



**PHYSICAL SCIENCE**

**0652/01**

Paper 1 Multiple Choice (Core)

**For Examination from 2019**

SPECIMEN PAPER

**45 minutes**

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.

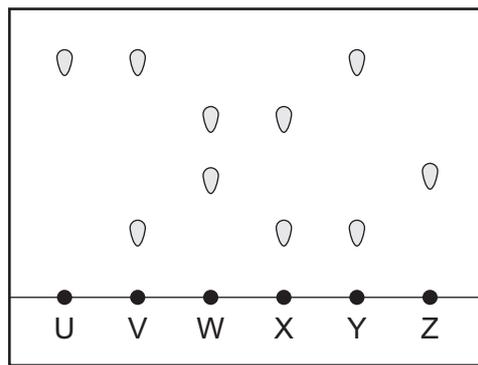
Any rough working should be done in this booklet.

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

Electronic calculators may be used.

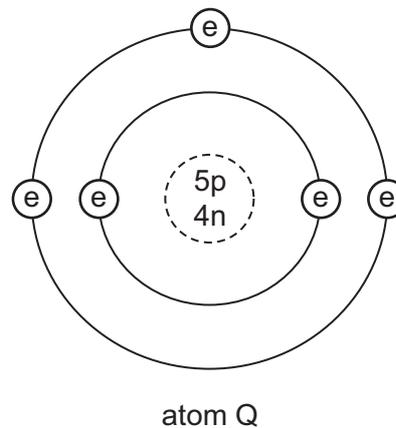
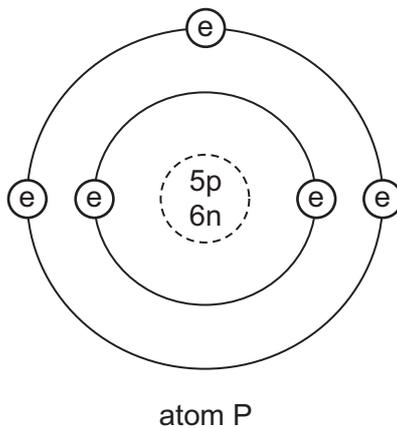
This document consists of **15** printed pages and **1** blank page.

- 1 The diagram shows the results of a chromatography experiment.



Which two substances are pure?

- A U and X
  - B U and Z
  - C V and Y
  - D V and W
- 2 The diagrams show two different atoms.



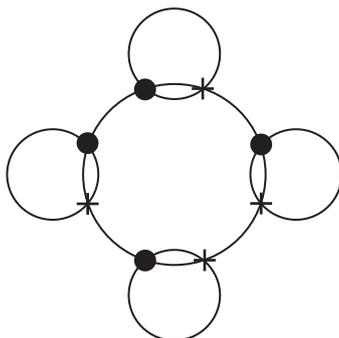
key

e = electron  
n = neutron  
p = proton

Which statement is **not** correct?

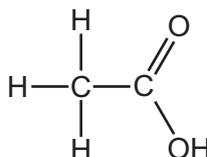
- A Atoms P and Q are isotopes of the same element.
- B Atom P has the electronic configuration 2,3.
- C Atom Q is boron.
- D The nucleon number of atom P is 9.

- 3 The diagram shows the bonding electrons in a covalent molecule.



Which molecule is shown?

- A chlorine
  - B hydrogen chloride
  - C methane
  - D water
- 4 The diagram shows the structure of ethanoic acid.



What is the formula of ethanoic acid?

- A CHO
  - B C<sub>2</sub>H<sub>4</sub>O<sub>2</sub>
  - C CH<sub>3</sub>CO<sub>2</sub>
  - D C<sub>2</sub>H<sub>3</sub>O<sub>2</sub>
- 5 Hydrochloric acid reacts with sodium carbonate.

The word equation is:

hydrochloric acid + sodium carbonate → sodium chloride + carbon dioxide + water

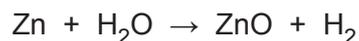
What is the correct balanced equation for this reaction?

- A  $\text{HCl} + \text{NaCO}_3 \rightarrow \text{NaCl} + \text{CO}_2 + \text{H}_2\text{O}$
- B  $2\text{HCl} + \text{Na}_2\text{CO}_3 \rightarrow \text{NaCl}_2 + \text{CO}_2 + \text{H}_2\text{O}$
- C  $2\text{HCl} + \text{Na}_2\text{CO}_3 \rightarrow 2\text{NaCl} + \text{CO}_2 + \text{H}_2\text{O}$
- D  $\text{HCl}_2 + \text{Na}_2\text{CO}_3 \rightarrow 2\text{NaCl} + \text{CO}_2 + \text{H}_2\text{O}$

6 Which statement describes all exothermic reactions?

- A Overall energy is absorbed.
- B Overall energy is released.
- C There is no temperature change.
- D The temperature decreases.

7 Zinc reacts with steam to form zinc oxide and hydrogen.



During the reaction, which substance is oxidised?

- A hydrogen
- B water
- C zinc
- D zinc oxide

8 A farmer tests the pH of his soil.

The pH is 5 so the farmer adds some powdered limestone (calcium carbonate).

The pH changes to 7.

Why does the pH change?

- A Calcium is a reactive metal.
- B Powdered limestone is a fertiliser.
- C Powdered limestone is an acid.
- D Powdered limestone neutralises acid in the soil.

9 Element X is burnt in oxygen.

A solid oxide is produced which dissolves in water to form a solution of pH 13.

What is X?

- A carbon
- B phosphorus
- C sodium
- D sulfur

10 Which gas turns damp red litmus paper blue?

- A ammonia
- B chlorine
- C hydrogen
- D sulfur dioxide

11 X is an element in group VII.

What are the properties of element X?

	formula of element	state at room temperature	colour
<b>A</b>	X	liquid	black
<b>B</b>	X	liquid	white
<b>C</b>	X <sub>2</sub>	solid	black
<b>D</b>	X <sub>2</sub>	solid	white

12 Element Y is a transition element.

Which row in the table describes element Y?

	forms coloured compounds	high density
<b>A</b>	yes	yes
<b>B</b>	no	no
<b>C</b>	no	yes
<b>D</b>	yes	no

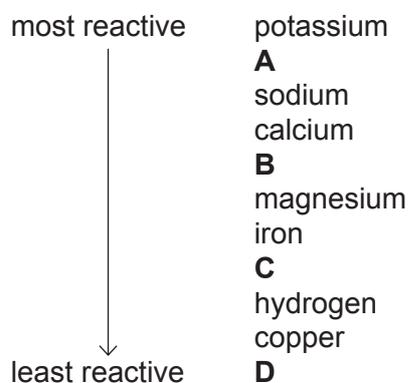
13 What method is used to extract aluminium from its ore?

- A electrolysis
- B filtration
- C fractional distillation
- D heating with carbon

14 Metal M reacts with hydrochloric acid.

Metal M is extracted from its ores by heating with carbon.

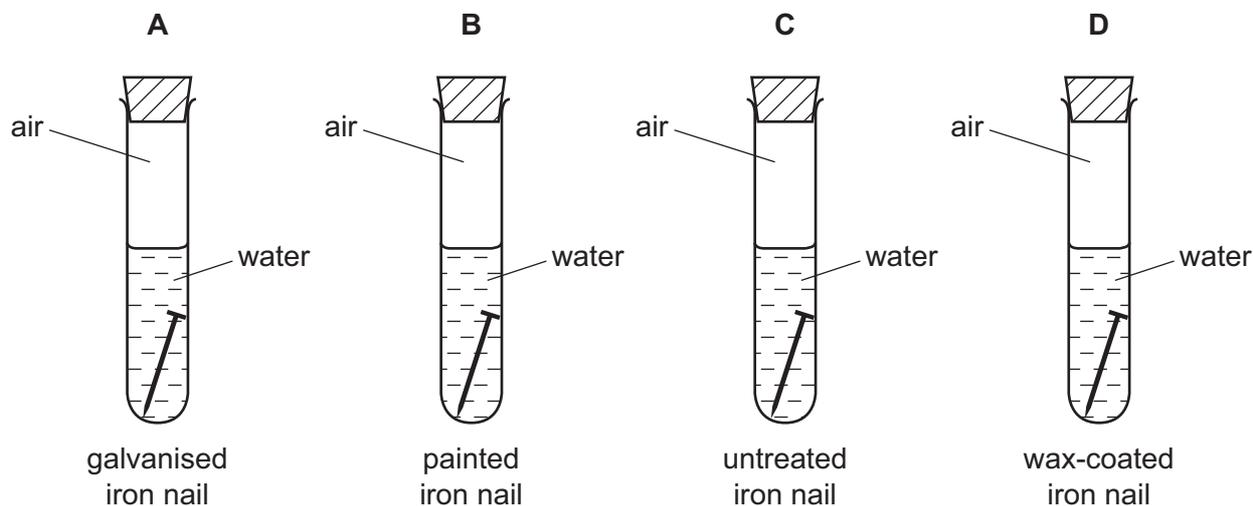
In which position in the reactivity series is M found?



15 Which colour change is observed when water is added to anhydrous copper(II) sulfate?

- A blue to pink
- B blue to white
- C pink to blue
- D white to blue

16 In which tube does the iron nail rust most quickly?



17 Which products are formed when limestone is heated?

- A carbon dioxide and calcium oxide
- B carbon dioxide and calcium hydroxide
- C calcium oxide and oxygen
- D calcium oxide and calcium hydroxide

18 Which row in the table shows the correct uses of the fractions obtained from petroleum?

	petrol	refinery gases	naphtha
<b>A</b>	fuel for cars	fuel for cooking	making chemicals
<b>B</b>	fuel for cars	fuel for diesel engines	fuel for cooking
<b>C</b>	fuel for diesel engines	fuel for cooking	making chemicals
<b>D</b>	fuel for diesel engines	fuel for cars	fuel for cooking

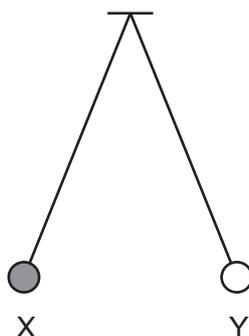
19 Which statement about ethene is **not** correct?

- A It contains a double bond.
- B It is a hydrocarbon.
- C It is saturated.
- D It will decolourise bromine water.

20 Which statement about ethanol is correct?

- A It is used as an inert atmosphere.
- B It is used as a solvent.
- C It is used to extract metals.
- D It is used to treat acid soil.

21 A pendulum swings between point X and point Y.



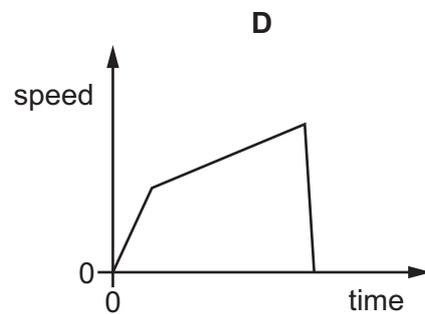
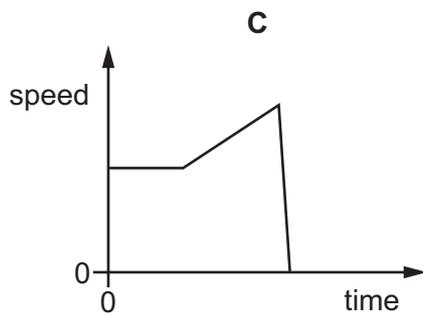
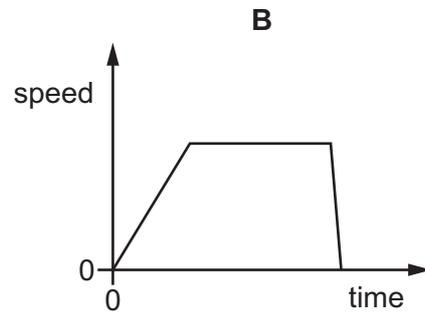
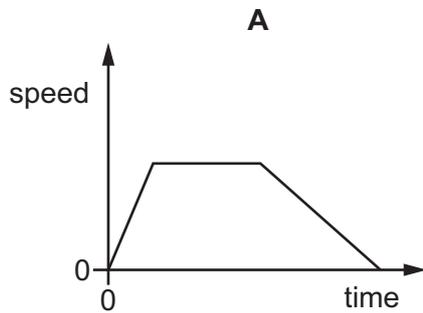
A student wishes to measure the period of the pendulum.

Which method produces the most accurate value for the period?

- A measure the time for the pendulum to move from X to Y once
- B measure the time for the pendulum to move from X to Y ten times and divide this time by ten
- C measure the time for the pendulum to move from X to Y and back to X once
- D measure the time for the pendulum to move from X to Y and back to X ten times and divide this time by ten

- 22 A car accelerates uniformly from rest. It then travels at constant speed for a certain time and finally it stops suddenly.

Which diagram represents the speed-time graph for the motion of the car?



- 23 Which property of a body is measured in newtons?

- A energy
- B power
- C volume
- D weight

- 24 What quantity does the area under a speed-time graph represent?

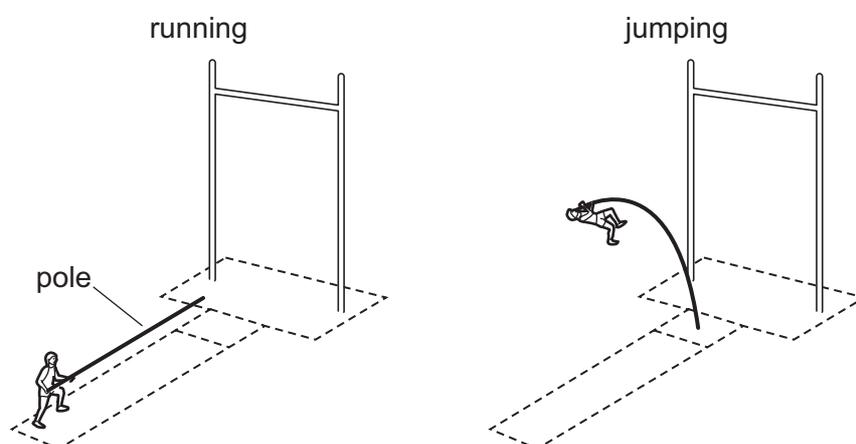
- A acceleration
- B average velocity
- C distance travelled
- D initial velocity

- 25 An astronaut in an orbiting spacecraft experiences a force due to gravity. This force is less than when she is on the Earth's surface.

Compared with being on the Earth's surface, how do her mass and her weight change, if at all, when she is in orbit?

	mass in orbit	weight in orbit
<b>A</b>	decreased	decreased
<b>B</b>	decreased	unchanged
<b>C</b>	unchanged	decreased
<b>D</b>	unchanged	unchanged

- 26 A pole-vaulter runs up to a jump with his pole straight. He puts one end of the pole down on the ground and the pole bends as he jumps.



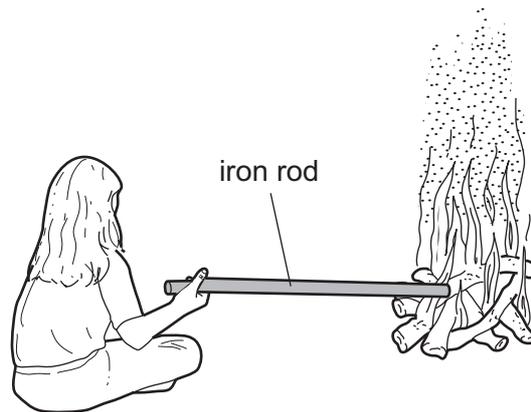
Which form of energy is stored in the pole because it is bent?

- A** chemical
  - B** elastic (strain)
  - C** gravitational potential
  - D** motion
- 27 The table lists the melting points and the boiling points of four different substances.

Which substance is a gas at 25 °C?

	melting point/°C	boiling point/°C
<b>A</b>	-219	-183
<b>B</b>	-7	58
<b>C</b>	98	890
<b>D</b>	1083	2582

28 A girl sits by a camp fire. She holds an iron rod with one end in the fire.

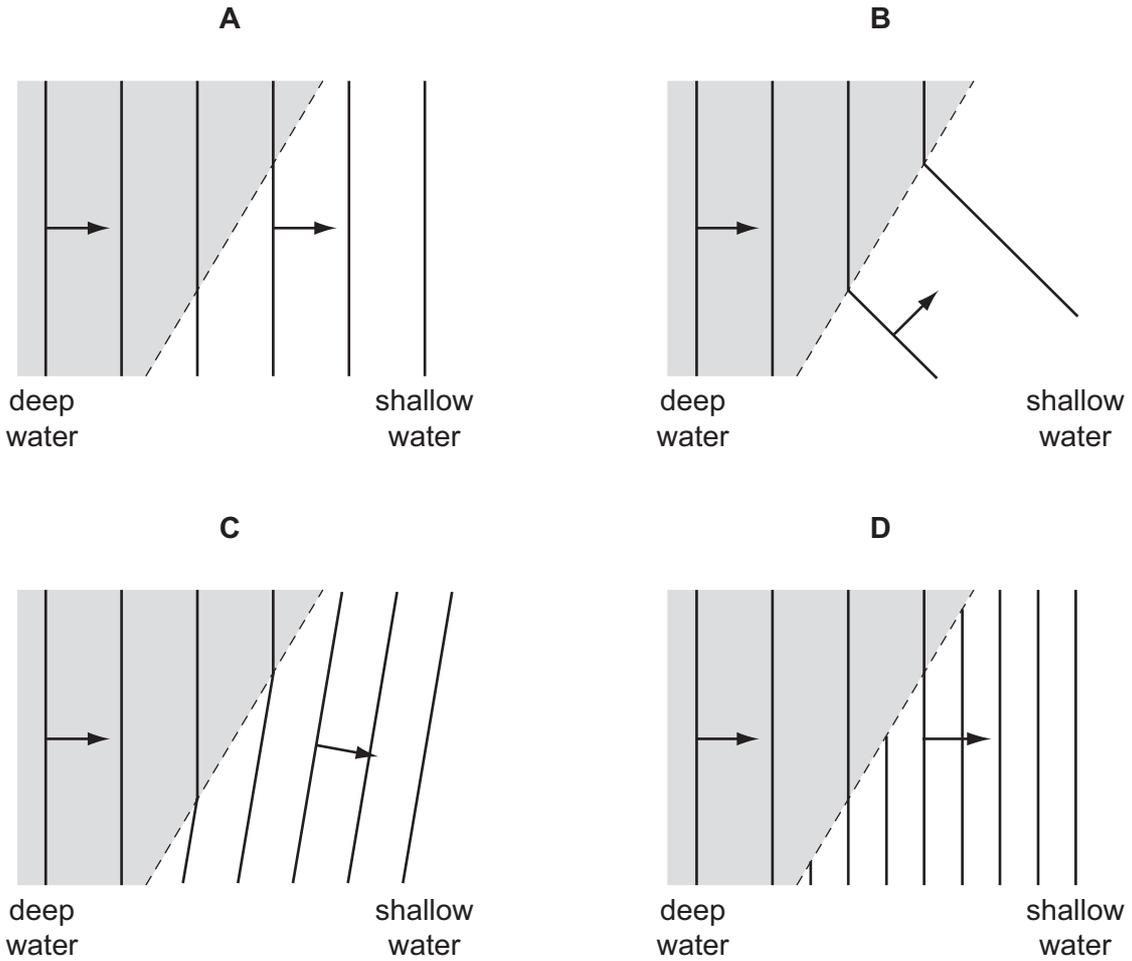


Heat from the fire reaches her hand.

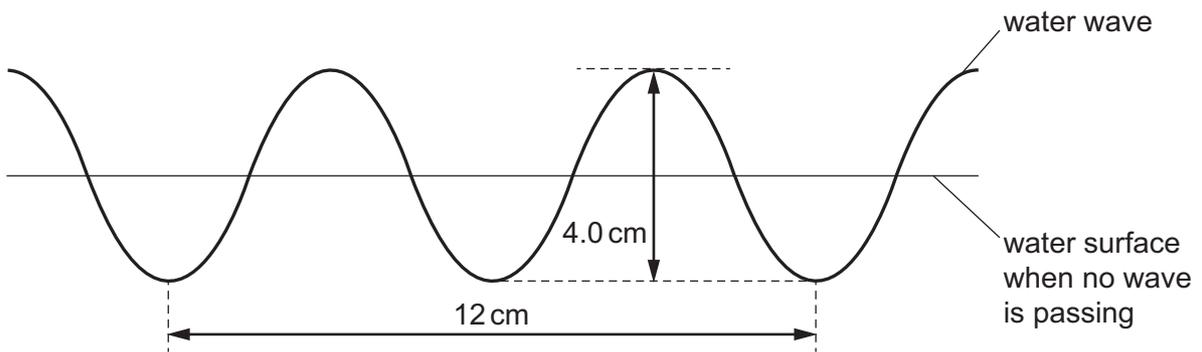
How does heat from the fire reach her hand?

- A conduction, convection and radiation
- B conduction and convection
- C conduction and radiation
- D convection and radiation

29 Which diagram shows what happens to water waves when they pass from deep to shallow water?



30 The diagram shows a water wave. The horizontal line represents the surface of the water when no wave is passing.



Which statement about the wave is correct?

- A The amplitude of the wave is 2.0 cm.
- B The amplitude of the wave is 4.0 cm.
- C The wavelength of the wave is 3.0 cm.
- D The wavelength of the wave is 12 cm.

- 31 The diagram shows the electromagnetic spectrum. Three sections have been labelled with their names.

Where should the label for infra-red be placed?

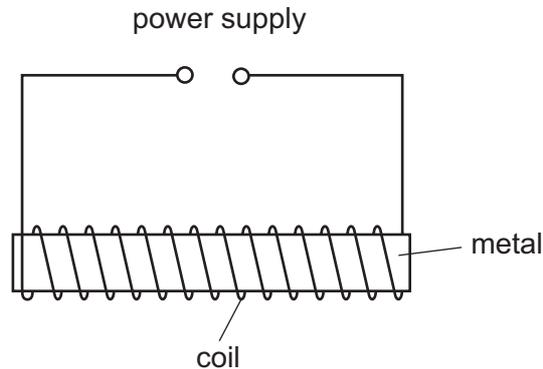
<b>A</b>	microwaves	<b>B</b>	visible light	<b>C</b>	<b>D</b>	gamma-rays
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- 32 A loudspeaker produces waves with the following frequencies.

5 Hz                      500 Hz                      5000 Hz                      50 000 Hz

Which frequencies can be heard by a person with normal hearing?

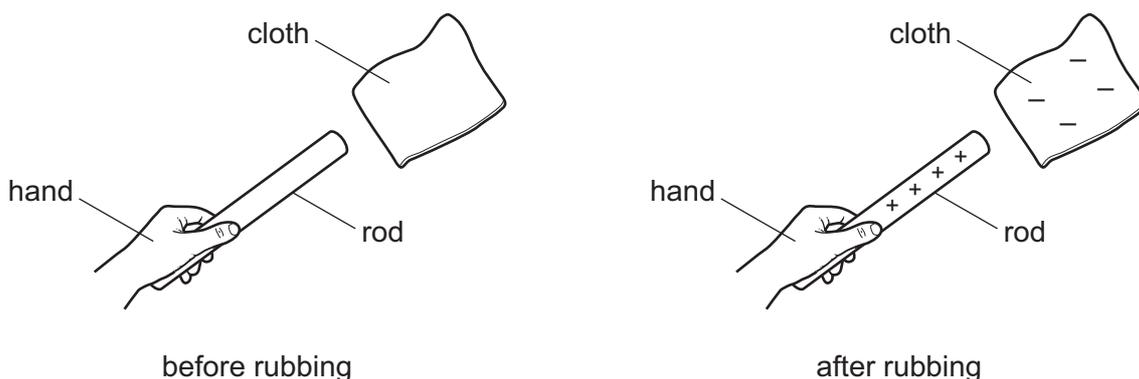
- A** 5 Hz and 50 000 Hz only  
**B** 5 Hz and 5000 Hz only  
**C** 500 Hz and 50 000 Hz only  
**D** 500 Hz and 5000 Hz only
- 33 The diagram shows apparatus that is used to make a permanent magnet.



Which metal and which power supply are normally used to make a permanent magnet?

	metal	power supply
<b>A</b>	iron	a.c.
<b>B</b>	iron	d.c.
<b>C</b>	steel	a.c.
<b>D</b>	steel	d.c.

- 34 A student holds a rod in her hand. She rubs the rod with a cloth. The rod becomes positively charged, and the cloth becomes negatively charged.



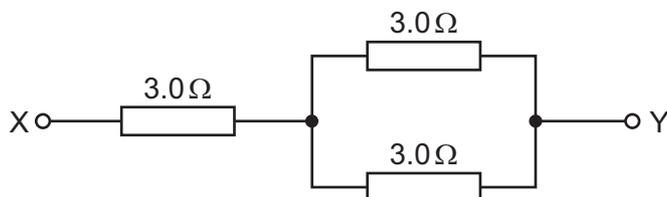
Which row shows whether the rod is an insulator or a conductor, and which particles move while the rod is rubbed with the cloth?

	rod	charges that move
<b>A</b>	conductor	electrons
<b>B</b>	conductor	protons
<b>C</b>	insulator	electrons
<b>D</b>	insulator	protons

- 35 Which row gives the unit for current and the unit for electromotive force (e.m.f.)?

	current	e.m.f.
<b>A</b>	ampere	newton
<b>B</b>	ampere	volt
<b>C</b>	volt	ampere
<b>D</b>	volt	newton

- 36 Three  $3.0\ \Omega$  resistors are connected between point X and point Y, as shown.



What is the resistance between point X and point Y?

- A**  $3.0\ \Omega$
- B** between  $3.0\ \Omega$  and  $6.0\ \Omega$
- C** between  $6.0\ \Omega$  and  $9.0\ \Omega$
- D**  $9.0\ \Omega$

37 Domestic appliances use electricity in a variety of ways.

Which electrical appliance includes both an electric motor and a heater?

- A hairdryer
- B iron
- C kettle
- D vacuum cleaner

38 Electric sockets and wall switches should not be fitted in rooms with a hot shower.

Why is this?

- A In a steamy atmosphere you may not be able to see a switch.
- B The switch contacts might become rusty and not work.
- C The warmth of the atmosphere might damage the switch insulation.
- D Water conducts electricity, so a damp switch may be 'live' if touched.

39 What is a beta-particle and from which part of a radioactive atom is it emitted?

	beta-particle	emitted from
A	electron	nucleus
B	electron	outer shell
C	helium nucleus	nucleus
D	helium nucleus	outer shell

40 Two atoms are different isotopes of the same element.

Which statement about these atoms is correct?

- A They have different numbers of electrons.
- B They have different numbers of neutrons.
- C They have different numbers of protons.
- D They have the same number of nucleons.



## The Periodic Table of Elements

Group																							
I	II											III	IV	V	VI	VII	VIII						
												1 <b>H</b> hydrogen 1											2 <b>He</b> helium 4
												<b>Key</b> atomic number atomic symbol name relative atomic mass						5 <b>B</b> boron 11	6 <b>C</b> carbon 12	7 <b>N</b> nitrogen 14	8 <b>O</b> oxygen 16	9 <b>F</b> fluorine 19	10 <b>Ne</b> neon 20
3 <b>Li</b> lithium 7	4 <b>Be</b> beryllium 9											13 <b>Al</b> aluminium 27	14 <b>Si</b> silicon 28	15 <b>P</b> phosphorus 31	16 <b>S</b> sulfur 32	17 <b>Cl</b> chlorine 35.5	18 <b>Ar</b> argon 40						
19 <b>K</b> potassium 39	20 <b>Ca</b> calcium 40	21 <b>Sc</b> scandium 45	22 <b>Ti</b> titanium 48	23 <b>V</b> vanadium 51	24 <b>Cr</b> chromium 52	25 <b>Mn</b> manganese 55	26 <b>Fe</b> iron 56	27 <b>Co</b> cobalt 59	28 <b>Ni</b> nickel 59	29 <b>Cu</b> copper 64	30 <b>Zn</b> zinc 65	31 <b>Ga</b> gallium 70	32 <b>Ge</b> germanium 73	33 <b>As</b> arsenic 75	34 <b>Se</b> selenium 79	35 <b>Br</b> bromine 80	36 <b>Kr</b> krypton 84						
37 <b>Rb</b> rubidium 85	38 <b>Sr</b> strontium 88	39 <b>Y</b> yttrium 89	40 <b>Zr</b> zirconium 91	41 <b>Nb</b> niobium 93	42 <b>Mo</b> molybdenum 96	43 <b>Tc</b> technetium –	44 <b>Ru</b> ruthenium 101	45 <b>Rh</b> rhodium 103	46 <b>Pd</b> palladium 106	47 <b>Ag</b> silver 108	48 <b>Cd</b> cadmium 112	49 <b>In</b> indium 115	50 <b>Sn</b> tin 119	51 <b>Sb</b> antimony 122	52 <b>Te</b> tellurium 128	53 <b>I</b> iodine 127	54 <b>Xe</b> xenon 131						
55 <b>Cs</b> caesium 133	56 <b>Ba</b> barium 137	57–71 lanthanoids	72 <b>Hf</b> hafnium 178	73 <b>Ta</b> tantalum 181	74 <b>W</b> tungsten 184	75 <b>Re</b> rhenium 186	76 <b>Os</b> osmium 190	77 <b>Ir</b> iridium 192	78 <b>Pt</b> platinum 195	79 <b>Au</b> gold 197	80 <b>Hg</b> mercury 201	81 <b>Tl</b> thallium 204	82 <b>Pb</b> lead 207	83 <b>Bi</b> bismuth 209	84 <b>Po</b> polonium –	85 <b>At</b> astatine –	86 <b>Rn</b> radon –						
87 <b>Fr</b> francium –	88 <b>Ra</b> radium –	89–103 actinoids	104 <b>Rf</b> rutherfordium –	105 <b>Db</b> dubnium –	106 <b>Sg</b> seaborgium –	107 <b>Bh</b> bohrium –	108 <b>Hs</b> hassium –	109 <b>Mt</b> meitnerium –	110 <b>Ds</b> darmstadtium –	111 <b>Rg</b> roentgenium –	112 <b>Cn</b> copernicium –		114 <b>Fl</b> flerovium –		116 <b>Lv</b> livermorium –								

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

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

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