Cambridge Assessment International Education

Cambridge IGCSE™

PHYSICAL SCIENCE **0652/11**

Paper 1 Multiple Choice (Core) **October/November 2025**

45 minutes

You must answer on the multiple choice answer sheet.

You will need: Multiple choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

INSTRUCTIONS

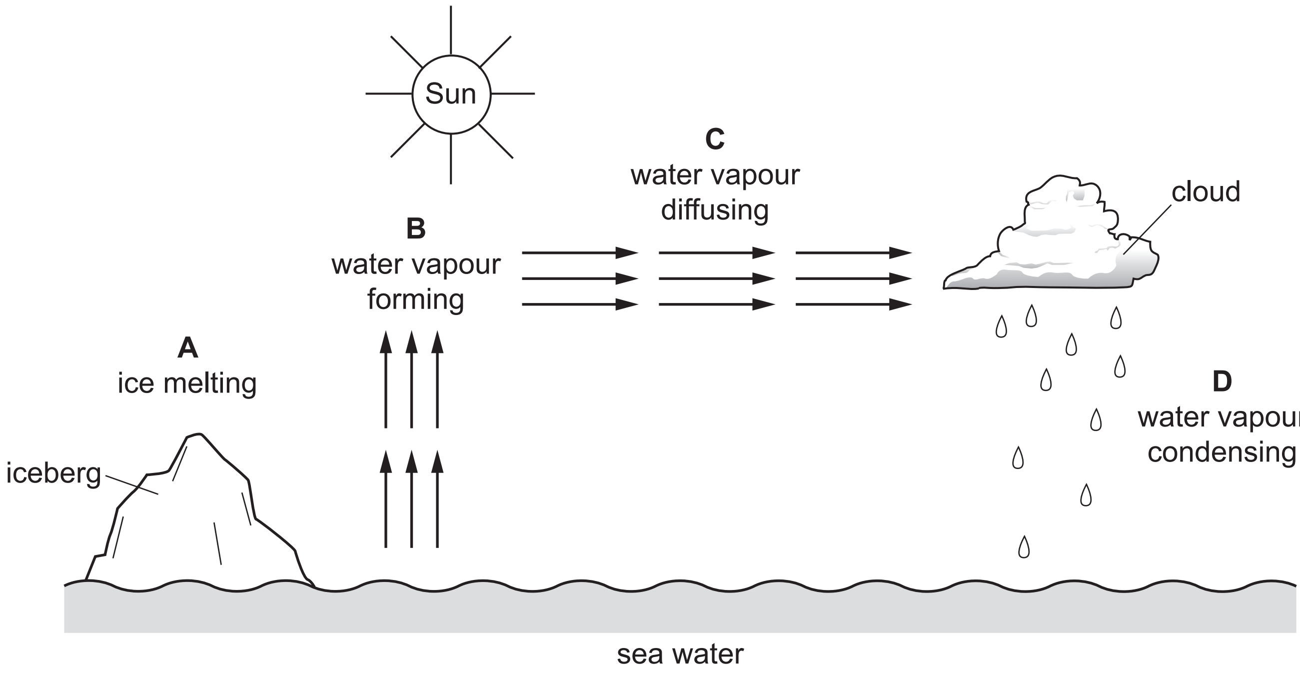
- There are **forty** questions on this paper. Answer **all** questions.
- For each question there are four possible answers **A**, **B**, **C** and **D**. Choose the **one** you consider correct and record your choice in soft pencil on the multiple choice answer sheet.
- Follow the instructions on the multiple choice answer sheet.
- Write in soft pencil.
- Write your name, centre number and candidate number on the multiple choice answer sheet in the spaces provided unless this has been done for you.
- Do **not** use correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.

INFORMATION

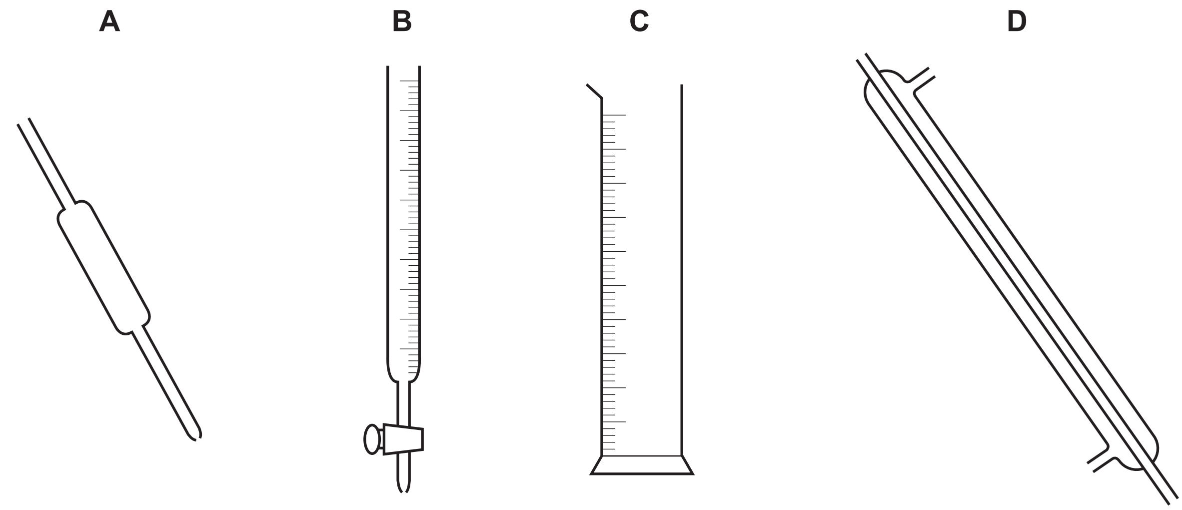
- The total mark for this paper is 40.
- Each correct answer will score one mark.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

This document has **16** pages.

1 In which process are water particles becoming closer together and moving in continuous random motion?

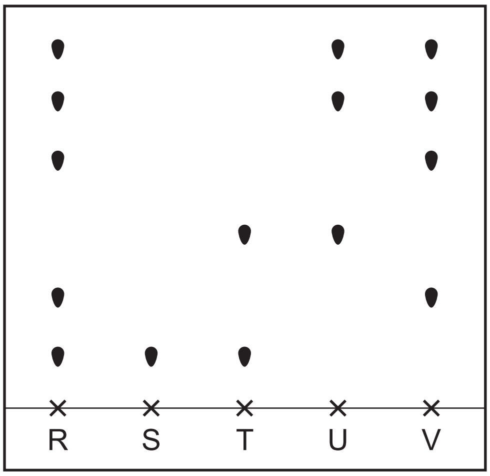


2 Which diagram shows a pipette?



3 Food colouring R is compared with food colourings S, T, U and V using chromatography.

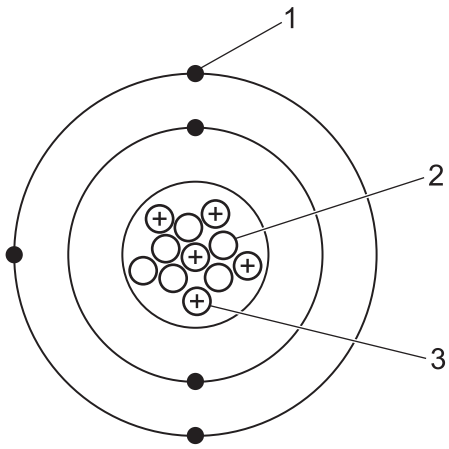
The chromatogram is shown.



Which food colourings are present in food colouring R?

A S and T **B** S and U **C** S and V **D** U and V

4 The atomic structure of an atom of boron is shown.



What do the labels on the diagram represent?

	1	2	3
A	electron	proton	neutron
B	electron	neutron	proton
C	proton	neutron	electron
D	proton	nucleus	electron

5 Which statement describes what happens when a sodium atom and a chlorine atom combine to form an ionic bond?

A The chlorine atom gives an electron to the sodium atom.

B The sodium atom gives an electron to the chlorine atom.

C The sodium atom and the chlorine atom share a pair of electrons.

D The sodium atom and the chlorine atom share two pairs of electrons.

6 Which statement about the structures of **both** diamond and graphite is correct?

A They are both ionic structures.

B They both contain atoms arranged in flat planes.

C They both contain atoms held together by four covalent bonds.

D They both contain only carbon atoms.

7 Methane burns in oxygen to produce carbon dioxide and water.

An unbalanced equation for the reaction is shown.

$$CH_4 + xO_2 \rightarrow yCO_2 + zH_2O$$

Which values of x, y and z balance the equation?

	x	y	z
A	1	1	1
B	1	1	3
C	2	1	2
D	2	2	1

8 Which substances produce hydrogen when they are electrolysed using inert electrodes?

1 dilute sulfuric acid

2 concentrated aqueous sodium chloride

3 molten lead(II) bromide

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

9 The starting and finishing temperatures of four reactions are shown.

reaction	starting temperature / °C	finishing temperature / °C
1	–2	–8
2	5	35
3	21	42
4	28	16

Which reactions are endothermic?

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

10 A student added solid calcium carbonate (marble chips) to dilute hydrochloric acid.

Which set of conditions produces the fastest rate of reaction?

	concentration of acid	surface area of calcium carbonate	temperature
A	high	large	high
B	high	small	high
C	low	large	high
D	low	small	low

11 The equation for the reaction of magnesium with copper(II) oxide is shown.

$$CuO + Mg \rightarrow MgO + Cu$$

Which statement is correct?

A Copper(II) oxide is oxidised.

B Copper(II) oxide is reduced.

C Magnesium oxide is oxidised.

D Magnesium oxide is reduced.

12 Which row describes the properties of an acid?

	blue litmus	magnesium	calcium carbonate	pH
A	stays blue	no change	no change	1
B	stays blue	no change	no change	14
C	turns red	bubbles	bubbles	1
D	turns red	bubbles	bubbles	14

13 An aqueous solution contains a metal ion T.

When excess aqueous ammonia is added to the solution, a coloured solution is produced.

What is T?

A Cu^{2+} **B** Ca^{2+} **C** Fe^{2+} **D** Fe^{3+}

14 Which statement about an element in Group VII of the Periodic Table is correct?

A It is a metal with one outer electron.

B It is a metal with seven outer electrons.

C It is a non-metal with one outer electron.

D It is a non-metal with seven outer electrons.

15 Which row describes the properties of a transition element?

	melting point / °C	$\frac{\text{density}}{\text{g/cm}^3}$	colour of compounds
A	–210	0.0011	one oxide is brown, but most compounds are colourless
B	98	0.97	all the compounds are white
C	328	11.34	the iodide is yellow, but most compounds are white
D	1535	7.86	most compounds are either green or brown

16 The oxides of three metals, X, Y and Z, are heated with carbon powder.

A small piece of each metal is added to dilute hydrochloric acid.

The results are shown.

metal	metal oxide heated with carbon powder	metal added to dilute hydrochloric acid
X	reacts to form metal X	no observed change
Y	no observed change	rapid effervescence
Z	reacts to form metal Z	slow effervescence

What is the order of reactivity of the metals, from most reactive to least reactive?

A X → Z → Y

B Y → Z → X

C Z → X → Y

D Z → Y → X

17 The ore bauxite is used in the extraction of a metal.

Which row identifies the metal and describes how it is extracted?

	metal	extraction
A	aluminium	electrolysis
B	aluminium	reduction by carbon
C	iron	electrolysis
D	iron	reduction by carbon

18 Air is a mixture of different gases.

Which row gives the percentage of nitrogen, oxygen and other gases in the air?

	percentage of gas present in air		
	nitrogen	oxygen	other gases
A	1	21	78
B	21	78	1
C	78	1	21
D	78	21	1

19 Which row describes the correct use for a fraction obtained from petroleum by fractional distillation?

	fraction	use
A	bitumen	making waxes and polishes
B	diesel	fuel for cooking
C	gasoline	fuel in cars
D	naphtha	making roads

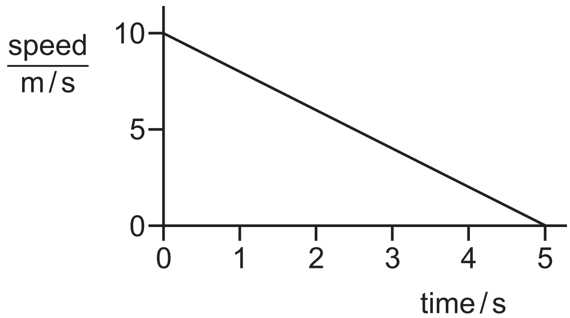
20 Compound Q is an unsaturated hydrocarbon.

Compound R is formed by reaction of compound Q and steam.

Which row identifies Q and R?

	Q	R
A	ethane	ethanol
B	ethane	poly(ethene)
C	ethene	ethanol
D	ethene	poly(ethene)

21 The graph shows the changing speed of a car for a time of 5.0 s.



What is the distance that the car travels in this time?

A 5.0 m **B** 10 m **C** 25 m **D** 50 m

22 A student uses a measuring cylinder and a balance to find the density of oil.

Which expression gives the density of the oil?

A $\dfrac{\text{mass of cylinder containing oil}}{\text{volume of oil}}$

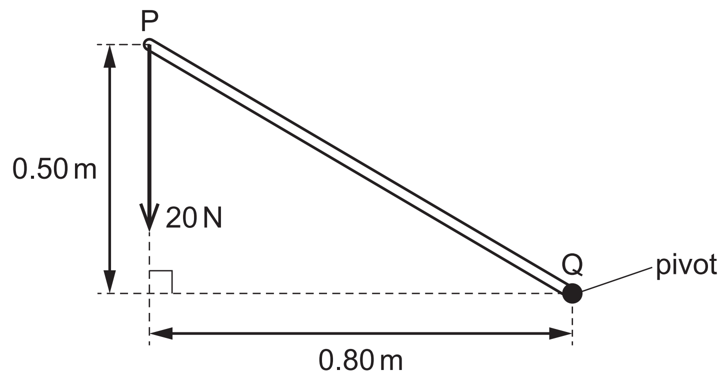
B $\dfrac{\text{mass of cylinder containing oil} - \text{mass of empty cylinder}}{\text{volume of oil}}$

C $\dfrac{\text{volume of oil}}{\text{mass of cylinder containing oil}}$

D $\dfrac{\text{volume of oil}}{\text{mass of cylinder containing oil} - \text{mass of empty cylinder}}$

23 The diagram shows a bar PQ that is pivoted at end Q.

A force of 20 N acts at end P in the direction shown.



What is the moment of this force about end Q?

A 10 N m **B** 16 N m **C** 25 N m **D** 40 N m

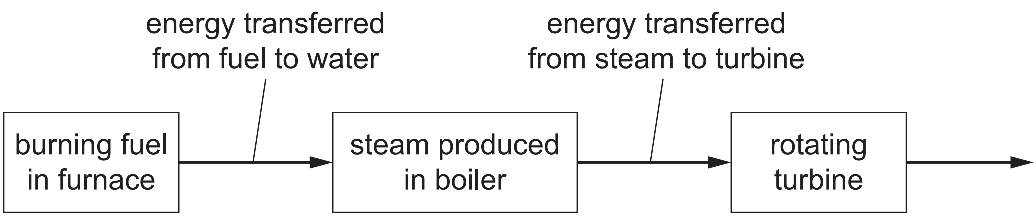
24 Four cars travel up the same hill at constant speed.

The table shows the mass of each car and the time taken to travel up the hill.

Which car transfers the greatest power in climbing the hill?

	mass of car / kg	time taken / s
A	800	12
B	800	20
C	2000	12
D	2000	20

25 The diagram shows two stages in the operation of a gas-fired power station.



Which row shows how the energy is transferred at each stage?

	from fuel to water	from steam to turbine
A	by heating	by electrical working
B	by heating	by mechanical working
C	by mechanical working	by electrical working
D	by mechanical working	by mechanical working

26 Equal volumes of a solid, a liquid and a gas are heated at constant pressure.

The increase in temperature of the three samples is the same.

Which statement about the expansion of the samples is correct?

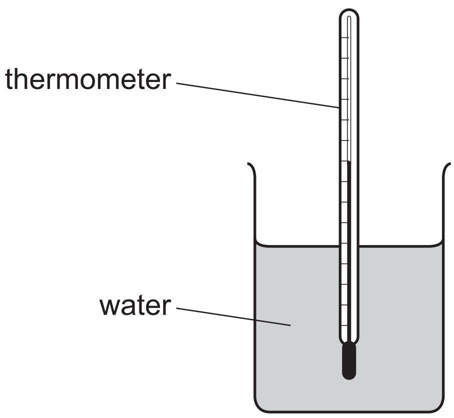
A The gas expands more than the solid.

B The liquid expands more than the gas.

C The solid expands more than the gas.

D The solid expands more than the liquid.

27 A liquid-in-glass thermometer measures temperatures between –20 °C and 120 °C. The diagram shows the thermometer in water at 60 °C.



Which temperature is a fixed point on the scale of the thermometer?

A –20 °C **B** 60 °C **C** 100 °C **D** 120 °C

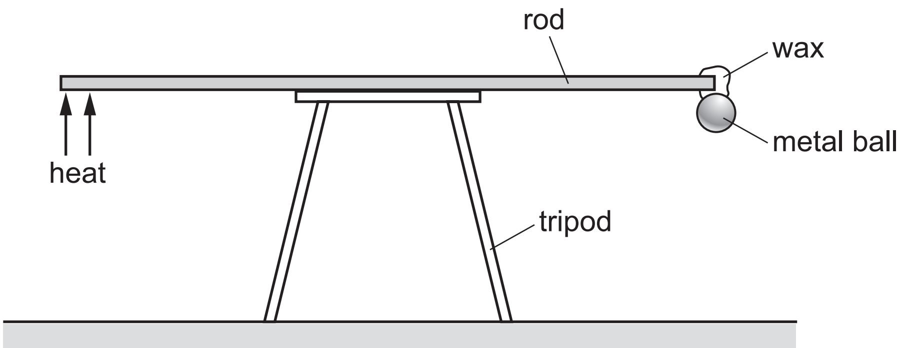
28 Which row shows what happens to the temperature of a solid during melting, and to the temperature of a liquid during boiling?

	temperature of a solid during melting	temperature of a liquid during boiling
A	increases	increases
B	increases	no change
C	no change	increases
D	no change	no change

29 A student investigates thermal conduction of energy in rods made of different metals.

The rods are equal in size.

A small metal ball is fixed to one end of one rod with wax. The rod is placed on a tripod and heated at the other end. Eventually, the wax melts and the metal ball drops.



This experiment is repeated with each of the rods.

The student wants to determine which rod is the best thermal conductor.

Which additional piece of equipment is needed?

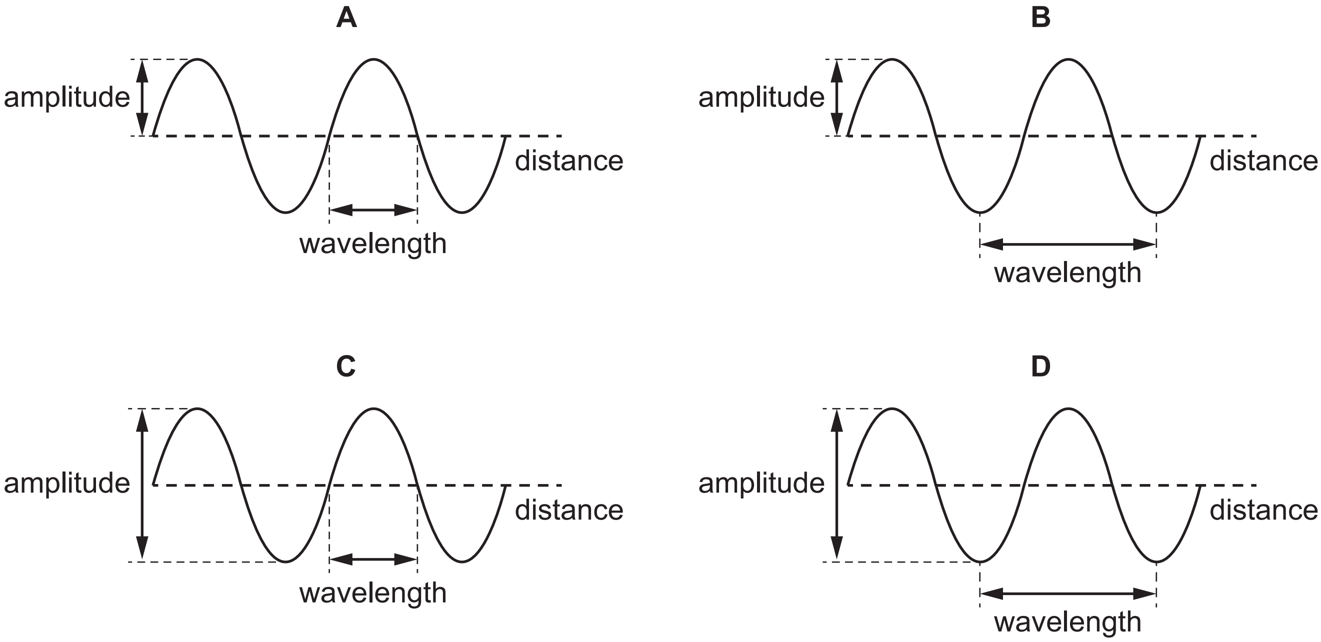
A a 50 cm rule

B a balance

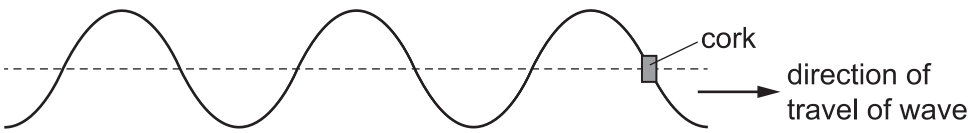
C a stop-watch

D a thermometer

30 Which diagram shows the amplitude and the wavelength of the wave?



31 A cork moves up and down in water as a wave passes.

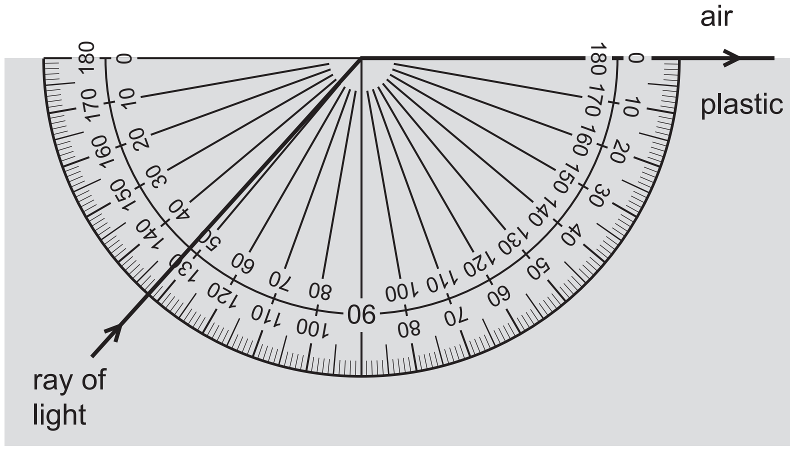


The cork moves from its lowest point to its highest point and then back to its lowest point three times in 12 s.

What is the frequency of the wave?

A 0.25 Hz **B** 3.0 Hz **C** 4.0 Hz **D** 36 Hz

32 The diagram shows a ray of light as it travels from plastic into air.

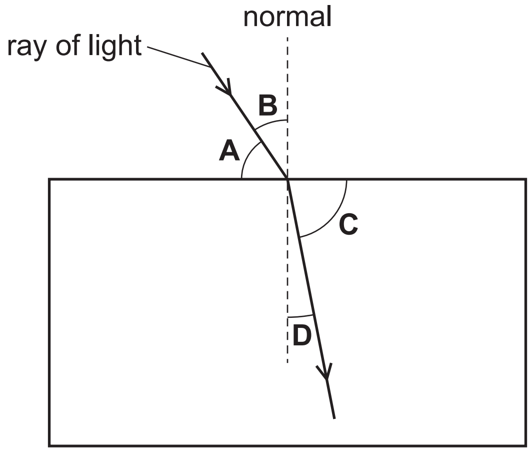


What is the critical angle for the plastic?

A 42° **B** 48° **C** 52° **D** 90°

33 The diagram shows a ray of light passing into a glass block.

Which labelled angle is the angle of refraction?



34 Which row describes the force between two magnets and the force between a magnet and a piece of soft iron?

	force between two magnets	force between a magnet and a piece of soft iron
A	always attractive	always attractive
B	always attractive	can be attractive or repulsive
C	can be attractive or repulsive	always attractive
D	can be attractive or repulsive	can be attractive or repulsive

35 A balloon is rubbed on a woollen jumper.

Particles move between the balloon and the jumper.

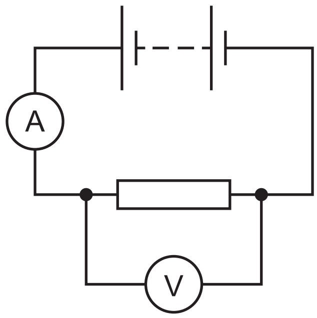
The balloon and the jumper become charged.

The final charge on the balloon and on the jumper are compared.

Which particles move and how do the final charges compare?

	which particles move	final charges on balloon and jumper
A	electrons	like charges
B	electrons	unlike charges
C	protons	like charges
D	protons	unlike charges

36 The diagram shows a circuit.



The reading on the ammeter is 20 mA.

The reading on the voltmeter is 10 V.

What is the resistance of the resistor?

A 0.50 Ω **B** 2.0 Ω **C** 200 Ω **D** 500 Ω

37 A current-carrying coil is placed in a magnetic field. This makes the coil rotate in a clockwise direction.

Which change makes the coil rotate in an anticlockwise direction?

A decreasing the current

B increasing the current

C increasing the number of turns on the coil

D reversing the direction of the magnetic field

38 Four different nuclides are represented by the symbols shown.

$$^{56}_{26}\mathrm{J} \qquad ^{58}_{28}\mathrm{Q} \qquad ^{58}_{26}\mathrm{L} \qquad ^{58}_{27}\mathrm{M}$$

Which pair of symbols represents different isotopes of the same element?

A J and Q **B** J and L **C** Q and L **D** L and M

39 A nucleus contains 228 nucleons; 90 of these nucleons are protons.

The nucleus emits an alpha-particle.

After the alpha-particle is emitted, how many nucleons and how many protons are in the nucleus?

	number of nucleons	number of protons
A	224	88
B	224	90
C	226	86
D	226	88

40 Which statement about alpha-particles and beta-particles is correct?

A Alpha-particles are negatively charged and are less penetrating than beta-particles.

B Alpha-particles are negatively charged and are more penetrating than beta-particles.

C Alpha-particles are positively charged and are less penetrating than beta-particles.

D Alpha-particles are positively charged and are more penetrating than beta-particles.

The Periodic Table of Elements

Key

atomic number
atomic symbol
name
relative atomic mass

Group																	
I	II											III	IV	V	VI	VII	VIII
							1 H hydrogen 1										2 He helium 4
3 Li lithium 7	4 Be beryllium 9											5 B boron 11	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	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
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 –

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
actinoids	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 –

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