 Lanthanoid series																								
90-103 Actinoid series																								

*58-71 Lanthanoid series
†90-103 Actinoid series

Key

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

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