



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

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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)

* 4 8 8 7 4 6 0 2 0 5 *

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.

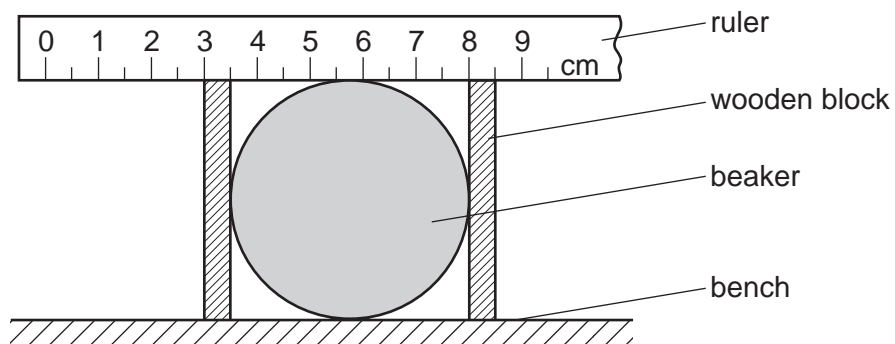
Any rough working should be done in this booklet.

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

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

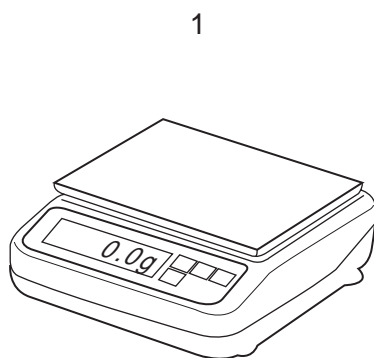


- 1 The diagram shows a method of measuring the diameter of a beaker.

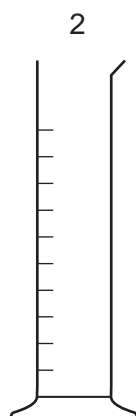


What is the diameter of the beaker?

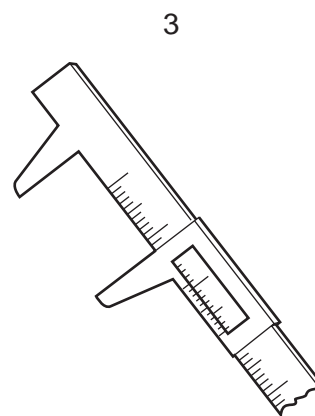
- A** 4.5 cm **B** 5.0 cm **C** 5.5 cm **D** 8.0 cm
- 2 A block of mass 1 kg is pushed across a frictionless surface with a force of 2 N.
- What is the acceleration of the block?
- A** 0.5 m/s^2 **B** 1.0 m/s^2 **C** 2.0 m/s^2 **D** 3.0 m/s^2
- 3 The diagram shows three pieces of apparatus.



balance



measuring cylinder

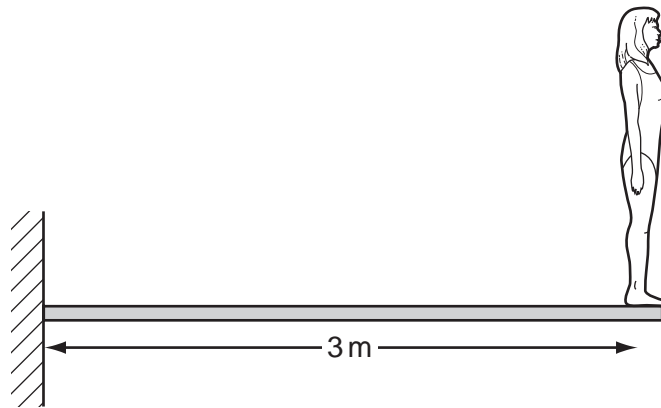


vernier calipers

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

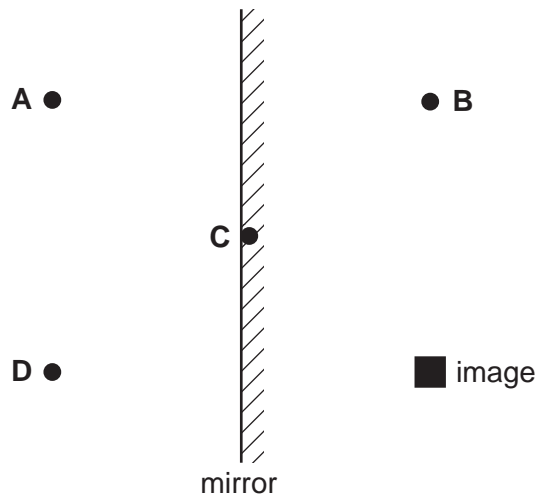
- 4 A diver, weighing 720 N, stands at the end of a springboard measuring 3 m long.



What is the moment about the support?

- A 720 Nm B 720×3 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

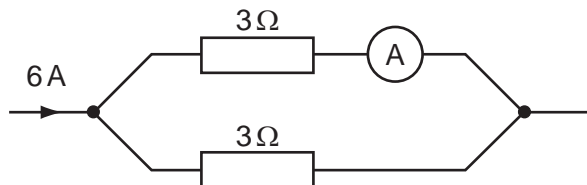
- 7 The diagram shows a plane mirror and the position of an image.
Where must the object be placed to form this image?



- 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?

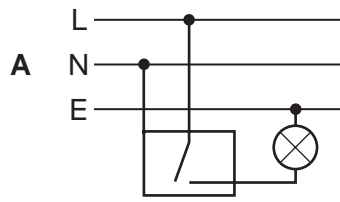
- A** 0.3 A **B** 3.0 A **C** 40 A **D** 1200 A
- 9 A current of 6 A flows in the circuit shown. The current splits up when it enters parallel branches of resistors.



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?



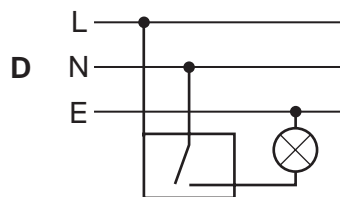
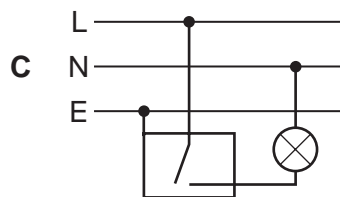
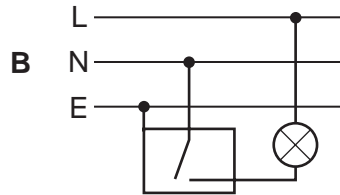
key

L live

N neutral

E earth

□ metal case



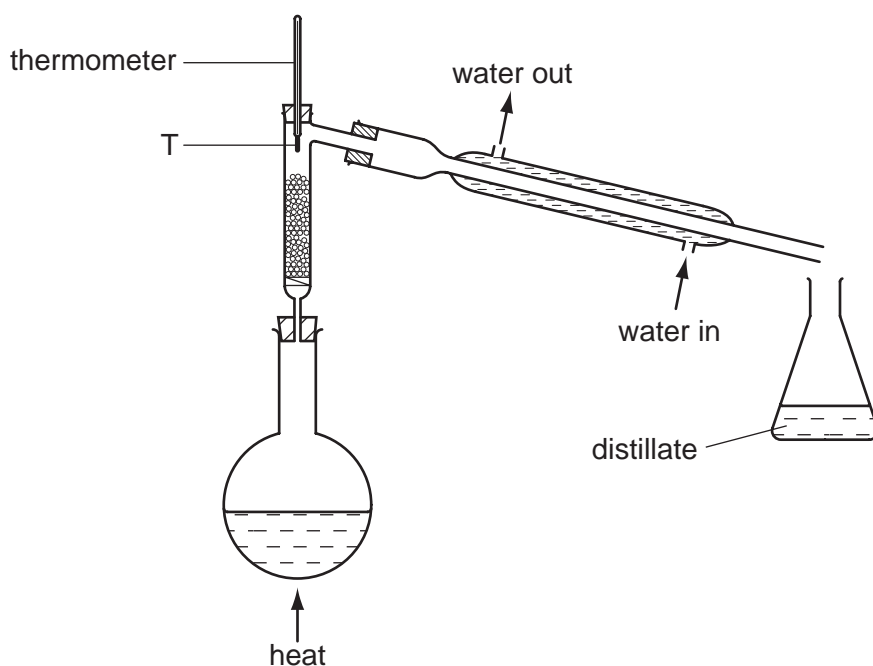
12 What particles are present in the nucleus of the oxygen nuclide $^{17}_8\text{O}$?

	neutrons	protons
A	8	9
B	9	17
C	9	8
D	17	8

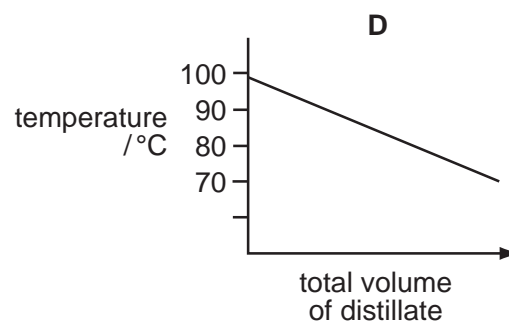
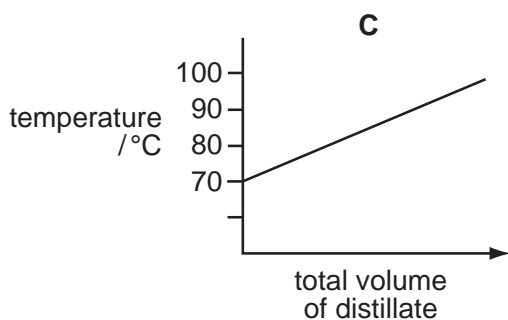
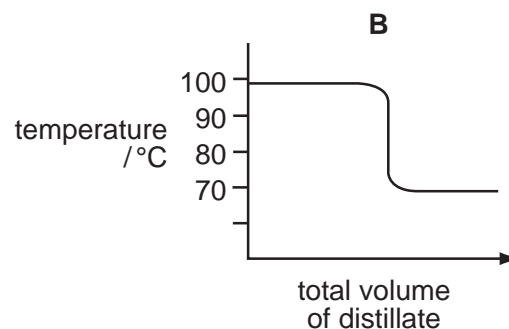
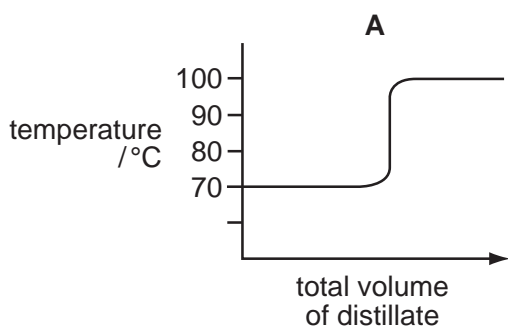
13 Which particle is positively charged?

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

- 14 The diagram shows apparatus used to separate hexane (boiling point, 70°C) and octane (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 $^{32}_{16}\text{S}^{2-}$?

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

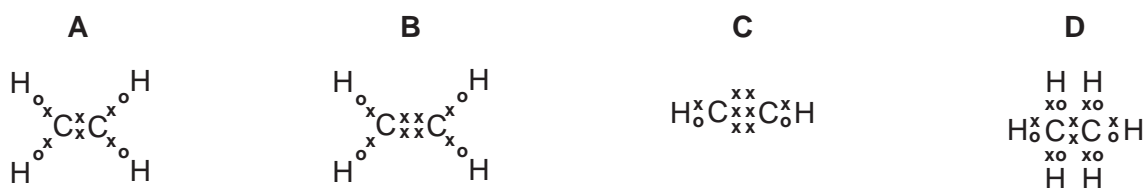
- 16 Rubidium is in Group I and bromine is in Group VII of the Periodic Table.

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?

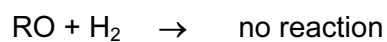
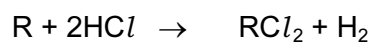
- A $\text{C}_8\text{H}_{16}\text{O}_4 + 2\text{O}_2 \rightarrow 8\text{C} + 8\text{H}_2\text{O}$
 B $\text{C}_8\text{H}_{16}\text{O}_4 + 6\text{O}_2 \rightarrow 8\text{CO} + 8\text{H}_2\text{O}$
 C $\text{C}_8\text{H}_{16}\text{O}_4 + 10\text{O}_2 \rightarrow 8\text{CO}_2 + 8\text{H}_2\text{O}$
 D $\text{C}_8\text{H}_{16}\text{O}_4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

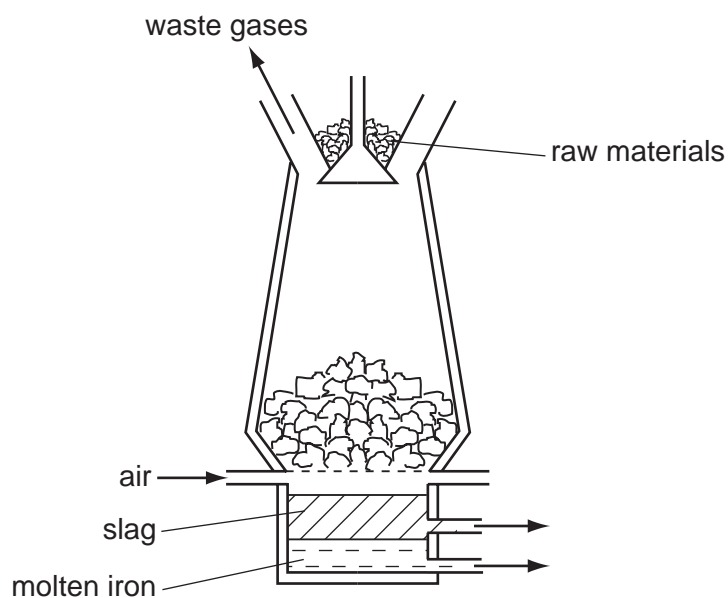
21 An element R reacts in the following ways.



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?

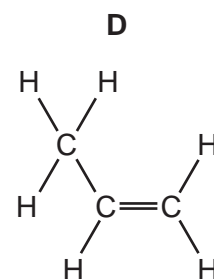
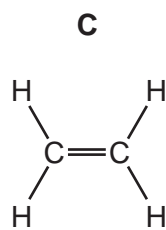
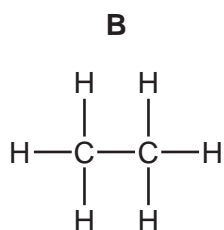
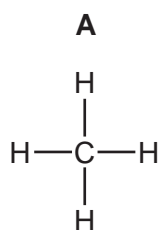
	percentage by mass		
	N	P	K
A	29	13	0
B	29	5	5
C	13	13	20
D	9	0	25

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
A	absent	absent
B	absent	present
C	present	absent
D	present	present

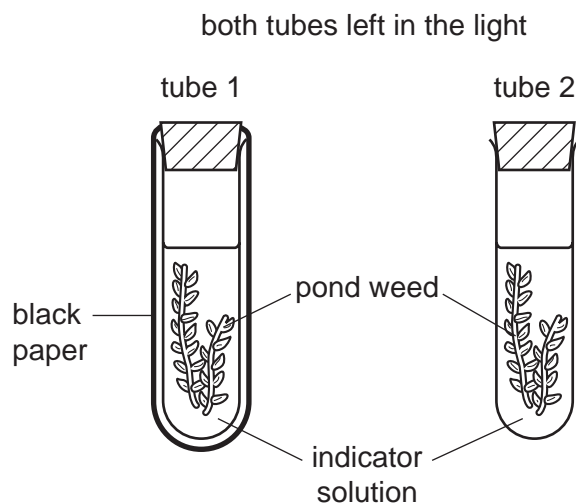
29 An indicator solution shows the following colour changes -

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
A	orange	yellow
B	purple	orange
C	purple	yellow
D	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

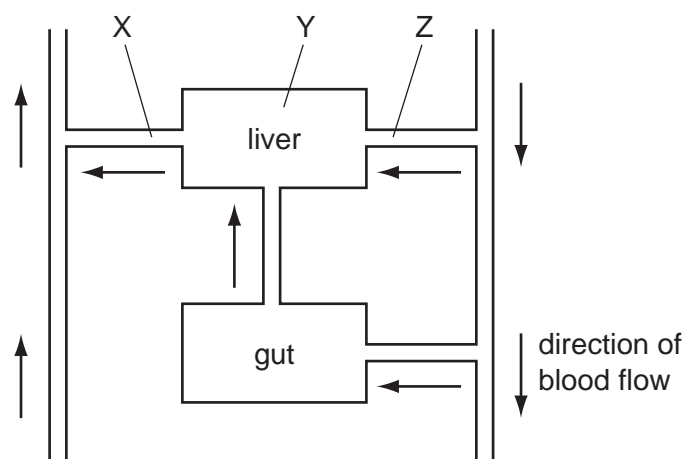
- 31 Four similar leafy shoots are exposed to different conditions. The rates of water uptake and rates of water loss are measured.

The results are shown in the table.

Which shoot is most likely to wilt?

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

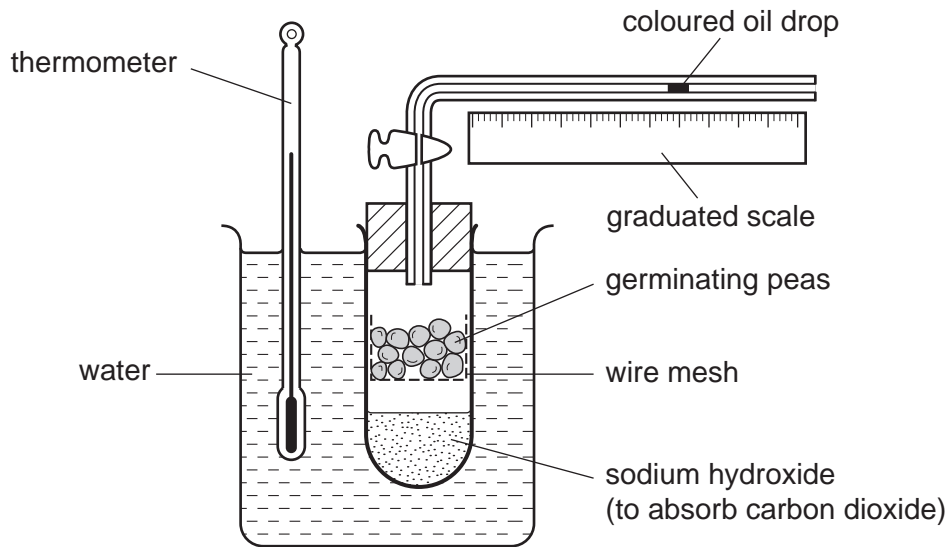
- 32 The diagram shows the path of blood through the liver and gut.



Where are an artery, capillaries and a vein?

	artery	capillaries	vein
A	X	Y	Z
B	Y	Z	X
C	Z	X	Y
D	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
A	depressant	depressant
B	depressant	stimulant
C	stimulant	depressant
D	stimulant	stimulant

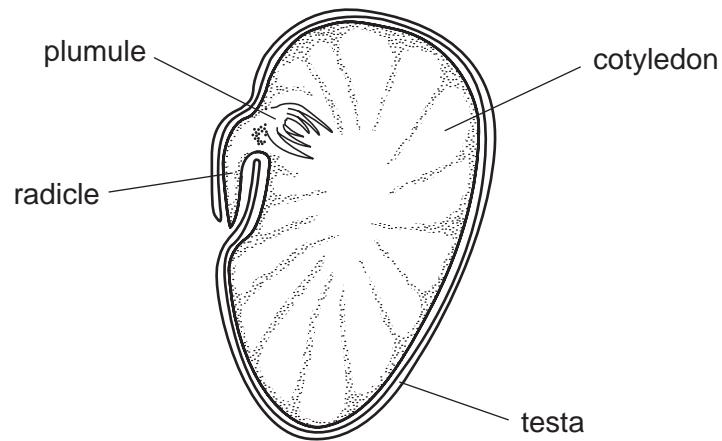
37 Which statement is **not** correct?

- 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
A	absorbed	absorbed
B	absorbed	released
C	released	absorbed
D	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	0							
		1 H Hydrogen 1																	
7	9	Li Lithium 3	Be Beryllium 4											He Helium 2					
23	24	Na Sodium 11	Mg Magnesium 12											Ne Neon 10					
39	40	K Potassium 19	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	88	Rb Rubidium 37	Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	101 Ru Ruthenium 44	101 Rh Rhodium 45	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	127 I Iodine 53	131 Xe Xenon 54
133	137	Cs Caesium 55	Ba Barium 56	139 La Lanthanum 57	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	210 Po Polonium 84	210 At Astatine 85	210 Rn Radon 86	
87	226	Fr Francium 87	Ra Radium 88	227 Ac Actinium 89															
													*58-71 Lanthanoid series		†90-103 Actinoid series				
Key		a	X	a = relative atomic mass			X	X = atomic symbol			b	b = proton (atomic) number							
140	141	Ce Cerium 58	Pr Praseodymium 59	144 Nd Neodymium 60	144 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	103 Lr Lawrencium 103			
232	238	Th Thorium 90	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				

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

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