

COMBINED SCIENCE

Paper 1 Multiple Choice

5129/12

May/June 2017

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, 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.

DO NOT WRITE IN ANY BARCODES.

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.

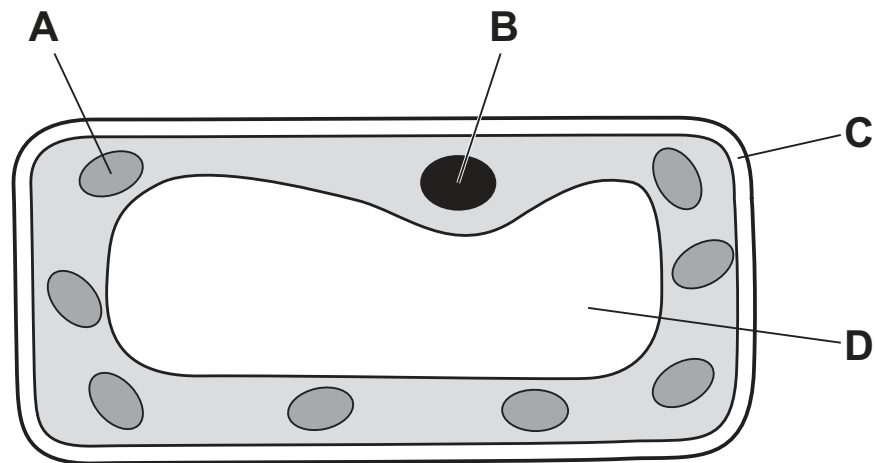
A copy of the Periodic Table is printed on page 16.

Electronic calculators may be used.

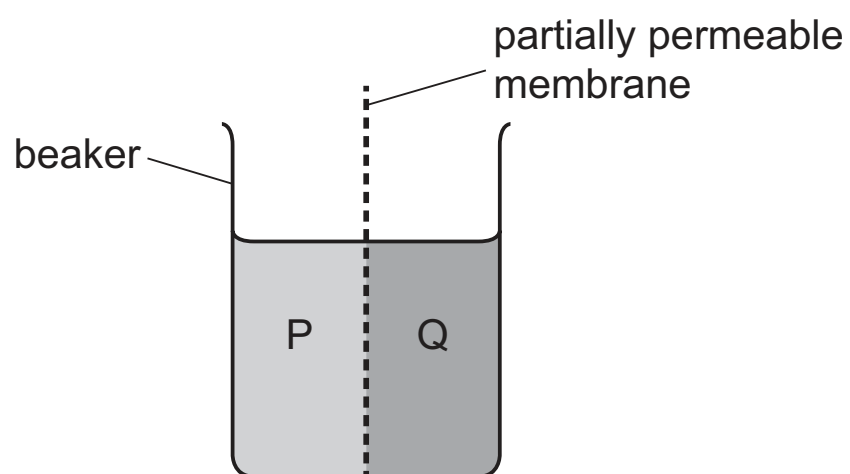
This document consists of **15** printed pages and **1** blank page.

- 1 The diagram shows a plant cell.

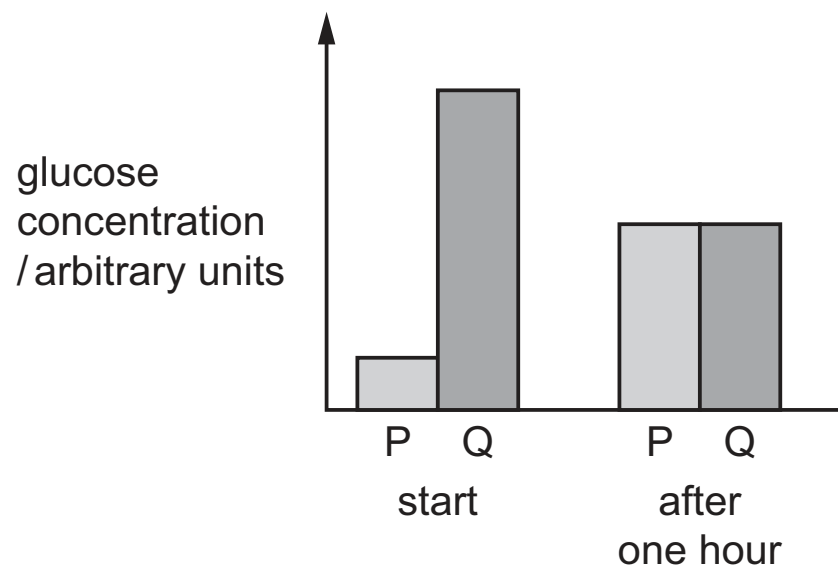
Which labelled structure is a chloroplast?



- 2 Two different glucose solutions, P and Q, are placed in a beaker on either side of a partially permeable membrane.



The glucose concentration of both solutions is measured at the start and again, after leaving the beaker for one hour. The results are shown in the graph.



What explains these results?

- A Glucose has moved from P to Q through the membrane.
- B Glucose has moved from Q to P through the membrane.
- C Water has moved from P to Q through the membrane.
- D Water has moved from Q to P through the membrane.

3 Amylase is an enzyme important in seed germination.

What is the function of amylase in seed germination?

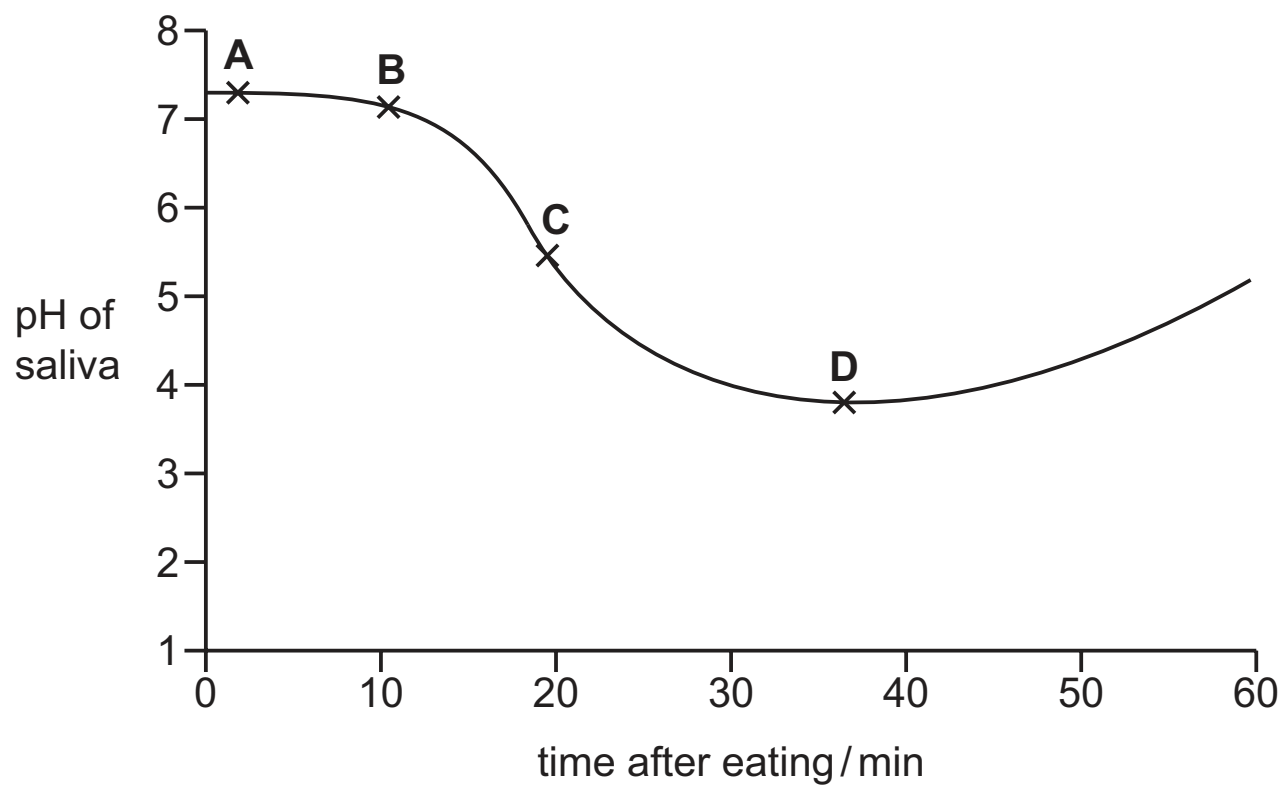
- A It breaks the testa so the plumule can emerge.
- B It causes the radical to elongate.
- C It changes the stored starch into sugars for respiration.
- D It helps the seed absorb water to rehydrate the cells.

4 Which row describes the functions of chloroplasts, stomata and vascular bundles in a plant?

	chloroplasts	stomata	vascular bundles
A	photosynthesis	gas exchange	transport
B	photosynthesis	osmosis	transport
C	transport	gas exchange	absorption
D	transport	osmosis	absorption

5 A person eats some sugary food, and then does not clean their teeth. Over the next hour, samples of their saliva are taken and the pH of the samples measured. The graph shows the results.

At which point on the graph are bacteria producing most acid?



6 A student wrote some notes about the functions of phloem and xylem.

- 1 Phloem transports sugars up and down the stem.
- 2 Phloem transports starch to growing leaves.
- 3 Xylem transports water and mineral salts.
- 4 Xylem transports water down the stem.

Which statements are correct?

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

7 Which combination of factors is most likely to prevent coronary heart disease?

- A** no smoking, high fat diet, little exercise
B no smoking, low fat diet, lots of exercise
C heavy smoking, high fat diet, lots of exercise
D heavy smoking, low fat diet, little exercise

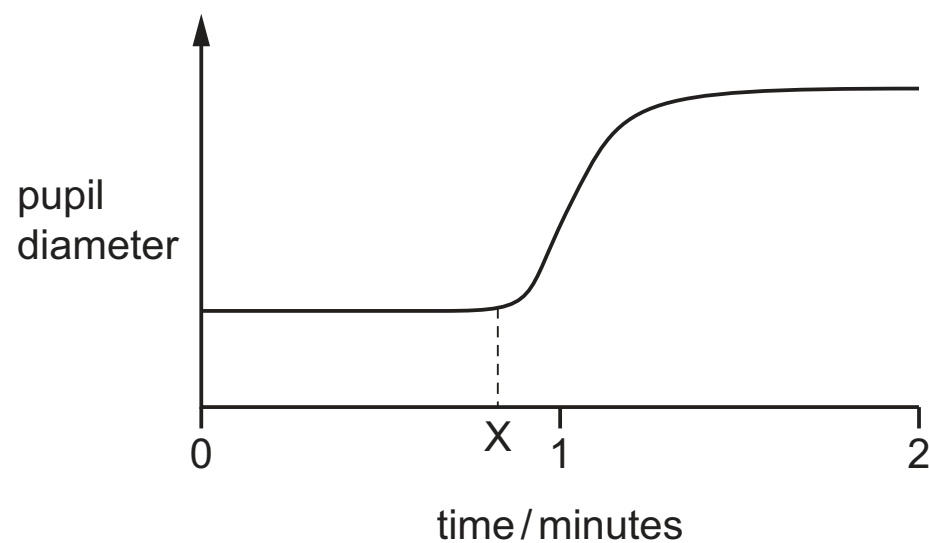
8 What is produced by anaerobic respiration in a muscle cell during exercise?

- A** carbon dioxide and lactic acid
B carbon dioxide and water
C carbon dioxide only
D lactic acid only

9 Which row correctly shows what is excreted from the lungs and the kidneys?

	lungs	kidneys
A	carbon dioxide and water	urea and water
B	carbon dioxide and water	urea only
C	water only	urea and water
D	water only	urea only

- 10 The graph shows how the diameter of the pupil of a person's eye changes during the course of two minutes.



What happens to the light intensity and the pupil diameter immediately after time X?

	light intensity	pupil diameter
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

- 11 Which statement about drugs is correct?

- A** They affect chemical reactions in the body.
- B** They are produced in the body.
- C** They can be treated with antibiotics.
- D** They never cause withdrawal symptoms.

- 12 Which human activity has caused most damage to tropical rain forests?

- A** burning fossil fuels
- B** flooding of land
- C** logging for timber
- D** searching for medicinal plants

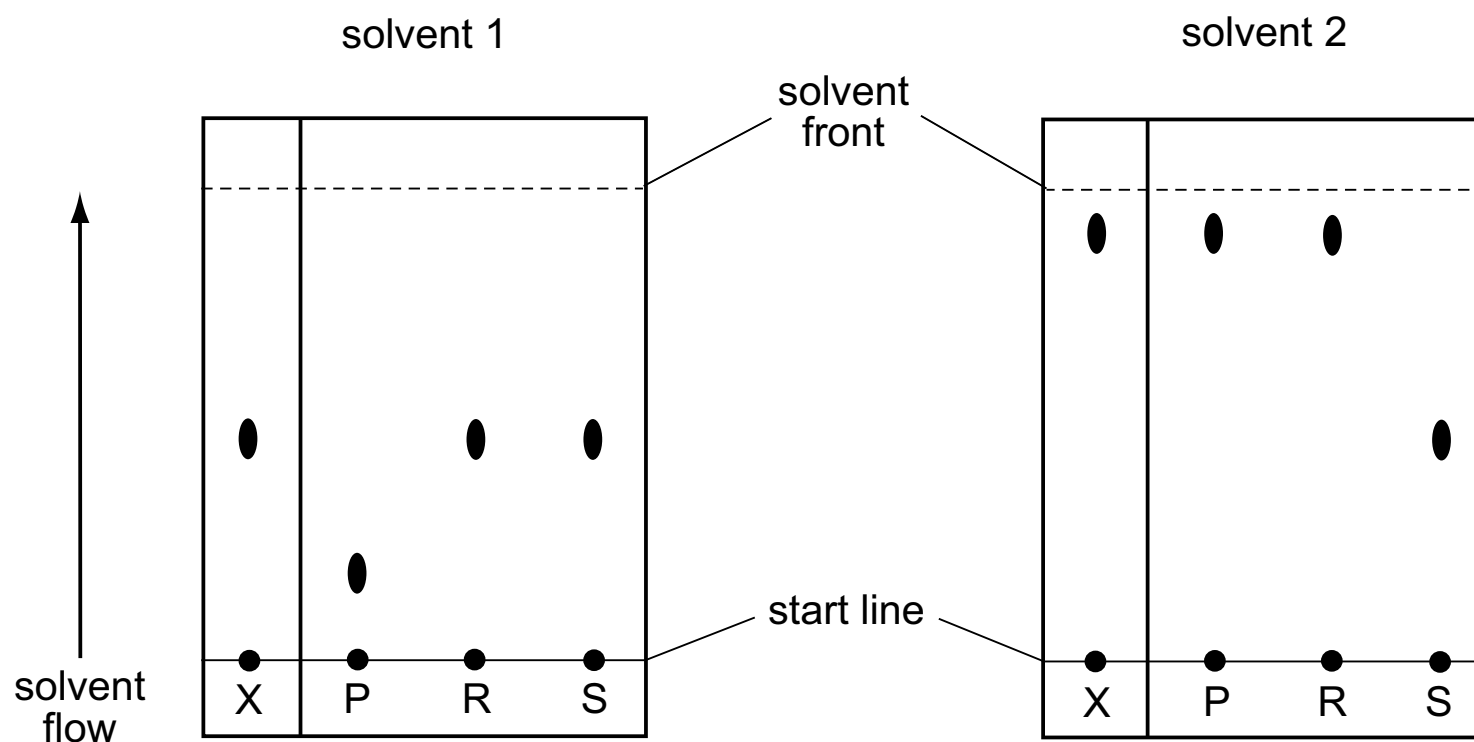
- 13** The flower of a particular species of plant normally has both stamens and carpels.
Sometimes a flower develops extra petals in place of stamens.

What is one consequence of this?

- A** The flower will attract fewer pollinating insects.
B The flower will not be able to pollinate other flowers.
C The flower will not be able to produce seeds.
D The flower will photosynthesise less.
- 14** Solution X contains one or more of three substances P, R or S.

Two chromatograms, to compare X with each of the three substances, are obtained using different solvents.

The results are shown.



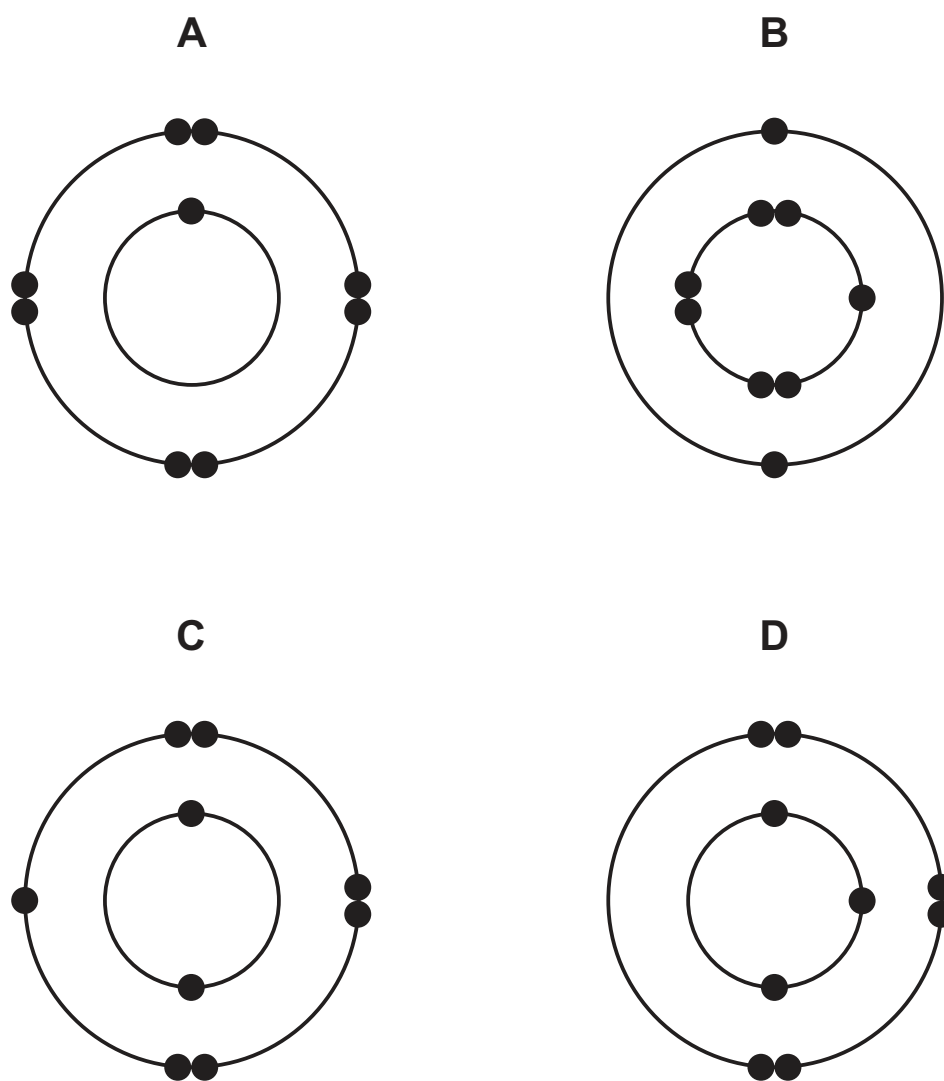
What does X contain?

- A** P only **B** R only **C** P and R **D** R and S

- 15 Which row describes the movement and arrangement of particles in a solid crystal such as sodium chloride?

	movement	arrangement
A	move quickly from place to place	far apart in a random manner
B	move slowly from place to place	packed close together in a regular manner
C	vibrate about a fixed point	packed close together in an irregular manner
D	vibrate about a fixed point	packed close together in a regular manner

- 16 Which electronic structure represents a fluorine atom?



- 17 A particle has 10 electrons, 7 protons and 8 neutrons.

What is the symbol for the particle?

- A** N^{3-} **B** O^{2-} **C** F^- **D** Ne

18 Covalent compounds and ionic compounds have different physical properties.

Which statement about covalent compounds is **not** correct?

- A They are more soluble in water than ionic compounds.
- B They are more volatile than ionic compounds.
- C They do not conduct electricity in the liquid state.
- D They have lower melting points than ionic compounds.

19 When methane is passed over heated copper oxide, copper, water and carbon dioxide are produced.

What is the balanced equation?

- A $\text{CuO} + \text{CH}_4 \rightarrow \text{Cu} + 2\text{H}_2\text{O} + \text{CO}_2$
- B $2\text{CuO} + \text{CH}_4 \rightarrow 2\text{Cu} + 2\text{H}_2\text{O} + \text{CO}_2$
- C $4\text{CuO} + \text{CH}_4 \rightarrow 4\text{Cu} + 2\text{H}_2\text{O} + \text{CO}_2$
- D $6\text{CuO} + \text{CH}_4 \rightarrow 6\text{Cu} + 2\text{H}_2\text{O} + \text{CO}_2$

20 Copper sulfate is prepared by reacting dilute sulfuric acid with solid copper oxide.

Why is excess copper oxide used?

- A to help copper sulfate crystals to form
- B to make sure that all of the sulfuric acid reacts
- C to make sure that all of the copper oxide reacts
- D to speed up the reaction

21 Caesium, Cs, is a Group I metal.

Which statement about caesium is **not** correct?

- A It has a higher melting point than lithium.
- B It has one electron in its outer shell.
- C It reacts vigorously with water.
- D It reacts with chlorine to form CsCl .

22 Platinum is a metal.

Which statements about platinum are correct?

- 1 It can be hammered into shape.
- 2 It conducts heat.
- 3 It has a low boiling point.
- 4 It is shiny.
- 5 It is strong.

- A** 1, 2, 3 and 4
B 1, 2, 3 and 5
C 1, 2, 4 and 5
D 2, 3, 4 and 5

23 Four metals, W, X, Y and Z, are tested with water, steam and dilute hydrochloric acid.

The results are shown.

W does not react with cold water or steam and only reacts slowly with dilute hydrochloric acid.

Z reacts slowly with cold water, reacts moderately fast with steam and reacts rapidly with dilute hydrochloric acid.

Y reacts vigorously with cold water.

X does not react with cold water, reacts very slowly with steam and reacts moderately fast with dilute hydrochloric acid.

What is the order of reactivity of the metals?

	most reactive	→	least reactive
A	W	X	Z Y
B	W	Z	X Y
C	Y	X	Z W
D	Y	Z	X W

24 Substances P and Q are formed during the complete combustion of petrol, in a car engine.

P is acidic and turns limewater cloudy.

Q is poisonous gas.

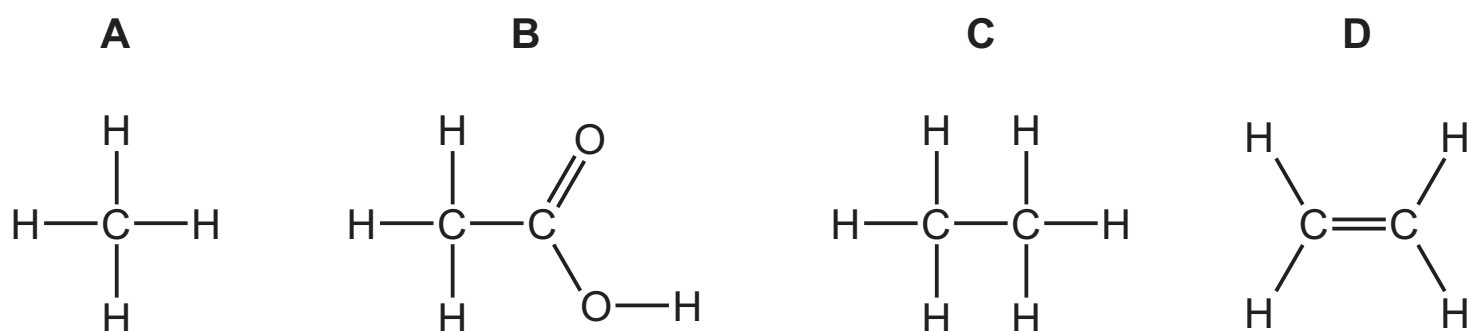
What are P and Q?

	P	Q
A	a lead compound	an oxide of nitrogen
B	an oxide of nitrogen	carbon monoxide
C	carbon dioxide	an oxide of nitrogen
D	sulfur dioxide	carbon dioxide

25 How many of each type of bond are present in the structure of ethanol, C_2H_6O ?

	C-H	C-C	C-O	O-H
A	5	1	0	1
B	5	1	1	1
C	6	2	0	1
D	6	0	2	0

26 Which structure represents an unsaturated hydrocarbon?



27 Ethene reacts with steam to produce ethanol.

Which type of reaction occurs?

- A** addition
- B** decomposition
- C** fermentation
- D** neutralisation

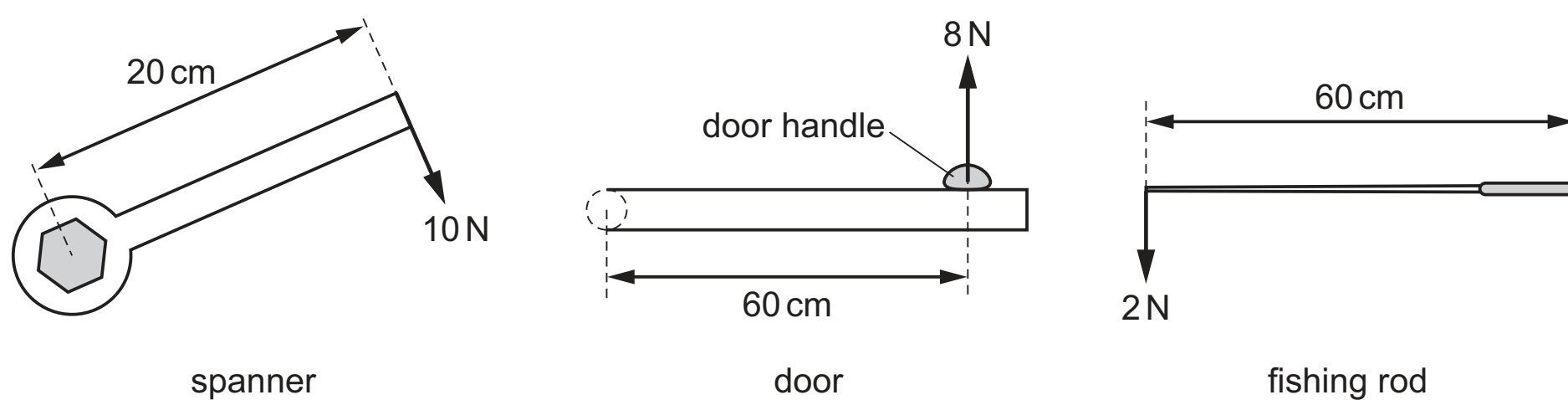
28 Which instrument is used to measure the volume of an irregularly shaped object?

- A a measuring cylinder
- B a metre rule
- C a micrometer
- D vernier calipers

29 What describes the density of a material?

- A the amount of matter in the material
- B the mass per unit volume of the material
- C the pull of gravity on the material
- D the volume per unit mass of the material

30 The diagrams show forces applied to objects to cause a turning effect (moment).



What is the correct order for the size of the moments produced by the forces?

	smallest moment	→	largest moment
A	door	fishing rod	spanner
B	door	spanner	fishing rod
C	fishing rod	door	spanner
D	fishing rod	spanner	door

31 Four people run up the same steps.

Which person produces the largest power?

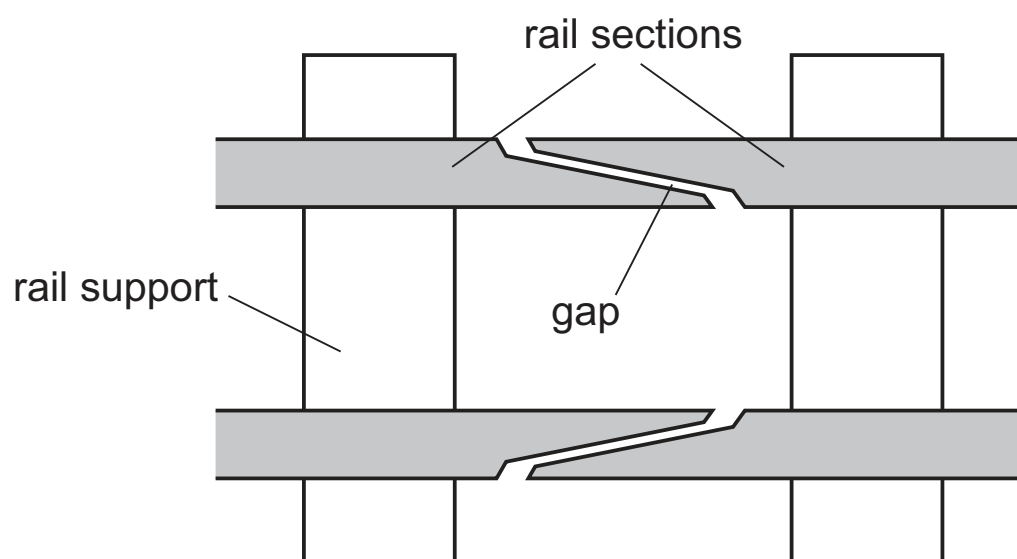
	weight of person / N	time taken / s
A	300	4
B	400	5
C	500	10
D	600	15

32 In order to create a scale of temperature, two fixed points are needed.

What are the fixed points for the Centigrade scale?

	lower fixed point	upper fixed point
A	melting point of alcohol	boiling point of alcohol
B	melting point of mercury	boiling point of mercury
C	melting point of pure ice	boiling point of alcohol
D	melting point of pure ice	boiling point of pure water

33 At regular intervals along a railway line there is a gap between the rail sections.



What is the reason for the gap?

- A** to allow for expansion of the rail sections during hot weather
- B** to allow for vibrations of the rail sections as the train passes over them
- C** to allow rain water to drain from the rail sections
- D** to keep the wheels of the train and carriages on the rail sections

34 The frequency of a v.h.f. radio transmitter is 2.0×10^8 Hz.

The speed of the waves is 3.0×10^8 m/s.

What is the wavelength?

- A 0.67 m
- B 1.5 m
- C $1.0 \text{ m} \times 10^8 \text{ m}$
- D $6.0 \text{ m} \times 10^{16} \text{ m}$

35 How do the frequencies and wavelengths of radiowaves compare with those of X-rays?

	the frequencies of radiowaves	the wavelengths of radiowaves
A	are higher	are larger
B	are higher	are smaller
C	are lower	are larger
D	are lower	are smaller

36 A 12 V lamp uses a current of 2 A.

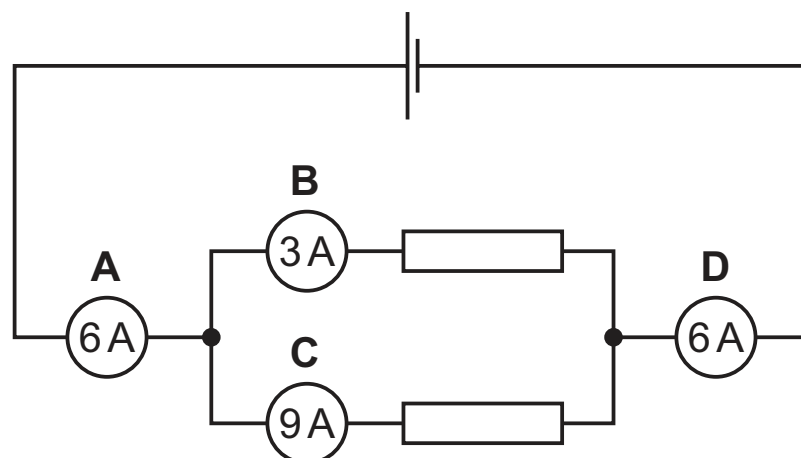
What is the resistance when the lamp is working correctly?

- A 6Ω
- B 10Ω
- C 14Ω
- D 24Ω

37 Four ammeters are connected in the circuit shown.

One ammeter is faulty and does not give the correct reading.

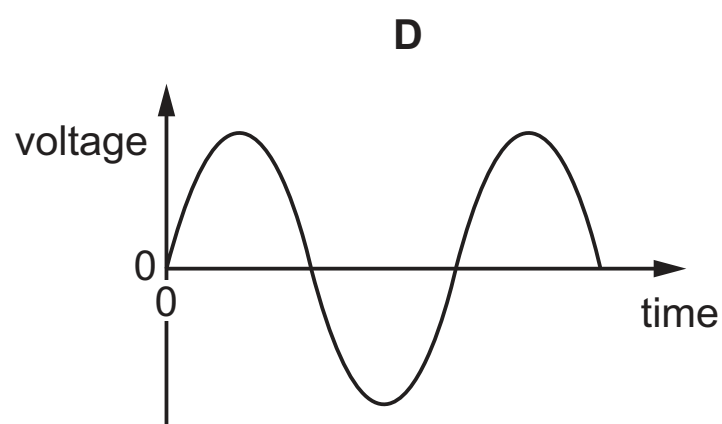
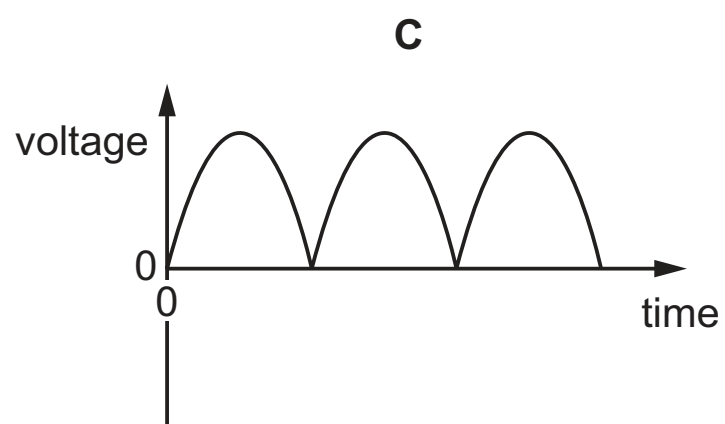
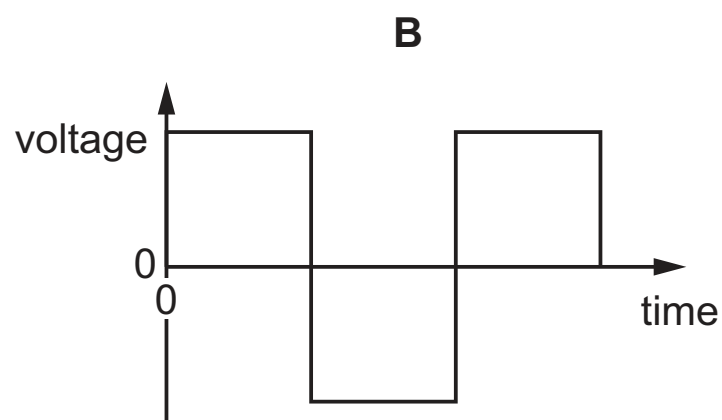
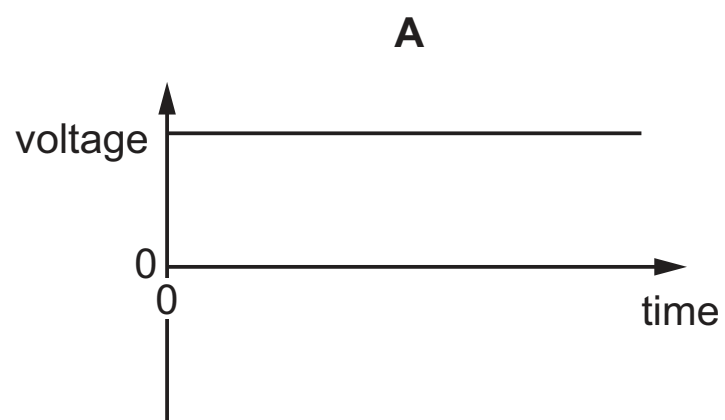
Which ammeter is faulty?



38 What is an example of induced magnetism?

- A a compass needle pointing north
- B a north pole attracting iron filings
- C a north pole repelling a north pole
- D a negatively charged balloon attracting small pieces of paper

39 Which graph shows how the voltage output from a simple a.c. generator varies with time?



40 Which source emits radiation that passes through thick paper and could be considered to have a constant activity over ten years?

- A an alpha source with a half-life of 140 days
- B an alpha source with a half-life of 400 000 years
- C a beta source with a half-life of 6000 years
- D a gamma source with a half-life of six hours

BLANK PAGE

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.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge International Examinations Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cie.org.uk after the live examination series.

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.

The Periodic Table of Elements

		Group																																																																																																																																																			
I	II	III	IV	V	VI	VII	VIII						VIII																																																																																																																																								
3 Li lithium 7	4 Be beryllium 9	1 H hydrogen 1	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	2 He helium 4						10 Ne neon 20																																																																																																																																								
11 Na sodium 23	12 Mg magnesium 24	13 Al aluminium 27	14 Si silicon 28	15 P phosphorus 31	16 S sulfur 32	17 Cl chlorine 35.5	18 Ar argon 40						36 Kr krypton 84																																																																																																																																								
19 K potassium 39	20 Ca calcium 40	21 Sc scandium 45	22 Ti titanium 48	23 V vanadium 51	24 Cr chromium 52	25 Mn manganese 55	26 Fe iron 56	27 Co cobalt 59	28 Ni nickel 59	29 Cu copper 64	30 Zn zinc 65	31 Ga gallium 70	32 Ge germanium 73	33 As arsenic 75	34 Se selenium 79	35 Br bromine 80	36 Kr krypton 84																																																																																																																																				
37 Rb rubidium 85	38 Sr strontium 88	39 Y yttrium 89	40 Zr zirconium 91	41 Nb niobium 93	42 Mo molybdenum 96	43 Tc technetium —	44 Ru ruthenium 101	45 Rh rhodium 103	46 Pd palladium 106	47 Ag silver 108	48 Cd cadmium 112	49 In indium 115	50 Sn tin 119	51 Sb antimony 122	52 Te tellurium 128	53 I iodine 127	54 Xe xenon 131	55 Cs caesium 133	56 Ba barium 137	57–71 lanthanoids	72 Hf hafnium 178	73 Ta tantalum 181	74 W tungsten 184	75 Re rhenium 186	76 Os osmium 190	77 Ir iridium 192	78 Pt platinum 195	79 Au gold 197	80 Hg mercury 201	81 Tl thallium 204	82 Pb lead 207	83 Bi bismuth 209	84 Po polonium —	85 At astatine —	86 Rn radon —																																																																																																																		
87 Fr francium —	88 Ra radium —	89–103 actinoids	104 Rf rutherfordium —	105 Db dubnium —	106 Sg seaborgium —	107 Bh bohrium —	108 Hs hassium —	109 Mt meitnerium —	110 Ds darmstadtium —	111 Rg roentgenium —	112 Cn copernicium —	113 Nh nihonium —	114 Fl flerovium —	115 Mc moscovium —	116 Lv livermorium —	117 Ts tennessine —	118 Og oganesson —	119 Uue unbinilium —	120 Uub ununilium —	121 Uut unununium —	122 Uuq ununquadium —	123 Uup ununpentium —	124 Uuq ununhexium —	125 Uuh ununheptium —	126 Uuo ununoctium —	127 Uuq ununnonium —	128 Uuh unundecium —	129 Uuo ununduodecium —	130 Uuh ununtridecium —	131 Uuo ununquadradecium —	132 Uuh ununpentadecium —	133 Uuo ununhexadecium —	134 Uuh ununseptadecium —	135 Uuo ununoctadecium —	136 Uuh ununnonadecium —	137 Uuo ununtriacontium —	138 Uuh ununtriacontium —	139 Uuo ununtriacontium —	140 Uuh ununtriacontium —	141 Uuo ununtriacontium —	142 Uuh ununtriacontium —	143 Uuo ununtriacontium —	144 Uuh ununtriacontium —	145 Uuo ununtriacontium —	146 Uuh ununtriacontium —	147 Uuo ununtriacontium —	148 Uuh ununtriacontium —	149 Uuo ununtriacontium —	150 Uuh ununtriacontium —	151 Uuo ununtriacontium —	152 Uuh ununtriacontium —	153 Uuo ununtriacontium —	154 Uuh ununtriacontium —	155 Uuo ununtriacontium —	156 Uuh ununtriacontium —	157 Uuo ununtriacontium —	158 Uuh ununtriacontium —	159 Uuo ununtriacontium —	160 Uuh ununtriacontium —	161 Uuo ununtriacontium —	162 Uuh ununtriacontium —	163 Uuo ununtriacontium —	164 Uuh ununtriacontium —	165 Uuo ununtriacontium —	166 Uuh ununtriacontium —	167 Uuo ununtriacontium —	168 Uuh ununtriacontium —	169 Uuo ununtriacontium —	170 Uuh ununtriacontium —	171 Uuo ununtriacontium —	172 Uuh ununtriacontium —	173 Uuo ununtriacontium —	174 Uuh ununtriacontium —	175 Uuo ununtriacontium —	176 Uuh ununtriacontium —	177 Uuo ununtriacontium —	178 Uuh ununtriacontium —	179 Uuo ununtriacontium —	180 Uuh ununtriacontium —	181 Uuo ununtriacontium —	182 Uuh ununtriacontium —	183 Uuo ununtriacontium —	184 Uuh ununtriacontium —	185 Uuo ununtriacontium —	186 Uuh ununtriacontium —	187 Uuo ununtriacontium —	188 Uuh ununtriacontium —	189 Uuo ununtriacontium —	190 Uuh ununtriacontium —	191 Uuo ununtriacontium —	192 Uuh ununtriacontium —	193 Uuo ununtriacontium —	194 Uuh ununtriacontium —	195 Uuo ununtriacontium —	196 Uuh ununtriacontium —	197 Uuo ununtriacontium —	198 Uuh ununtriacontium —	199 Uuo ununtriacontium —	200 Uuh ununtriacontium —	201 Uuo ununtriacontium —	202 Uuh ununtriacontium —	203 Uuo ununtriacontium —	204 Uuh ununtriacontium —	205 Uuo ununtriacontium —	206 Uuh ununtriacontium —	207 Uuo ununtriacontium —	208 Uuh ununtriacontium —	209 Uuo ununtriacontium —	210 Uuh ununtriacontium —	211 Uuo ununtriacontium —	212 Uuh ununtriacontium —	213 Uuo ununtriacontium —	214 Uuh ununtriacontium —	215 Uuo ununtriacontium —	216 Uuh ununtriacontium —	217 Uuo ununtriacontium —	218 Uuh ununtriacontium —	219 Uuo ununtriacontium —	220 Uuh ununtriacontium —	221 Uuo ununtriacontium —	222 Uuh ununtriacontium —	223 Uuo ununtriacontium —	224 Uuh ununtriacontium —	225 Uuo ununtriacontium —	226 Uuh ununtriacontium —	227 Uuo ununtriacontium —	228 Uuh ununtriacontium —	229 Uuo ununtriacontium —	230 Uuh ununtriacontium —	231 Uuo ununtriacontium —	232 Uuh ununtriacontium —	233 Uuo ununtriacontium —	234 Uuh ununtriacontium —	235 Uuo ununtriacontium —	236 Uuh ununtriacontium —	237 Uuo ununtriacontium —	238 Uuh ununtriacontium —	239 Uuo ununtriacontium —	240 Uuh ununtriacontium —	241 Uuo ununtriacontium —	242 Uuh ununtriacontium —	243 Uuo ununtriacontium —	244 Uuh ununtriacontium —	245 Uuo ununtriacontium —	246 Uuh ununtriacontium —	247 Uuo ununtriacontium —	248 Uuh ununtriacontium —	249 Uuo ununtriacontium —	250 Uuh ununtriacontium —

Key

atomic number
atomic symbol
name
relative atomic mass

lanthanoids

57 La lanthanum 139	58 Ce cerium 140	59 Pr praseodymium 141	60 Nd neodymium 144	61 Pm promethium —	62 Sm samarium 150	63 Eu europium 152	64 Gd gadolinium 157	65 Tb terbium 159	66 Dy dysprosium 163	67 Ho holmium 165	68 Er erbium 167	69 Tm thulium 169	70 Yb ytterbium 173	71 Lu lutetium 175
89 Ac actinium —	90 Th thorium 232	91 Pa protactinium 231	92 U uranium 238	93 Np neptunium —	94 Pu plutonium —	95 Am americium —	96 Cm curium —	97 Bk berkelium —	98 Cf californium —	99 Es einsteinium —	100 Fm fermium —	101 Md mendelevium —	102 No nobelium —	103 Lr lawrencium —

actinoids

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