



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education Ordinary Level

**COMBINED SCIENCE**

**5129/01**

Paper 1 Multiple Choice

**May/June 2010**

**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.

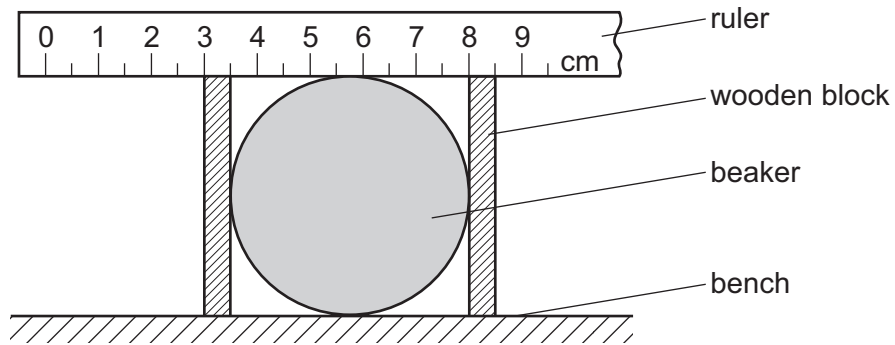
Any rough working should be done in this booklet.

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

This document consists of **16** printed pages.



- 1 The diagram shows a method of measuring the diameter of a beaker.

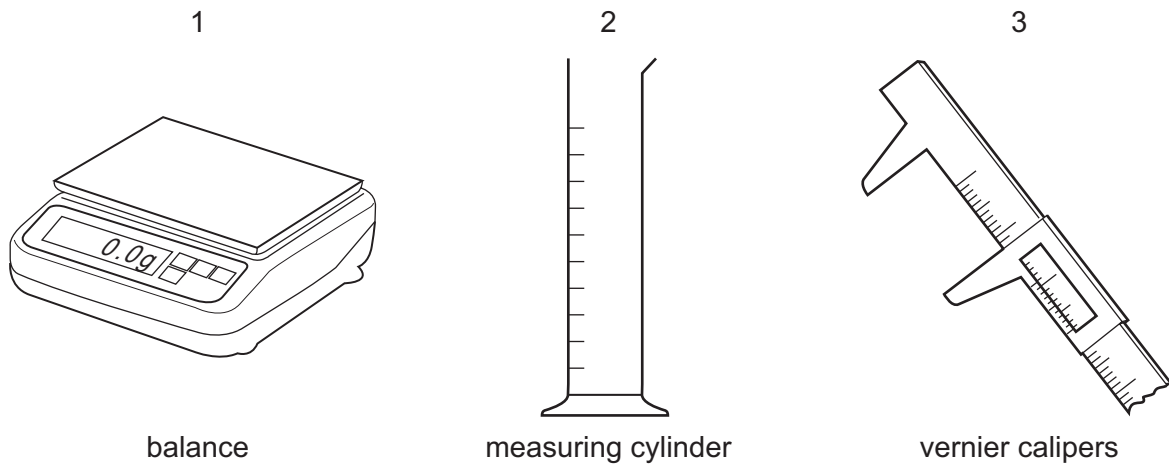


What is the diameter of the beaker?

- A** 4.5 cm      **B** 5.0 cm      **C** 5.5 cm      **D** 8.0 cm
- 2 A block of mass 1 kg is pushed across a frictionless surface with a force of 2 N.

What is the acceleration of the block?

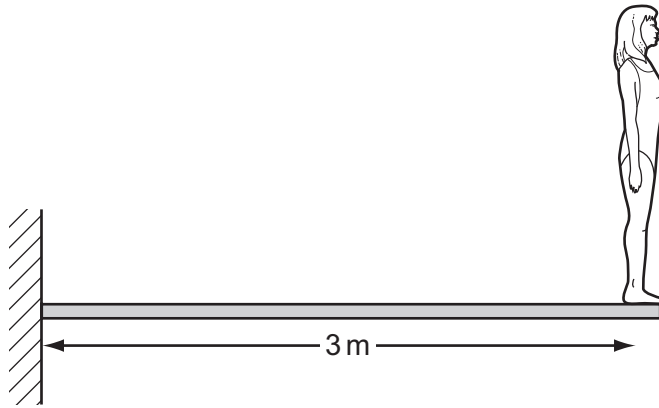
- A**  $0.5 \text{ m/s}^2$       **B**  $1.0 \text{ m/s}^2$       **C**  $2.0 \text{ m/s}^2$       **D**  $3.0 \text{ m/s}^2$
- 3 The diagram shows three pieces of apparatus.



Which instruments are required to measure the density of an irregular piece of rock?

- A** 1 and 2 only      **B** 1 and 3 only      **C** 2 and 3 only      **D** 1, 2 and 3

- 4 A diver, weighing 720 N, stands at the end of a springboard measuring 3 m long.

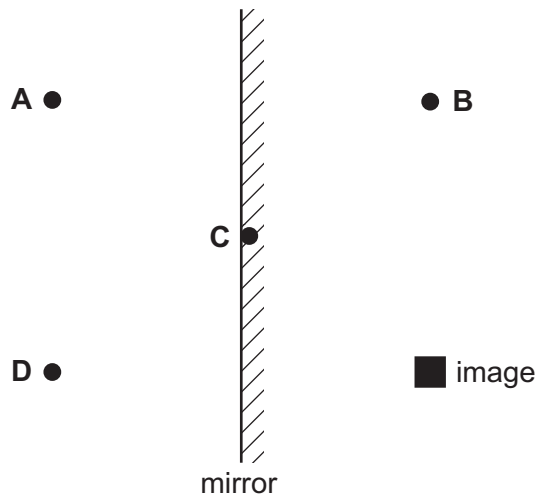


What is the moment about the support?

- A 720 Nm      B  $720 \times 3$  Nm      C  $\frac{3}{720}$  Nm      D  $\frac{720}{3}$  Nm
- 5 Which energy source is used in a nuclear power station?
- A coal  
B hydrogen  
C natural gas  
D uranium
- 6 Equal volumes of four substances are heated at atmospheric pressure.  
The temperature rise is the same for each substance.  
Which substance expands the most?
- A air  
B mercury  
C steel  
D water

- 7 The diagram shows a plane mirror and the position of an image.

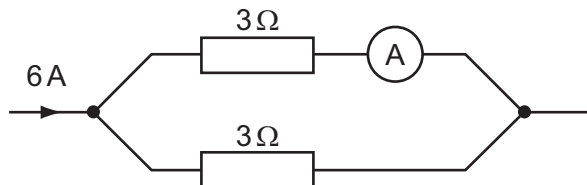
Where must the object be placed to form this image?



- 8 A battery moves a charge of 60 C around a circuit in a time of 20 s.

What is the current in the circuit?

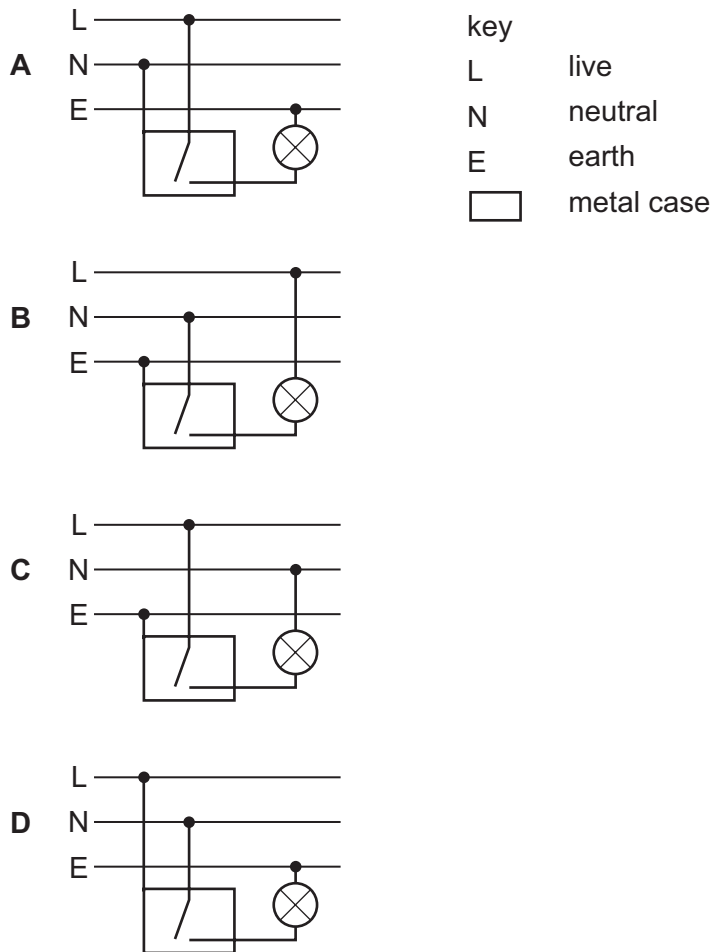
- A** 0.3 A      **B** 3.0 A      **C** 40 A      **D** 1200 A
- 9 A current of 6 A flows in the circuit shown. The current splits up when it enters parallel branches of resistors.



What is the reading on the ammeter?

- A** 2 A      **B** 3 A      **C** 6 A      **D** 12 A
- 10 A small heater operates at 12 V, 2 A.
- How much energy will it use when it is used for 5 minutes?
- A** 30 J      **B** 120 J      **C** 1800 J      **D** 7200 J

11 Which diagram shows the correct connections for a switch and a lamp in a lighting circuit?



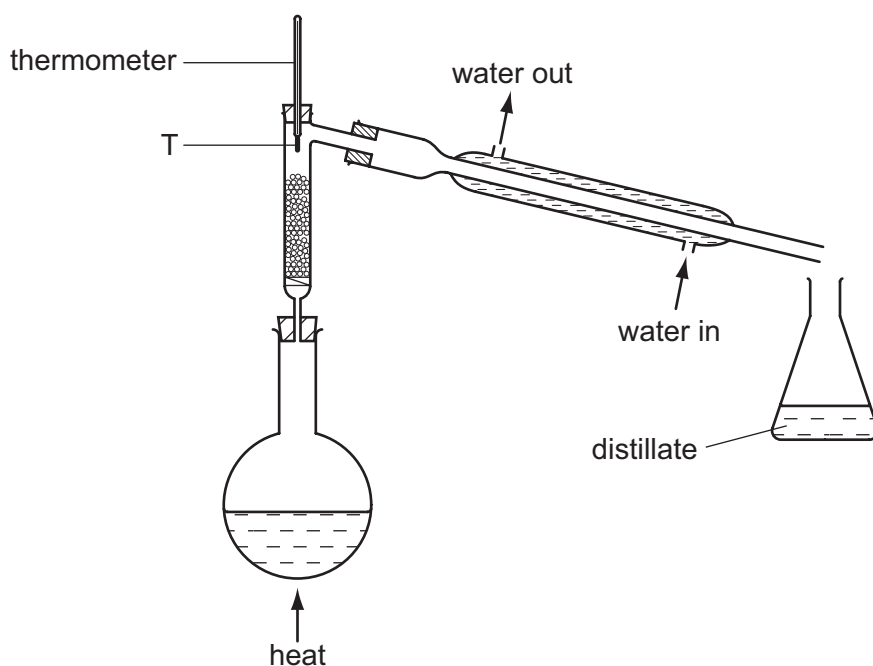
12 What particles are present in the nucleus of the oxygen nuclide  $^{17}_8\text{O}$ ?

	neutrons	protons
<b>A</b>	8	9
<b>B</b>	9	17
<b>C</b>	9	8
<b>D</b>	17	8

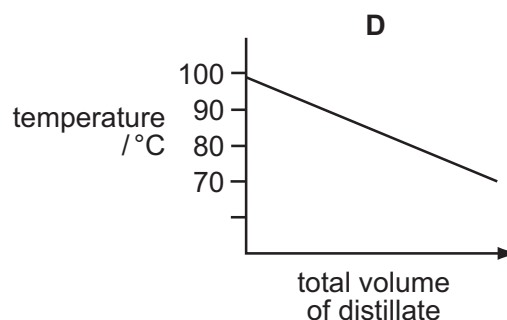
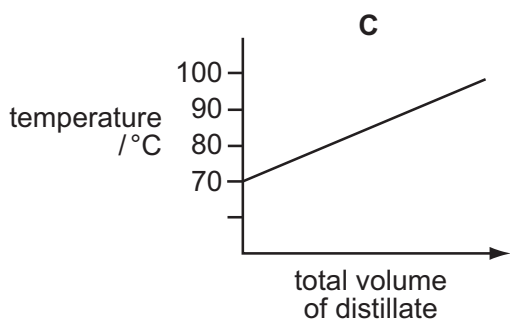
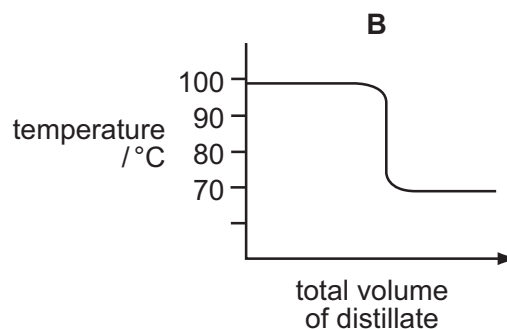
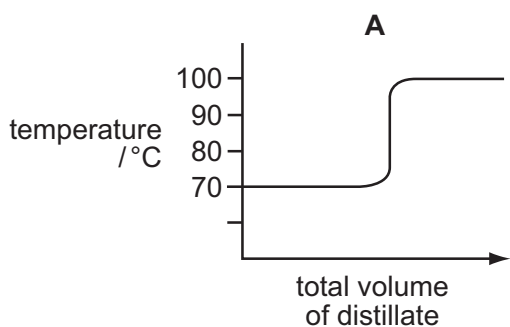
13 Which particle is positively charged?

- A** electron
- B** neutral atom
- C** neutron
- D** proton

- 14 The diagram shows apparatus used to separate hexane (boiling point, 70°C) and heptane (boiling point, 98°C).



Which graph would be obtained if the temperature at point T was plotted against the total volume of distillate collected?



- 15 What is the electronic structure of  ${}_{16}^{32}\text{S}^{2-}$ ?

- A** 2,8,6      **B** 2,8,8      **C** 2,8,18,4      **D** 2,8,18,6

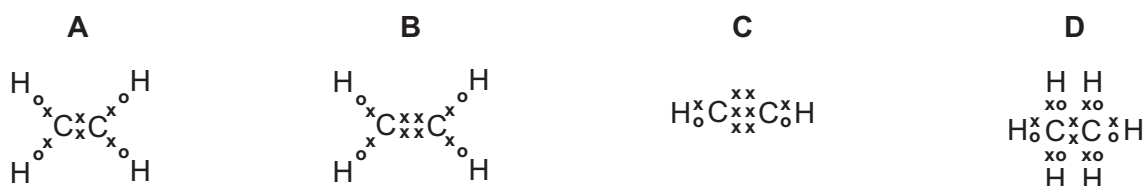
- 16 Rubidium is in Group I and bromine is in Group VII of the Periodic Table.

How is a compound formed between rubidium and bromine?

- A Each atom of bromine shares an electron with an atom of rubidium.  
 B Each atom of bromine shares a pair of electrons with an atom of rubidium.  
 C Each atom of bromine gives an electron to an atom of rubidium.  
 D Each atom of bromine receives an electron from an atom of rubidium.

- 17 In the structures below, the symbols x and o represent electrons.

Which structure is correct for an alkene?



- 18 'Meta-fuel',  $\text{C}_8\text{H}_{16}\text{O}_4$ , is a fuel used in camping stoves.

What is the equation for its complete combustion?

- A  $\text{C}_8\text{H}_{16}\text{O}_4 + 2\text{O}_2 \rightarrow 8\text{C} + 8\text{H}_2\text{O}$   
 B  $\text{C}_8\text{H}_{16}\text{O}_4 + 6\text{O}_2 \rightarrow 8\text{CO} + 8\text{H}_2\text{O}$   
 C  $\text{C}_8\text{H}_{16}\text{O}_4 + 10\text{O}_2 \rightarrow 8\text{CO}_2 + 8\text{H}_2\text{O}$   
 D  $\text{C}_8\text{H}_{16}\text{O}_4 + 8\text{O}_2 \rightarrow 4\text{CO}_2 + 4\text{CO} + 8\text{H}_2\text{O}$

- 19 Which are the most appropriate reagents for preparing potassium chloride in the laboratory?

- A potassium and chlorine  
 B potassium and hydrochloric acid  
 C potassium hydroxide and hydrochloric acid  
 D potassium nitrate and barium chloride

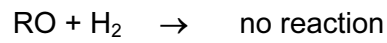
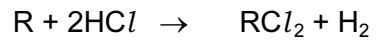
- 20 X, Y and Z are elements in the same period of the Periodic Table.

X forms an acidic oxide, Y forms a basic oxide and Z forms an amphoteric oxide.

If X, Y and Z are placed in order of increasing atomic number, which order is correct?

- A X, Y, Z      B X, Z, Y      C Y, X, Z      D Y, Z, X

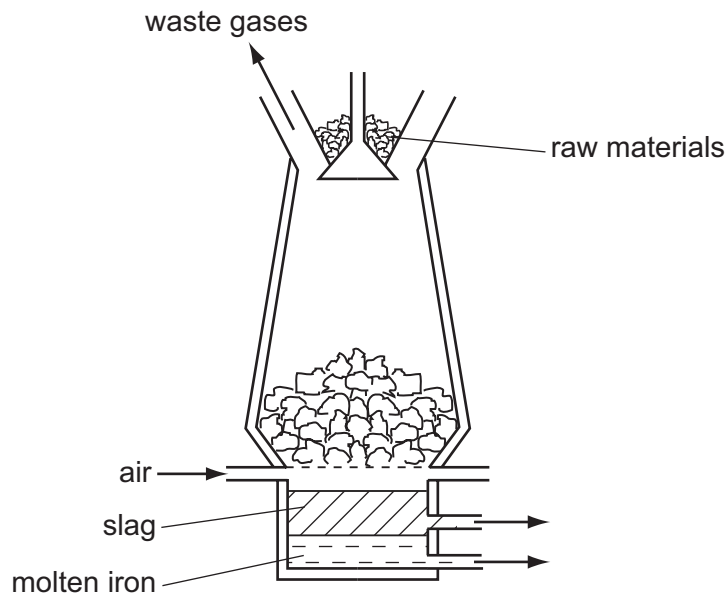
21 An element R reacts in the following ways.



What is R?

- A aluminium
- B calcium
- C copper
- D iron

22 Iron is extracted in the blast furnace using the raw materials haematite, coke and limestone.



Which substance undergoes thermal decomposition?

- A limestone
- B carbon dioxide
- C haematite
- D slag

23 Which gas is **most** abundant in air that has been breathed out?

- A argon
- B carbon dioxide
- C oxygen
- D nitrogen



24 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?

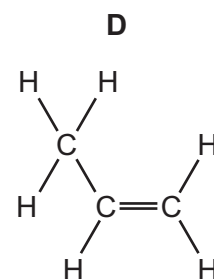
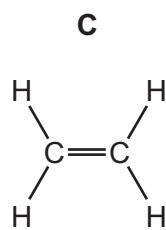
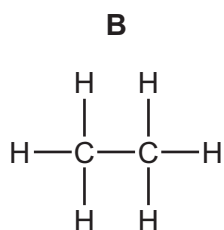
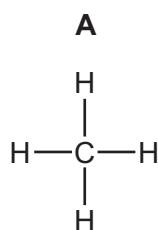
	percentage by mass		
	N	P	K
<b>A</b>	29	13	0
<b>B</b>	29	5	5
<b>C</b>	13	13	20
<b>D</b>	9	0	25

25 When an alkane burns in a plentiful supply of air, what are the combustion products?

- A** carbon dioxide and steam only
- B** carbon monoxide, carbon dioxide and steam
- C** carbon monoxide and carbon dioxide only
- D** carbon monoxide and steam only

26 Ethane gas was cracked to produce hydrogen gas and another gas Y which decolourised aqueous bromine.

What is the structural formula of Y?



27 Substance X has the following characteristics.

- 1 It burns in oxygen to produce carbon dioxide and water.
- 2 It is oxidised to produce a liquid smelling of vinegar.
- 3 It is made by the catalytic addition of steam to ethene.

What is X?

- A methane
- B ethanol
- C ethanoic acid
- D ethyl ethanoate

28 Which description applies to a red blood cell?

	cell wall	nucleus
<b>A</b>	absent	absent
<b>B</b>	absent	present
<b>C</b>	present	absent
<b>D</b>	present	present

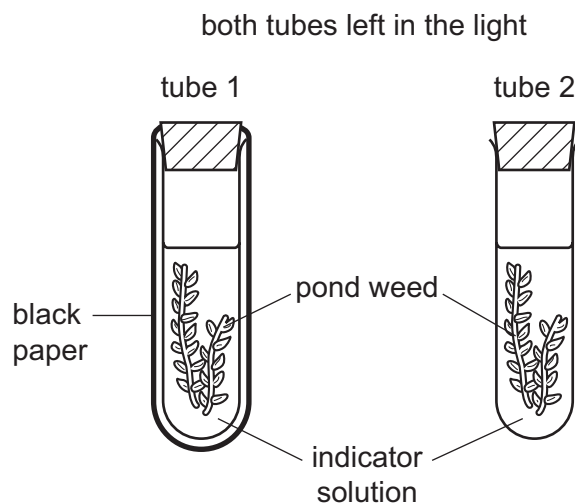
29 An indicator solution shows the following colour changes -

normal carbon dioxide concentration : orange

high carbon dioxide concentration : yellow

low carbon dioxide concentration : purple

Consider the experiment represented by the diagram below. The indicator was orange in both tubes at the beginning of the experiment.



Which colours would the indicators be after three hours?

	tube 1	tube 2
<b>A</b>	orange	yellow
<b>B</b>	purple	orange
<b>C</b>	purple	yellow
<b>D</b>	yellow	purple

30 Only two of the following statements accurately describe what happens in the mouth.

- 1 Amylase breaks down large starch molecules into smaller maltose molecules.
- 2 Chewing increases the surface area of food for digestion.
- 3 Saliva emulsifies fats into smaller droplets.
- 4 Teeth break up large insoluble molecules into smaller soluble molecules.

Which statements are correct?

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

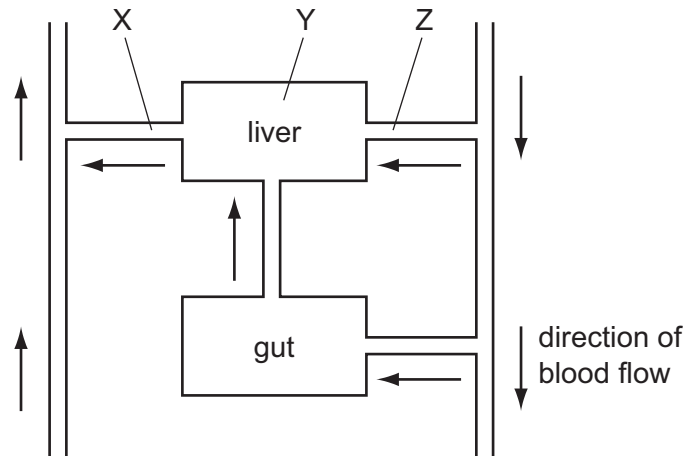
31 Four similar leafy shoots are exposed to different conditions. The rates of water uptake and the rates of water loss are measured.

The results are shown in the table.

Which shoot is most likely to wilt?

	water uptake /mm <sup>3</sup> per min	water loss /mm <sup>3</sup> per min
<b>A</b>	14	13
<b>B</b>	10	12
<b>C</b>	5	5
<b>D</b>	4	2

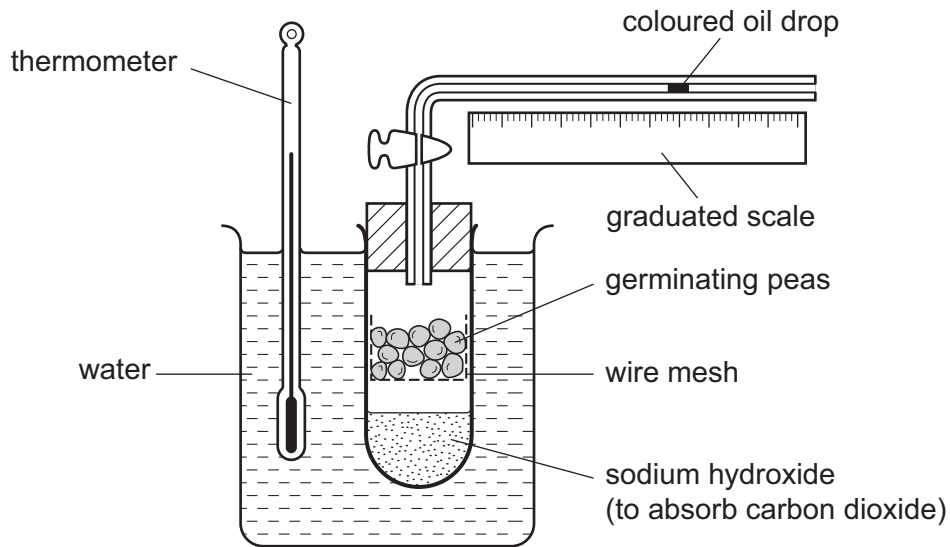
32 The diagram shows the path of blood through the liver and gut.



Where are an artery, capillaries and a 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

33 The diagram shows some apparatus used in investigating seed germination.



What is shown by the movement of the oil drop in the apparatus?

- A carbon dioxide released
  - B heat released
  - C oxygen used
  - D water produced
- 34 What is an example of excretion?
- A release of a hormone into the blood
  - B removal of carbon dioxide from the lungs
  - C removal of undigested food from the alimentary canal
  - D release of water from the sweat glands
- 35 What structures cover the pupil of a human eye?
- A conjunctiva and cornea
  - B conjunctiva and sclera
  - C cornea and retina
  - D retina and sclera

36 What are the effects of alcohol and heroin on the body?

	alcohol	heroin
<b>A</b>	depressant	depressant
<b>B</b>	depressant	stimulant
<b>C</b>	stimulant	depressant
<b>D</b>	stimulant	stimulant

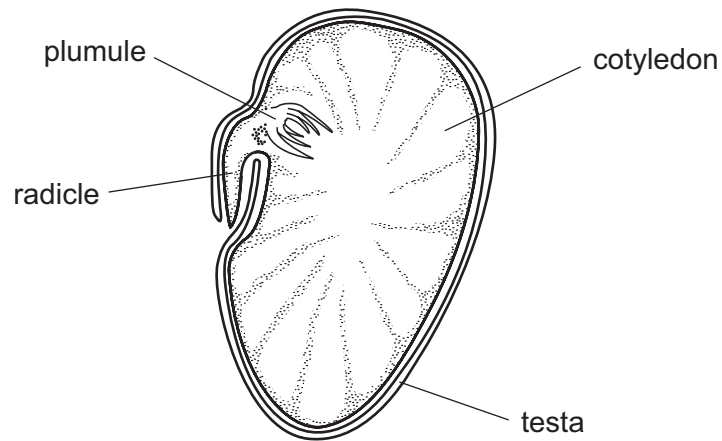
37 Which statement is **not** correct?

- A** Anaerobic respiration releases less energy than aerobic respiration.
- B** Energy flowing through biological systems is recycled.
- C** Food chains show energy flow in ecosystems.
- D** The sun is the principal source of energy input into biological systems.

38 When is carbon dioxide absorbed, and when is it released, by an ecosystem such as a tropical rainforest?

	daylight	darkness
<b>A</b>	absorbed	absorbed
<b>B</b>	absorbed	released
<b>C</b>	released	absorbed
<b>D</b>	released	released

39 The diagram shows a broad bean seed. Part of it has been cut away to show the structure.



Which parts make up the complete embryo?

- A radicle, plumule, cotyledons and testa
  - B radicle, plumule and cotyledons only
  - C radicle and plumule only
  - D radicle only
- 40 What would be the result of cutting the sperm ducts on the right and left sides in a man?
- A He would become sterile.
  - B He would be unable to develop sperms.
  - C He would be unable to pass urine.
  - D Male sex hormones would no longer circulate in the blood.

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

		Group																										
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI																
		1 <b>H</b> Hydrogen 1										4 <b>He</b> Helium 2																
7 <b>Li</b> Lithium 3	9 <b>Be</b> Beryllium 4											19 <b>F</b> Fluorine 9																
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> Sulfur 16	35.5 <b>Cl</b> Chlorine 17	36 <b>Ar</b> Argon 18						40 <b>Ne</b> Neon 10															
39 <b>K</b> Potassium 19	40 <b>Ca</b> Calcium 20	51 <b>V</b> Vanadium 23	52 <b>Cr</b> Chromium 24	55 <b>Mn</b> Manganese 25	56 <b>Fe</b> Iron 26	59 <b>Co</b> Cobalt 27	59 <b>Ni</b> Nickel 28	64 <b>Cu</b> Copper 29	65 <b>Zn</b> Zinc 30	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	91 <b>Zr</b> Zirconium 40	96 <b>Mo</b> Molybdenum 42	101 <b>Ru</b> Ruthenium 44	106 <b>Pd</b> Palladium 46	108 <b>Ag</b> Silver 47	112 <b>Cd</b> Cadmium 48	115 <b>In</b> Indium 49	119 <b>Sn</b> Tin 50	122 <b>Sb</b> Antimony 51	128 <b>Te</b> Tellurium 52	131 <b>Xe</b> Xenon 54			131 <b>Xe</b> Xenon 54													
133 <b>Cs</b> Caesium 55	137 <b>Ba</b> Barium 56	181 <b>Ta</b> Tantalum 73	184 <b>W</b> Tungsten 74	190 <b>Os</b> Osmium 76	195 <b>Pt</b> Platinum 78	197 <b>Au</b> Gold 79	201 <b>Hg</b> Mercury 80	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>Rn</b> Radon 86			210 <b>Rn</b> Radon 86													
226 <b>Ra</b> Radium 88	227 <b>Ac</b> Actinium 89											227 <b>Ac</b> Actinium 89																
													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	167 <b>Er</b> Erbium 68	169 <b>Tm</b> Thulium 69	173 <b>Yb</b> Ytterbium 70	175 <b>Lu</b> Lutetium 71				
													232 <b>Th</b> Thorium 90	238 <b>U</b> Uranium 92	238 <b>U</b> Uranium 92	238 <b>U</b> Uranium 92	238 <b>U</b> Uranium 92	238 <b>U</b> Uranium 92	238 <b>U</b> Uranium 92	238 <b>U</b> Uranium 92	238 <b>U</b> Uranium 92	238 <b>U</b> Uranium 92	238 <b>U</b> Uranium 92	238 <b>U</b> Uranium 92	238 <b>U</b> Uranium 92	238 <b>U</b> Uranium 92	238 <b>U</b> Uranium 92	238 <b>U</b> Uranium 92

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

a	<b>X</b>	b
---	----------	---

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

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

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

University of Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.