Centre Number	Candidate Number

Candidate Name _____

International General Certificate of Secondary Education
CAMBRIDGE INTERNATIONAL EXAMINATIONS

COMBINED SCIENCE 0653/2

PAPER 2

OCTOBER/NOVEMBER SESSION 2002

1 hour

Candidates answer on the question paper.
No additional materials are required.

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page.
Answer **all** questions.
Write your answers in the spaces provided on the question paper.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.
A copy of the Periodic Table is printed on page 16.

FOR EXAMINER'S USE	
1	
2	
3	
4	
5	
6	
7	
8	
9	
TOTAL	

This question paper consists of 13 printed pages and 3 blank pages.

University of Cambridge Local Examinations Syndicate

[Turn over

1 In the circuit diagram shown in Fig. 1.1, the brightness of the lamp can be controlled by the variable resistor.

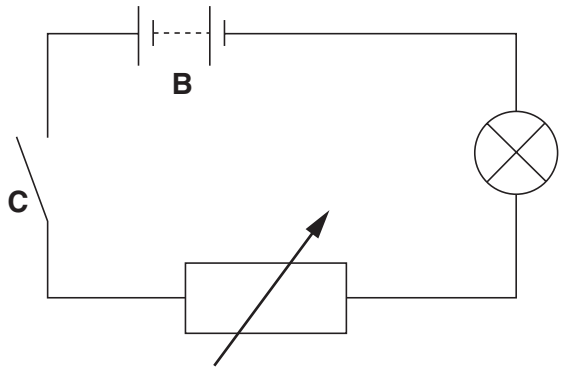

Fig. 1.1

(a) Name components **B** and **C**.

B .....

C .....[2]

(b) Redraw the circuit diagram to show how you would include an ammeter in the circuit to measure the current flowing through the lamp.

[2]

(c) State the unit in which electric current is measured.

.....[1]

(d) State **two** electrical dangers that are visible in Fig. 1.2.

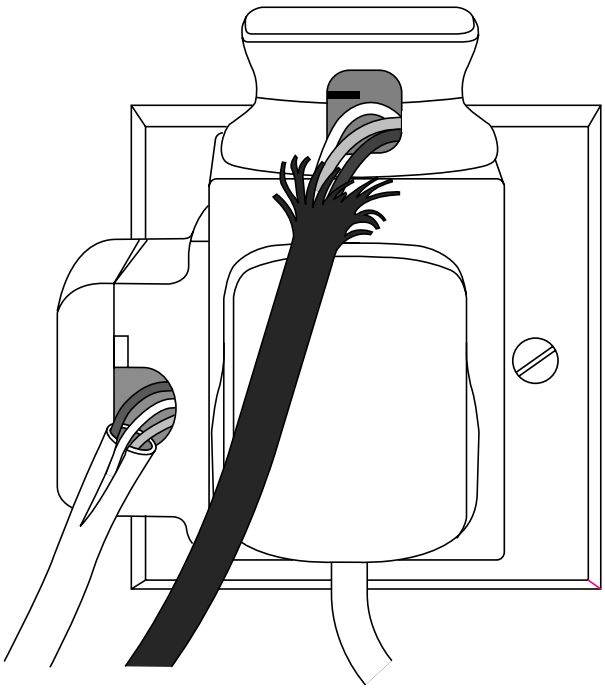

Fig. 1.2

danger 1 .....

.....

danger 2 .....

.....[2]

2 A student investigated the activity of the enzyme catalase, which is present in all living tissues. This enzyme catalyses the break-down of hydrogen peroxide to water and oxygen.

hydrogen peroxide → water + oxygen

She put equal volumes of hydrogen peroxide into two small flasks. She took two pieces of fresh liver of equal mass, and cut one of them into small pieces. Then she placed each flask onto a balance and added the whole piece of liver to one flask and the small pieces of liver to the other. She read the mass of each flask every 30 seconds for five minutes. Fig. 2.1 shows her results.

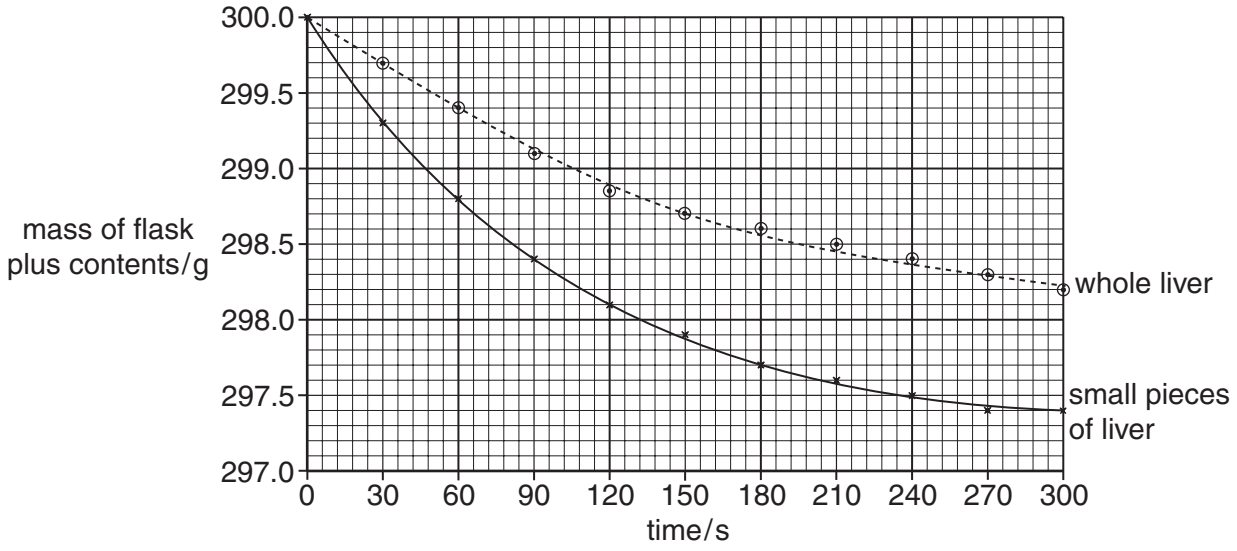

Fig. 2.1

(a) Use the word equation above to explain why the mass of each flask and its contents decreased.

.....

.....

.....[2]

(b) Explain why the mass of one flask and its contents decreased more rapidly than the other.

.....

.....

.....[2]

(c) Predict the results that would be obtained if the liver was placed in boiling water for a few minutes before adding it to hydrogen peroxide. Explain your prediction.

.....

.....

.....[2]

3 Fig. 3.1 shows four sets of apparatus **P**, **Q**, **R** and **S** which are used to separate mixtures. The diagrams are not drawn to scale.

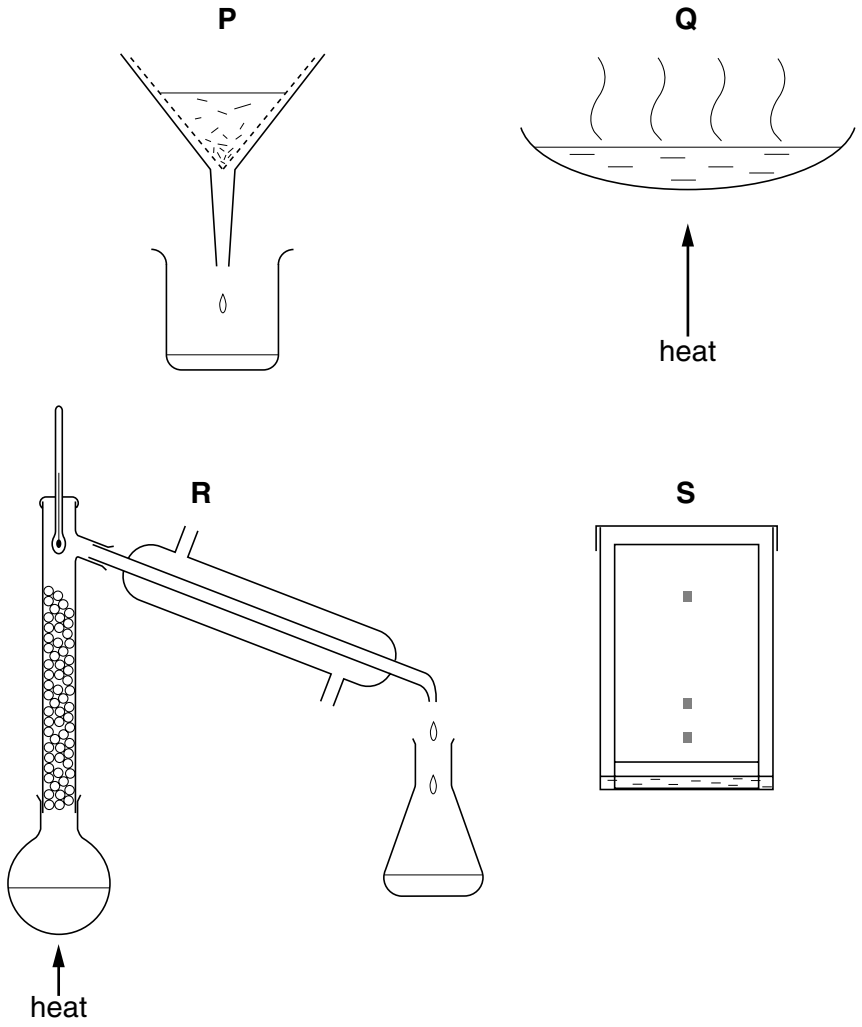

Fig. 3.1

(a) State which apparatus, **P**, **Q**, **R** or **S** is normally used to separate

the solid from a solid dissolved in a liquid, ...

the solid from an insoluble solid suspended in a liquid, ...

three differently coloured solids dissolved in a liquid. ..... [3]

(b) **(i)** Which of the diagrams **P**, **Q**, **R** or **S** in Fig. 3.1 shows apparatus used for fractional distillation?

.....[1]

(ii) Explain why fractional distillation is an important process in the oil industry.

.....

.....

.....[2]

4 **(a)** **(i)** Describe how sound is produced when an object is hit.

.....[1]

(ii) Explain how a sound can be heard some distance away from where it was produced.

.....

.....

.....[2]

(b) Two astronauts walking on the Moon cannot talk directly to each other. They have to speak to each other by radio.
Explain why this is so.

.....

.....

.....[2]

5 Fig. 5.1 shows a plant.

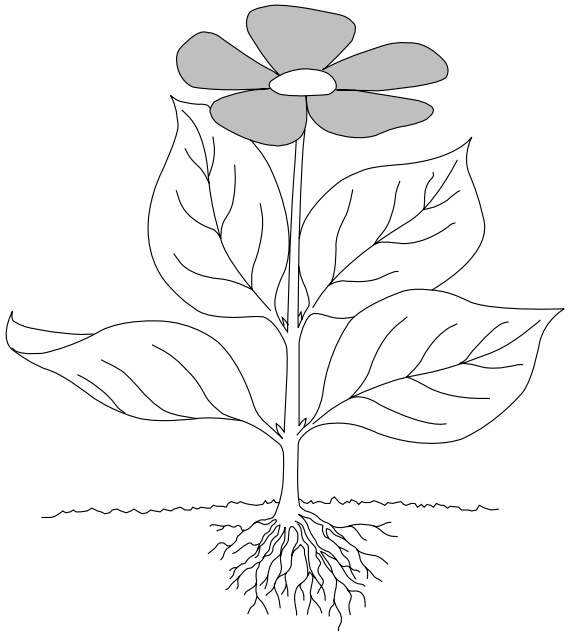

Fig. 5.1

(a) On Fig. 5.1, draw a label line to each of the following parts, and label each one with the appropriate letter.

P a place where water enters the plant.
Q the part of the plant that is responsible for sexual reproduction. [2]

(b) The palisade cells in the leaves of the plant are responsible for photosynthesis. In photosynthesis, energy from sunlight is used to make carbon dioxide and water react together to produce glucose and oxygen.

(i) Name the substance, present in the palisade cells, that traps sunlight energy.

.....[1]

(ii) Describe what happens to the glucose if the plant makes more than it immediately needs.

.....

.....

.....[2]

(c) A leafy shoot was cut from a plant, and placed with its cut end in a solution of a red dye. After an hour, red lines could be seen in the leaves.

Explain how this happened.

.....

.....

.....[2]

6 Poly(ethene) is a material used to make plastic articles. Poly(ethene) is made from the hydrocarbon ethene.

(a) (i) Explain the meaning of the term *hydrocarbon*.

.....

.....[2]

(ii) Explain why a molecule of poly(ethene) has a much higher mass than a molecule of ethene.

.....

.....

.....[2]

(b) A student is heating a sample of poly(ethene) when it catches fire. She covers the burning poly(ethene) with a damp cloth.

Explain why this action puts the fire out.

.....

.....

.....[2]

7 Fig. 7.1 shows the male reproductive system.

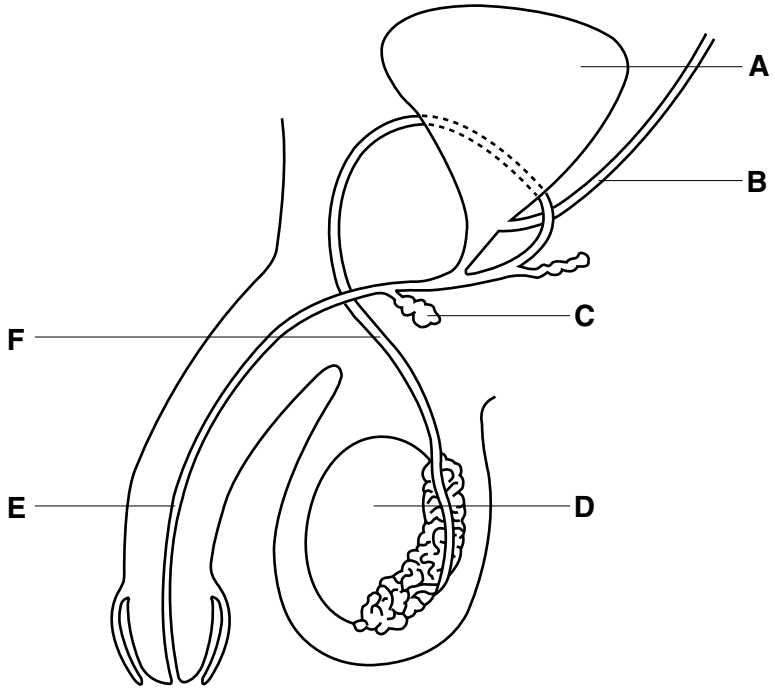

Fig. 7.1

(a) Give the letter of the structure on the diagram that matches each of the following descriptions. You may use each letter once, more than once, or not at all.

where sperms are made .....

the ureter .....

the tube that would be cut if the man was sterilised ..... [3]

(b) Complete the sentences about sexual reproduction in humans.

Sperms are deposited close to the cervix, and swim from there to the .....

where fertilisation takes place. The new cell that is formed when the sperm fuses with

an egg is called a ..... . [2]

(c) Gonorrhoea is a disease that is spread by sexual intercourse.
Give **two** ways by which the spread of gonorrhoea can be reduced.

1 .....

2 .....[2]

8 Fig. 8.1 shows one of the pyramids in Egypt. The pyramid is 140 m high.

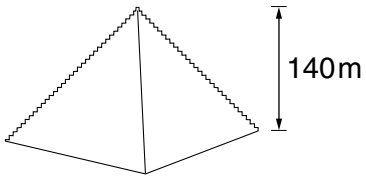

Fig. 8.1

A large number of blocks were used to build this pyramid.
Fig. 8.2 shows the final block weighing 100 000 N, that had to be raised to the top of the pyramid.

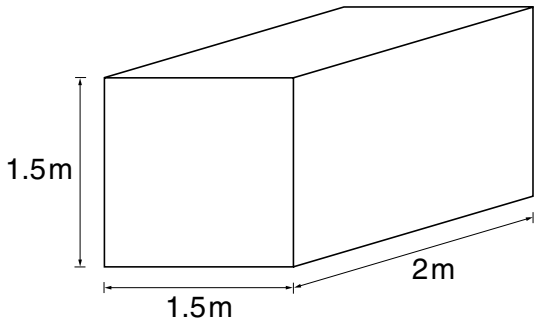

Fig. 8.2

(a) Calculate the mass of this block. (The Earth's gravitational field strength is 10 N/kg)

.....kg [1]

(b) Calculate the volume of the block

.....m^3 [1]

(c) Calculate the density of the block. Show your working and state any formula that you use.

.....kg/m^3 [3]

(d) Calculate the work done in raising this block through 140 m to the top of the pyramid. Show your working and state any formula that you use.

.....J [3]

[Turn over

9 **(a)** A student added dilute hydrochloric acid to some substances contained in the four test tubes, **A** to **D**, shown in Fig. 9.1.

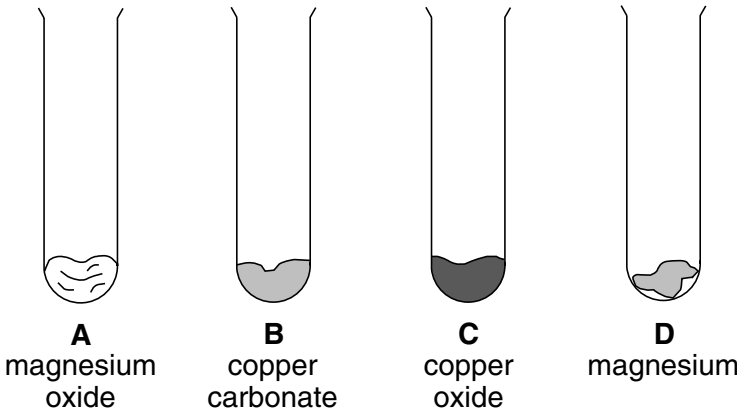

Fig. 9.1

(i) The results the student recorded are shown in Fig. 9.2. Complete the right hand column in Fig. 9.2 by writing in the letters **A**, **B**, **C** or **D**.

results recorded during reaction	appearance of contents of tube when reaction complete	tube
solid dissolves and carbon dioxide gas evolved	blue solution	
solid dissolves	colourless solution	
solid dissolves	blue solution	

[3]

Fig. 9.2

(ii) Describe the test for carbon dioxide gas.

.....

.....

.....[2]

(b) **(i)** What happens to the pH of an acid solution when a base is added to it?

.....[1]

(ii) Complete the word equation below for the reaction between an acid and a base.

sulphuric acid + nickel oxide → .....[2]

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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										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	Tc Technetium 43	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	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	Po Polonium 84	At Astatine 85	Rn Radon 86
Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89 †															

140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	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	Pa Protactinium 91	238 U Uranium 92	Np Neptunium 93	Pu Plutonium 94	Am Americium 95	Cm Curium 96	Bk Berkelium 97	Cf Californium 98	Es Einsteinium 99	Fm Fermium 100	Md Mendelevium 101	No Nobelium 102	Lr Lawrencium 103

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

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

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