UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

COMBINED SCIENCE **5129/01**

Paper 1 Multiple Choice **May/June 2007**

1 hour

Additional Materials: Multiple Choice Answer Sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

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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 **15** printed pages and **1** blank page.

1 What instrument should be used to measure the diameter of a steel ball bearing as accurately as possible?

A calipers

B micrometer

C rule

D vernier scale

2 An object moves from P to Q in ten seconds with uniform acceleration.

Velocity at P = 5 m / s.
Velocity at Q = 12 m / s.

What is the value of this acceleration?

A $0.5\,m/s^2$ **B** $0.7\,m/s^2$ **C** $1.2\,m/s^2$ **D** $1.7\,m/s^2$

3 A force is applied to an object on a frictionless surface. It produces an acceleration of $3\,m/s^2$.

What are possible values for the applied force and for the mass of the object?

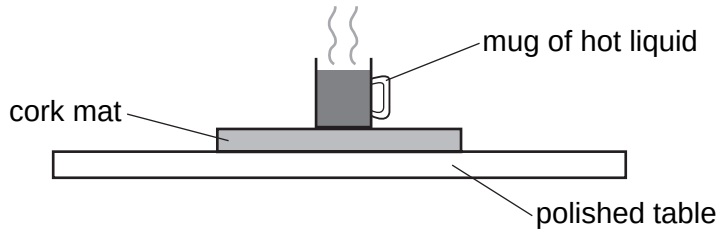
	force / N	mass / kg
A	2	5
B	2	6
C	5	2
D	6	2

4 An electric motor lifts a weight of 8 N through a height of 5 m in 4 s.

What is the power developed?

A 2.5 W **B** 6.4 W **C** 10 W **D** 40 W

5 To protect a polished table, a cork mat may be put on the table underneath a mug containing hot liquid.



Why is this effective?

A Cork is a good conductor.

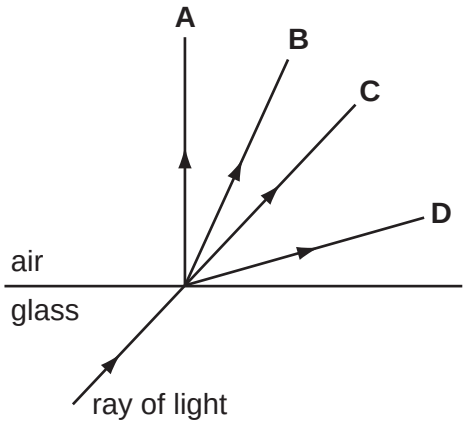
B Cork is a good radiator.

C Cork is a poor conductor.

D Cork is a poor radiator.

6 A ray of light passes from glass to air.

Which arrow shows the direction of the ray in air?

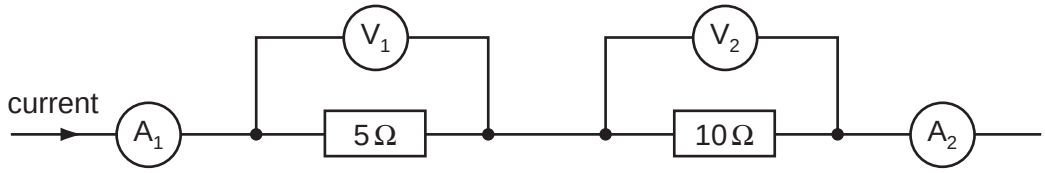


7 Electric current is defined as rate of flow of charge and is measured in amperes, A.

How can the unit of current also be written?

A Cm **B** C/m **C** Cs **D** C/s

8 A current flows in two resistors connected in series as shown. A_1 and A_2 are the readings on the ammeters. V_1 and V_2 are the readings on the voltmeters.



What correctly describes the ammeter and the voltmeter readings?

	ammeter readings	voltmeter readings
A	A_1 is equal to A_2	V_1 is equal to V_2
B	A_1 is equal to A_2	V_1 is less than V_2
C	A_1 is greater than A_2	V_1 is equal to V_2
D	A_1 is greater than A_2	V_1 is less than V_2

9 When working normally, an electric kettle draws a current of 10 A.

What is the current in each of the earth, live and neutral wires?

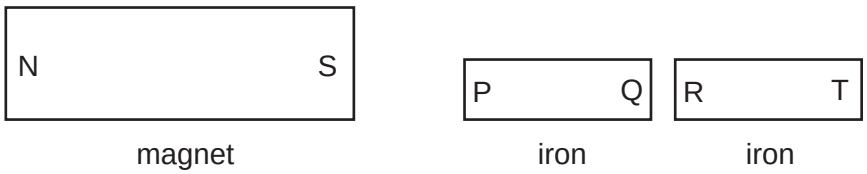
	earth	live	neutral
A	0 A	0 A	10 A
B	0 A	10 A	0 A
C	0 A	10 A	10 A
D	10 A	10 A	0 A

10 A light bulb is marked 12 V, 6 W.

When lit by a 12 V battery, what is the current?

A 0.5 A **B** 2 A **C** 6 A **D** 12 A

11 The diagram shows a magnet placed close to two fixed iron blocks.



Which of these four statements are correct?

1 P is attracted to S.
2 Q is attracted to S.
3 R is attracted to Q.
4 T is attracted to Q.

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

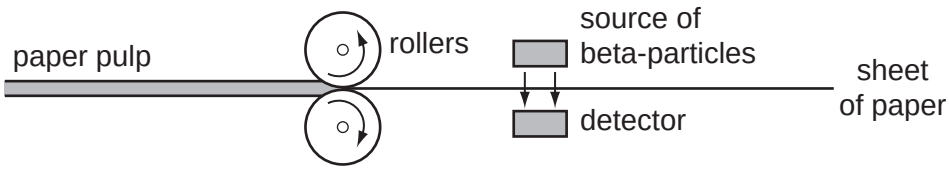
12 An atom has a nucleus surrounded by electrons.

What are the charges on the nucleus and on the whole atom?

	charge on nucleus	charge on whole atom
A	neutral	neutral
B	neutral	positive
C	positive	neutral
D	positive	positive

13 The diagram shows how the thickness of paper is measured during manufacture.

If the sheet is too thick, fewer beta-particles can reach the detector.



A source of alpha-particles is **not** used for this purpose because alpha-particles

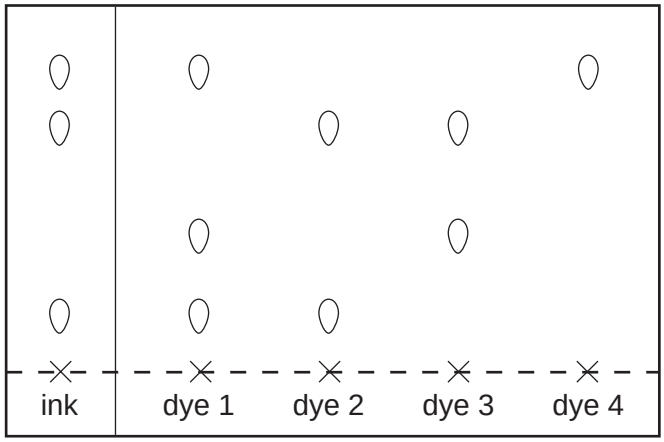
A are all stopped by the paper.

B are too dangerous to those working nearby.

C have a short half-life.

D make the paper radioactive.

14 A coloured ink is compared with 4 different dyes. The chromatogram produced is shown in the diagram.



Which dyes does the ink contain?

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

15 The numbers of protons, neutrons and electrons in four particles are given below.

Which particle is a positively charged ion?

	protons	neutrons	electrons
A	6	6	6
B	9	10	9
C	12	12	10
D	16	16	18

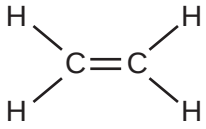
16 The table shows the electronic structures of four elements.

element	electron structure
Q	2,8,2
R	2,8,5
S	2,8,6
T	2,8,8,1

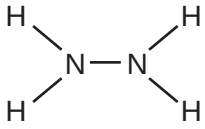
Which two elements form ionic chlorides?

A Q and S **B** Q and T **C** R and S **D** R and T

17 In the Periodic Table, carbon is in group IV and nitrogen in group V. Carbon forms ethene, C_2H_4, nitrogen forms hydrazine, N_2H_4.



ethene



hydrazine

How many shared electrons are there in these molecules?

	in ethene	in hydrazine
A	6	5
B	10	10
C	12	10
D	12	14

18 A 40 g sample of calcium is added gradually to 100 g of water.

$$Ca + 2H_2O \rightarrow Ca(OH)_2 + H_2$$

What is the total mass of the mixture left when the reaction shown is complete?

A 57 g **B** 74 g **C** 138 g **D** 140 g

19 The oxide of a metal reacts both with hydrochloric acid and with aqueous sodium hydroxide.

The type of oxide is

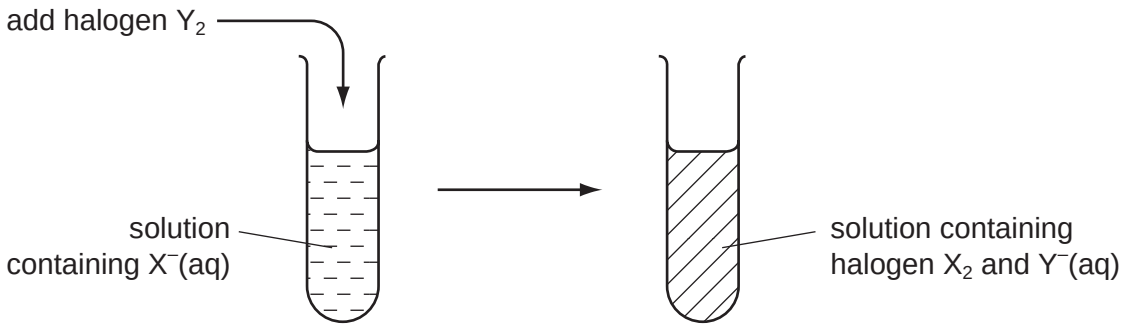
A acidic.

B amphoteric.

C basic.

D neutral.

20 The diagram shows an experiment involving halogens and other aqueous halide ions.



Which choices of Y_2 and $X^-(aq)$ give the result shown?

	$I_2 + Br^-(aq)$	$Cl_2 + Br^-(aq)$	$Cl_2 + I^-(aq)$
A	✗	✓	✓
B	✓	✗	✓
C	✓	✓	✓
D	✓	✓	✗

21 The table gives the melting points, densities and electrical conductivities of four elements.

Which element is copper?

	melting point / °C	density / g per cm^3	electrical conductivity
A	–38.9	13.6	good
B	–7.2	3.12	poor
C	97.8	0.97	good
D	1083	8.96	good

22 A metal **Y** reacts very slowly with water but decomposes steam at high temperatures.

What is **Y**?

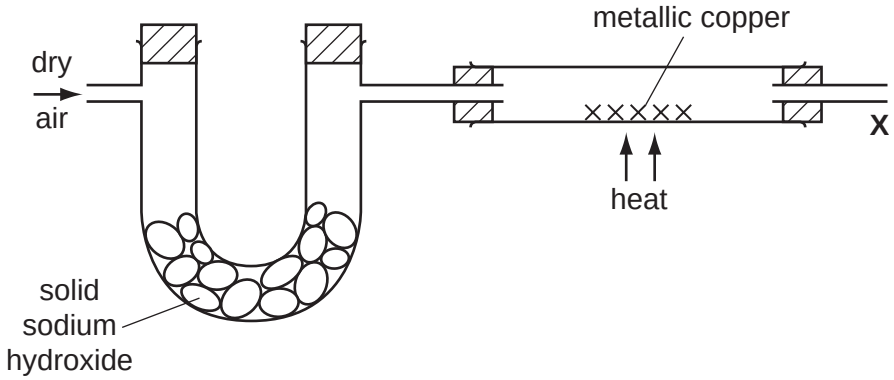
A copper

B lead

C magnesium

D sodium

23 A stream of dry air is passed through the apparatus shown.



Which gases leave the apparatus at **X**?

A nitrogen and the noble gases only

B nitrogen, the noble gases and carbon dioxide

C nitrogen, the noble gases and water vapour

D nitrogen, water vapour and carbon dioxide

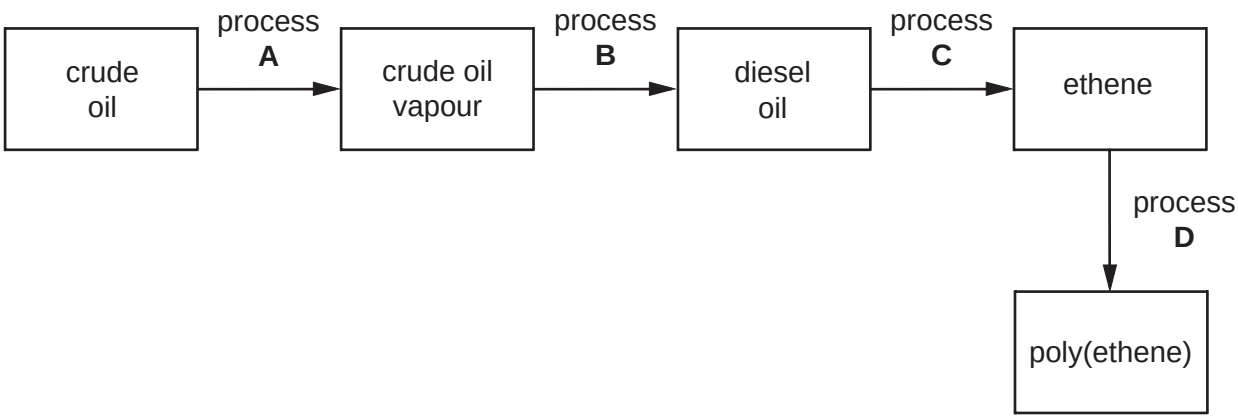
24 Ammonia can be manufactured from hydrogen and nitrogen by using the Haber process.

Which set of conditions is used?

	temperature / °C	pressure / atm
A	100	2
B	450	200
C	100	200
D	450	2

25 The flow chart outlines the manufacture of poly(ethene) from crude oil.

Which process involves cracking?



26 A hydrocarbon gas decolourises aqueous bromine.

What is the gas?

A carbon dioxide

B ethene

C ethane

D methane

27 When ethanol 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

28 What may be found in both animal and plant cells?

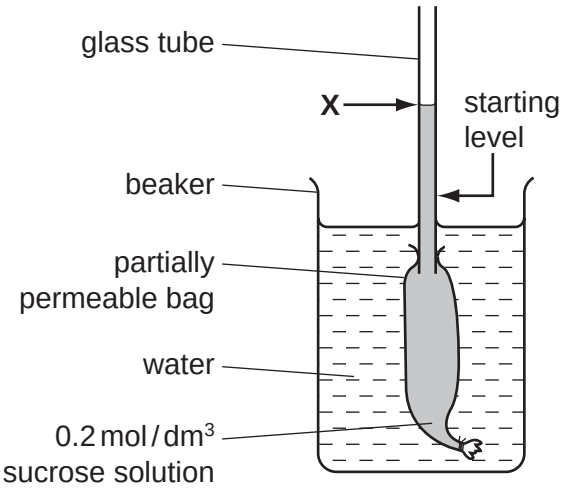
A cellulose cell wall

B chloroplast

C starch grain

D vacuole or vacuoles

29 The diagram shows the result of an experiment. The liquid in the glass tube had risen to point **X** after three hours.



In a second experiment, which change could be made to cause the liquid to rise higher than **X**?

A a larger beaker

B a smaller bag

C water in the bag

D 0.4 mol / dm^3 sucrose solution in the bag

30 Where does most photosynthesis occur in a typical leaf?

A epidermis

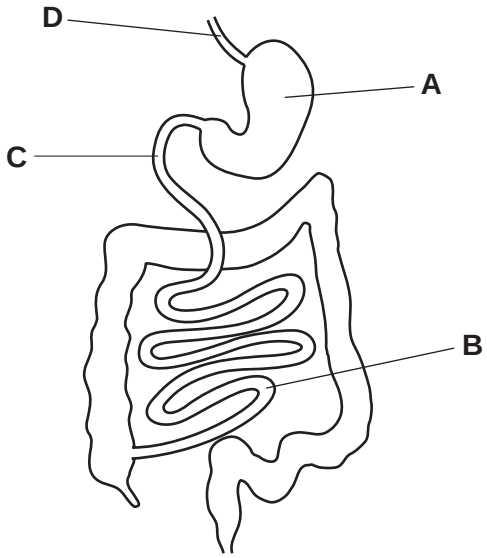
B guard-cells

C palisade mesophyll

D spongy mesophyll

31 The diagram shows the human gut.

Into which region is pancreatic juice secreted?



32 Which sequence shows the shortest route taken by blood travelling from a leg to an arm in the human body?

A leg → heart → lungs → heart → arm

B leg → heart → lungs → kidney → arm

C leg → kidney → heart → lungs → arm

D leg → lungs → heart → gut → arm

33 An athlete runs a 100 metre race.

The following changes take place in the athlete's body during the race.

1 increased availability of oxygen to muscles

2 increased breathing rate

3 increased carbon dioxide concentration in the blood

4 increased production of carbon dioxide by muscles

In which order do these changes occur?

	first ⟶			last
A	1	2	3	4
B	2	1	4	3
C	2	4	3	1
D	4	3	2	1

34 What is commonly present in both the blood plasma and the urine of a healthy person?

A amino-acids

B glucose

C protein

D urea

35 In which order does light pass through these structures in the eye?

A cornea → aqueous humour → lens → vitreous humour → retina

B cornea → vitreous humour → lens → aqueous humour → retina

C lens → aqueous humour → cornea → vitreous humour → retina

D lens → vitreous humour → cornea → aqueous humour → retina

36 What may happen to a heroin addict 48 hours after the drug is withdrawn?

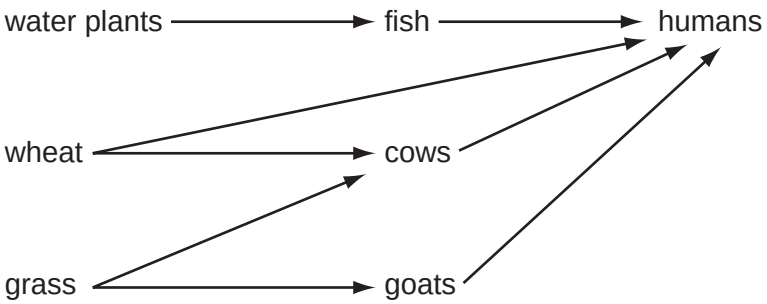
A Desire for the drug is reduced.

B The liver becomes damaged.

C Tolerance to the drug increases.

D Vomiting, sweating and cramp occur.

37 The diagram shows a food web.



What is the principal energy input?

A carbohydrate

B heat

C light

D oxygen

38 Which processes occur during the carbon cycle?

	carbon compounds absorbed by living organisms	carbon compounds excreted by living organisms
A	yes	yes
B	yes	no
C	no	yes
D	no	no

39 Small pieces of root tissue, taken from an oil palm tree and placed in a nutrient medium, each produce a new oil palm tree.

What type of reproduction is this and how does the genotype of the new trees compare with that of the parent tree?

	type of reproduction	genotype
A	asexual	different
B	asexual	identical
C	sexual	different
D	sexual	identical

40 On which date is a woman most likely to ovulate if the first day of menstrual loss was 1 February?

A 5 February

B 14 February

C 28 February

D 1 March

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DATA SHEET
The Periodic Table of the Elements

	Group																	
	I	II									III	IV	V	VI	VII	0
																4 He Helium 2
						1 H Hydrogen 1					11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10
	7 Li Lithium 3	9 Be Beryllium 4									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
	23 Na Sodium 11	24 Mg Magnesium 12														
	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	[98] 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	[209] Po Polonium 84	[210] At Astatine 85	[222] Rn Radon 86
	[223] Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89 †															

*58-71 Lanthanoid series	140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	[147] 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
†90-103 Actinoid series	232 Th Thorium 90	[231] Pa Protactinium 91	238 U Uranium 92	[237] Np Neptunium 93	[244] Pu Plutonium 94	[243] Am Americium 95	[247] Cm Curium 96	[247] Bk Berkelium 97	[251] Cf Californium 98	[254] Es Einsteinium 99	[257] Fm Fermium 100	[258] Md Mendelevium 101	[255] No Nobelium 102	[256] Lr Lawrencium 103

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.).