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UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

COMBINED SCIENCE **5129/01**

Paper 1 Multiple Choice **May/June 2011**

1 hour

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

1412078230

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 A plumber needs to measure the internal diameter of a water tap as accurately as po

Which instrument should be used?

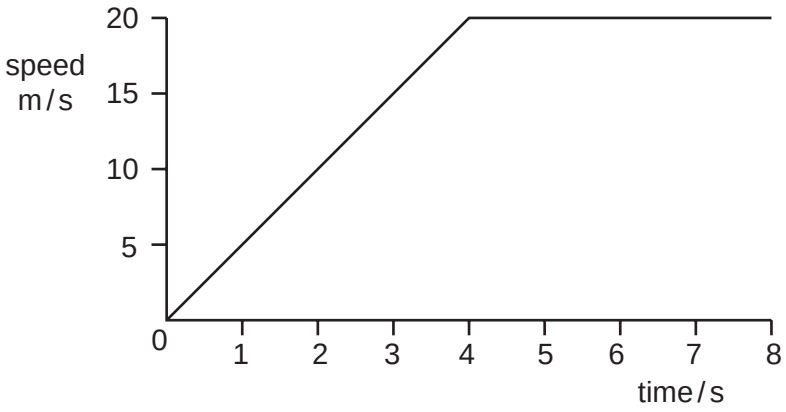
A measuring tape

B metre rule

C micrometer

D vernier calipers

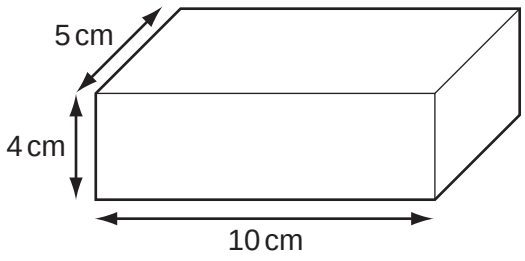
2 A speed-time graph for a car starting from rest is shown.



What is the acceleration of the car between 4 s and 8 s?

A $0\,m/s^2$ **B** $2.5\,m/s^2$ **C** $5\,m/s^2$ **D** $10\,m/s^2$

3 A rectangular metal block measures 4 cm × 5 cm × 10 cm. The mass of the block is 800 g.



What is the density of the metal?

A $0.25\,g/cm^3$ **B** $2.5\,g/cm^3$ **C** $4.0\,g/cm^3$ **D** $40\,g/cm^3$

4 A horseshoe can be made from a piece of metal by first heating and then hammering.

Which property of the metal changes during the hammering action?

A density

B mass

C shape

D volume

5 A box is subjected to a force of 60 N and moves a distance of 15 m in the direction of the force.

What is the work done?

A 0.25 J **B** 4.0 J **C** 75 J **D** 900 J

6 Density changes are responsible for which method of thermal energy transfer?

A conduction only

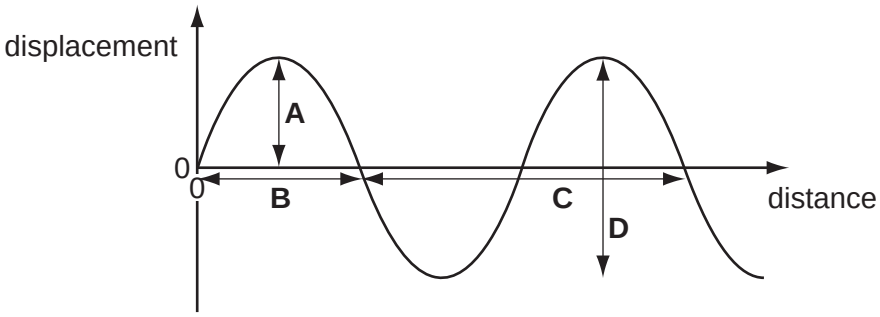
B convection only

C radiation only

D conduction, convection and radiation

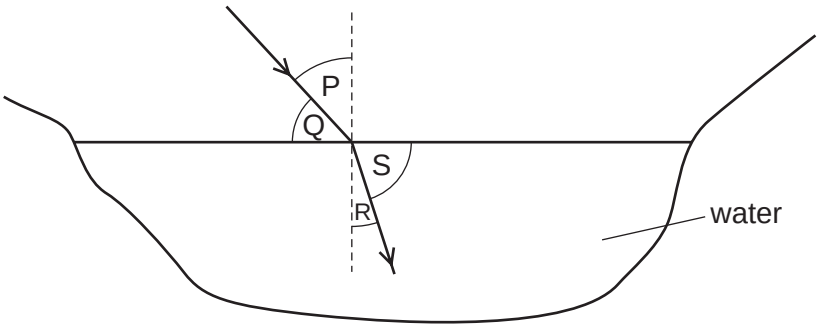
7 The diagram shows the displacement across a wave pattern.

Which value is multiplied by the frequency to give the speed of the wave?



8 The diagram shows the path of a ray of light travelling towards and into a pool of wate

Four angles are labelled.



Which two angles would be correctly used in the equation $\frac{\sin i}{\sin r}$ = constant?

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

9 Which type of electromagnetic radiation travels at the highest speed through a vacuum?

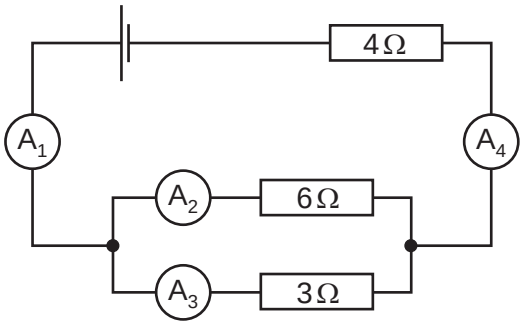
A gamma rays

B light waves

C radio waves

D none – all have the same speed

10 The diagram shows an electrical circuit.



The reading of ammeter A_2 is 1 A and of A_4 is 3 A.

What are the readings of ammeters A_1 and A_3?

	A_1 / A	A_3 / A
A	1.5	0.5
B	2	1
C	3	1
D	3	2

11 A 750 W microwave oven is used in a house where the mains voltage is 240 V.

Which fuse should be used in the plug?

A 3 A **B** 5 A **C** 7 A **D** 10 A

12 Which nuclide has equal numbers of neutrons and protons?

A $^{1}_{1}H$ **B** $^{4}_{2}He$ **C** $^{7}_{3}Li$ **D** $^{9}_{4}Be$

13 How do the ionising abilities of beta-particles and gamma-rays compare with the ionising abilities of alpha-particles?

	beta-particles	gamma-rays
A	less	less
B	less	more
C	more	less
D	more	more

14 Which property shows that a liquid is pure?

A It turns anhydrous copper(II) sulfate blue.

B It is colourless and odourless.

C It has no effect on red or blue litmus paper.

D It boils at a fixed temperature at a given pressure.

15 Which particle has the smallest mass?

A electron

B hydrogen ion

C neutron

D proton

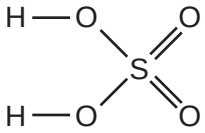
16 The table gives the electronic structure of four elements.

element	electronic structure
W	2,7
X	2,8,5
Y	2,8,6
Z	2,8,8,2

Which two elements form an ionic compound?

A W and X **B** W and Y **C** W and Z **D** X and Y

17 The bonding in sulfuric acid can be represented by the structure shown.



What is the total number of electrons in the covalent bonds surrounding the sulfur atom?

A 4 **B** 6 **C** 8 **D** 12

18 The compound iron(II) sulfide contains iron and sulfur in the proportion 7 g of iron to 4 g of sulfur.

It is made by heating iron and sulfur together.

A powdered mixture of 7 g of iron and 7 g of sulfur is heated.

No gases are released during the experiment.

What is present in the final mixture?

	mass of iron(II) sulfide / g	mass of iron / g	mass of sulfur / g
A	11	3	0
B	11	0	3
C	11	0	0
D	14	0	0

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

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

A aluminium

B chloride

C hydrogen

D hydroxide

20 Rubidium, Rb, is an element in Group I of the Periodic Table.

Which statement about rubidium is correct?

A It forms a sulfate, Rb_2SO_4.

B It forms an insoluble hydroxide.

C It has a higher melting point than sodium.

D It reacts slowly with water.

21 Zinc and aluminium both react with dilute hydrochloric acid.

Why does zinc react more quickly than aluminium?

A Aluminium is lower than hydrogen in the reactivity series.

B Aluminium has an oxide coating.

C Zinc is an amphoteric element.

D Zinc is higher than aluminium in the reactivity series.

22 Three types of steel have different properties.

steel 1 is easily shaped

steel 2 is brittle

steel 3 is resistant to corrosion

What are the names of these three types of steel?

	steel 1	steel 2	steel 3
A	high carbon	mild	stainless
B	high carbon	stainless	mild
C	mild	high carbon	stainless
D	mild	stainless	high carbon

23 Which gas is **not** produced when hydrocarbons are burned in the internal combustion

A carbon dioxide

B carbon monoxide

C hydrogen

D nitrogen oxide

24 Which conditions are suitable for the following reaction in the Haber Process?

$$N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$$

	temperature / °C	pressure / atmospheres	catalyst
A	450	1	V_2O_5
B	450	200	Fe
C	450	200	V_2O_5
D	1000	200	Fe

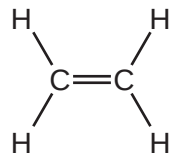
25 Methane, CH_4, the first member of the alkane homologous series, has a boiling point of –161 °C.

Which molecular formula and boiling point could be correct for another alkane?

	molecular formula	boiling point / °C
A	C_2H_4	–88
B	C_2H_6	–185
C	C_3H_6	–69
D	C_3H_8	–42

26 The structures of four organic compounds are shown.

1



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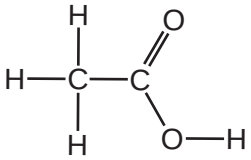

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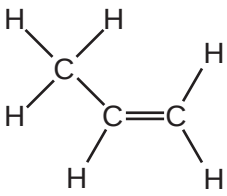
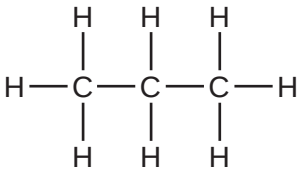


4



Which compound or compounds decolourise aqueous bromine?

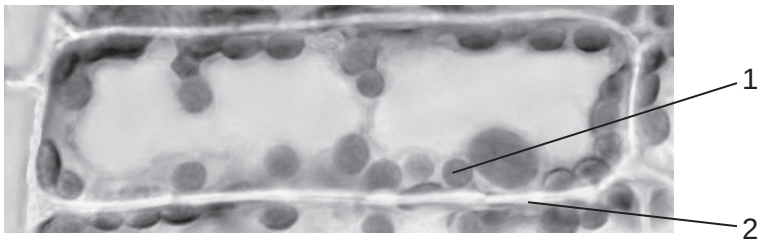
A 1 and 3 **B** 2 and 3 **C** 3 only **D** 3 and 4

27 Compound X decolourises aqueous bromine. It reacts with hydrogen to form ethane.

What would be the molecular formula of the alcohol formed when X reacts with steam?

A C_2H_4O **B** C_2H_5O **C** C_2H_6O **D** C_2H_7O

28 The photomicrograph shows a plant cell.



What are the parts labelled 1 and 2?

	1	2
A	chloroplast	cell wall
B	chloroplast	vacuole
C	nucleus	cell wall
D	nucleus	vacuole

29 Diagram 1 shows an onion cell in pure water.

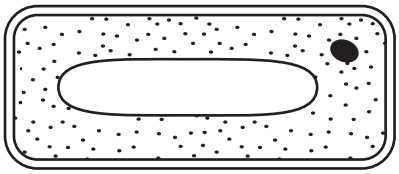


diagram 1

The cell is now placed in a concentrated sugar solution, and it changes to appear as in diagram 2.

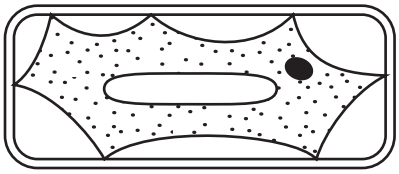


diagram 2

Which statement explains the change?

A Sugar has moved into the cell.

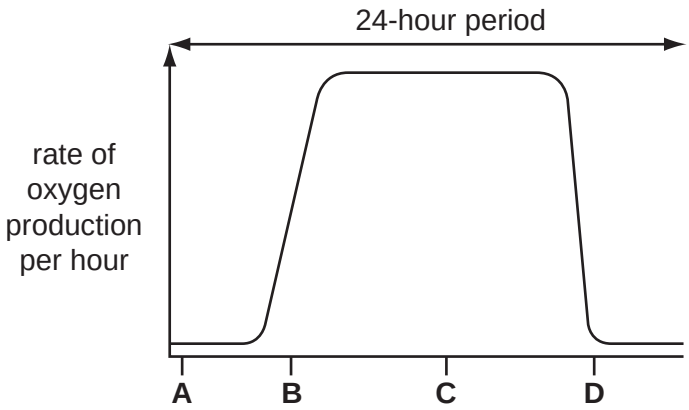
B Sugar has moved out of the cell.

C Water has moved into the cell.

D Water has moved out of the cell.

30 The graph shows the rate of oxygen production by a green plant during a 24-hour period.

Which letter represents midnight?



31 Where is amylase secreted in the digestive system, and what is the end product of t it catalyses?

	secreted from	end product
A	pancreas and salivary glands	glucose
B	pancreas and salivary glands	maltose
C	stomach and small intestine	glucose
D	stomach and small intestine	maltose

32 A young plant is dug up and then re-planted. Later, the plant wilts.

What causes the wilting?

A The leaves lose less water.

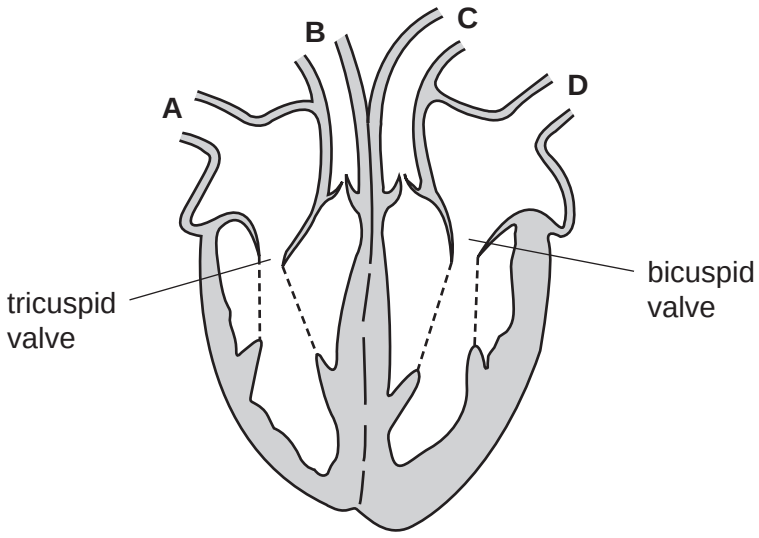
B The roots cannot take up mineral ions.

C The stomata close.

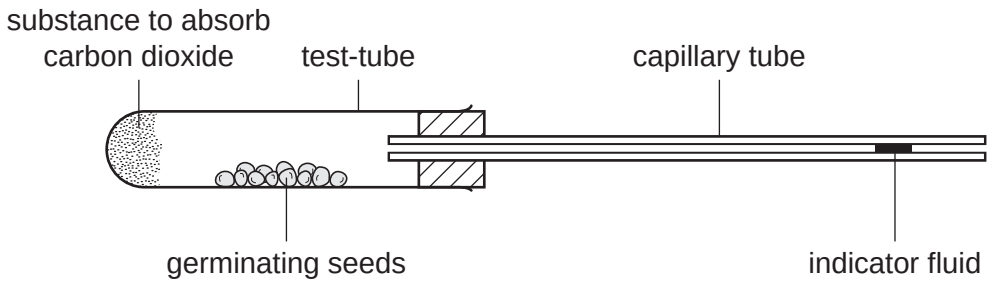
D The surface area of the roots is reduced.

33 The diagram shows the heart in section.

Which vessel is an artery carrying deoxygenated blood?



34 The diagram shows an investigation into the respiration of germinating seeds.



The indicator fluid in the capillary tube will

A move away from the test-tube because of oxygen output by the seeds.

B move towards the test-tube because of carbon dioxide uptake by the seeds.

C move towards the test-tube because of oxygen uptake by the seeds.

D remain stationary, because carbon dioxide output and oxygen intake are equal.

35 What is the pathway of diffusion of carbon dioxide during gaseous exchange in the lungs?

A alveolar wall → alveolus → blood → capillary wall

B blood → capillary wall → alveolar wall → alveolus

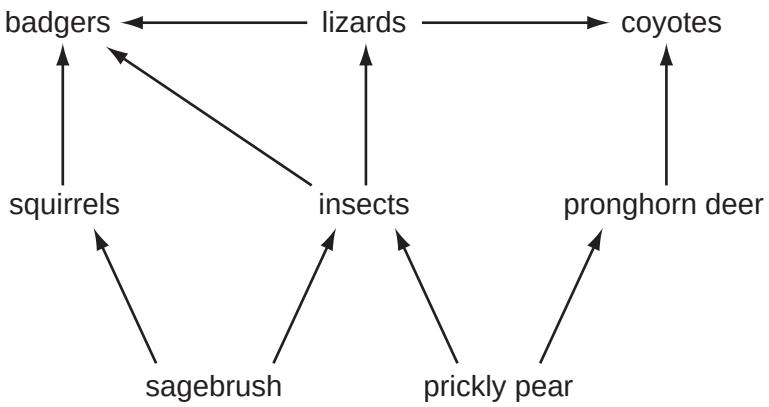
C capillary wall → blood → alveolus → alveolar wall

D alveolus → alveolar wall → capillary wall → blood

36 Which processes take place in the eye when a person moves into dim light?

	size of pupil	circular muscles of iris	radial muscles of iris
A	enlarges	contract	relax
B	enlarges	relax	contract
C	reduces	contract	relax
D	reduces	relax	contract

37 The diagram shows a food web from North America.



If the population of insects decreases, which other population will decrease the most?

A badgers

B lizards

C sagebrush

D squirrels

38 What increases the risk of famine?

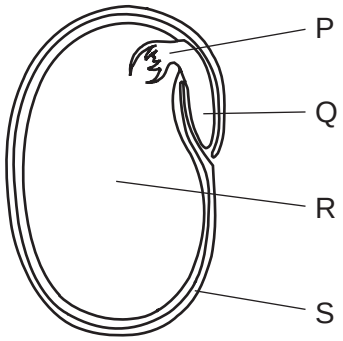
A decreased air pollution

B decreased population size

C increased carbon dioxide concentration in the air

D increased soil erosion

39 The diagram shows the structure of a seed in longitudinal section.



What is the embryo?

A P only

B P and Q only

C P, Q and R only

D P, Q, R and S

40 What is **not** an advantage of feeding babies on breast milk?

A Both parents can feed the baby.

B No sterile bottle is needed.

C The milk contains antibodies.

D The milk is at the correct temperature.

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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 Sulfur 16	35.5 Cl Chlorine 17	40 Ar Argon 18
	23 Na Sodium 11	24 Mg Magnesium 12									70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36
	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	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
	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
	226 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	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	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

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.).