



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.

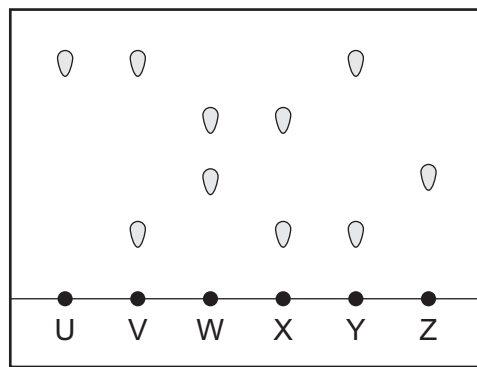
Any rough working should be done in this booklet.

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

Electronic calculators may be used.

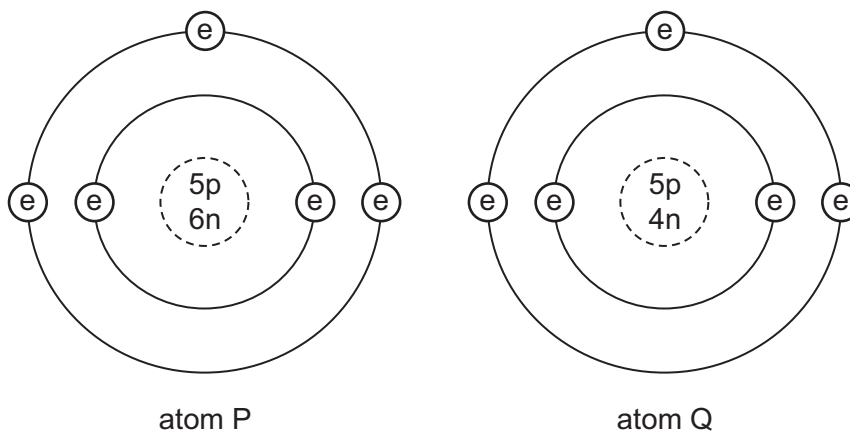
This document consists of **15** printed pages and **1** blank page.

- 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.



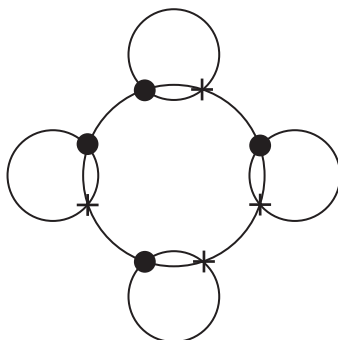
key

e = electron
n = neutron
p = proton

Which statement is **not** correct?

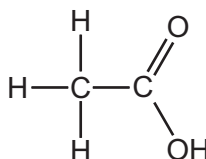
- A Atoms P and Q are isotopes of the same element.
- B Atom P has the electronic configuration 2,3.
- C Atom Q is boron.
- D The nucleon number of atom P is 9.

- 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 C₂H₄O₂
 - C CH₃CO₂
 - D C₂H₃O₂
- 5 Hydrochloric acid reacts with sodium carbonate.

The word equation is:

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

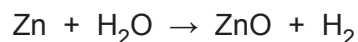
What is the correct balanced equation for this reaction?

- 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 |
|----------|--------------------|---------------------------|--------|
| A | X | liquid | black |
| B | X | liquid | white |
| C | X ₂ | solid | black |
| D | X ₂ | solid | white |

12 Element Y is a transition element.

Which row in the table describes element Y?

| | forms coloured compounds | high density |
|----------|--------------------------|--------------|
| A | yes | yes |
| B | no | no |
| C | no | yes |
| D | yes | no |

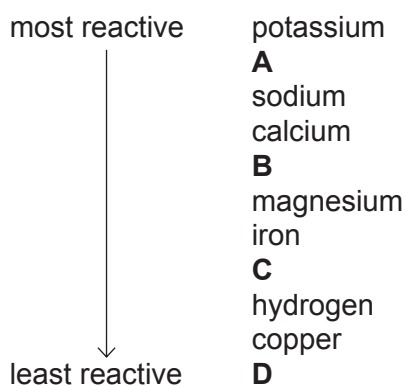
13 What method is used to extract aluminium from its ore?

- 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.

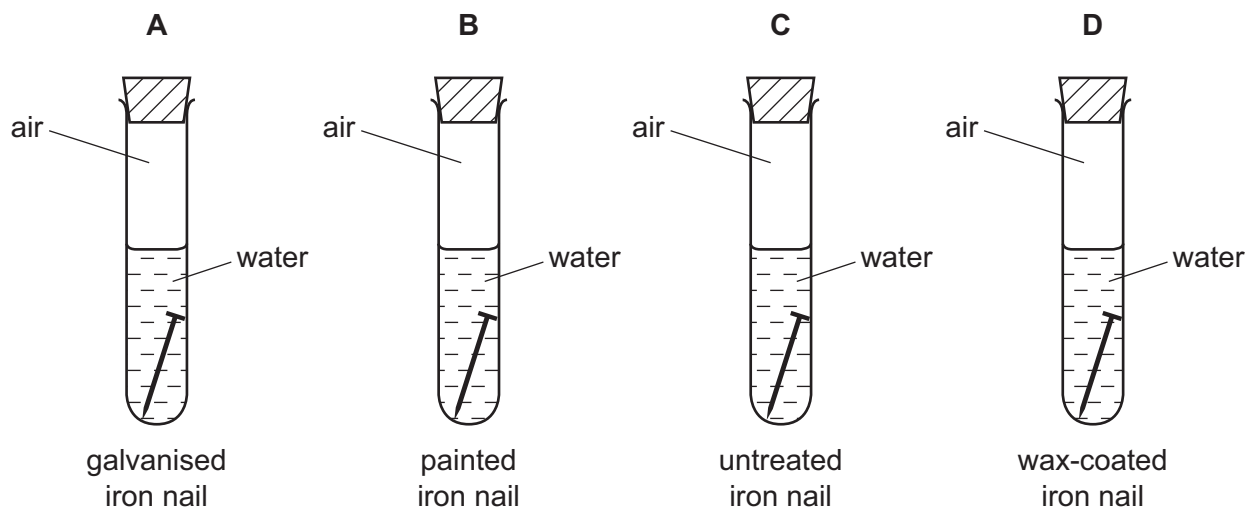
In which position in the reactivity series is M found?



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 |
|----------|-------------------------|-------------------------|------------------|
| A | fuel for cars | fuel for cooking | making chemicals |
| B | fuel for cars | fuel for diesel engines | fuel for cooking |
| C | fuel for diesel engines | fuel for cooking | making chemicals |
| D | fuel for diesel engines | fuel for cars | fuel for cooking |

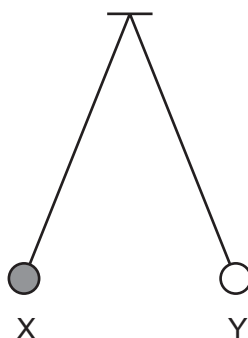
19 Which statement about ethene is **not** correct?

- 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.



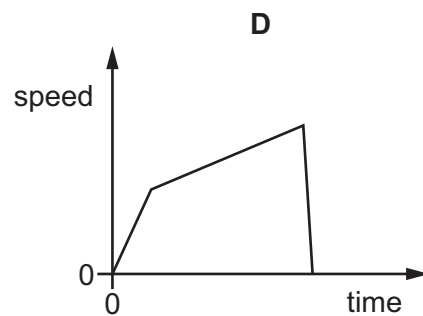
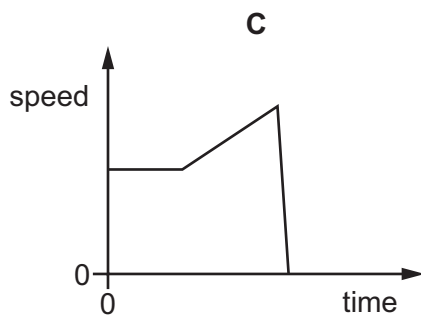
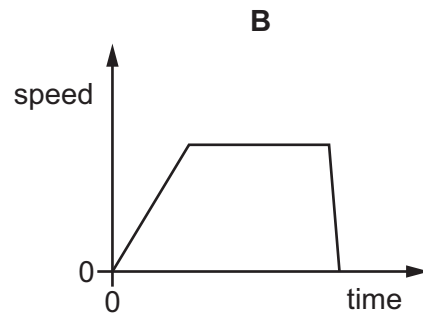
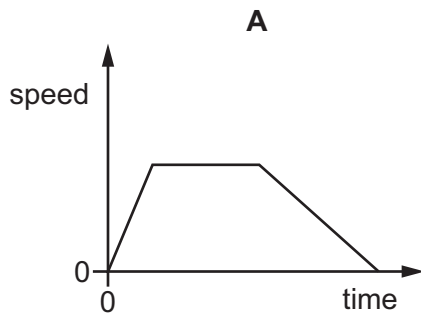
A student wishes to measure the period of the pendulum.

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?

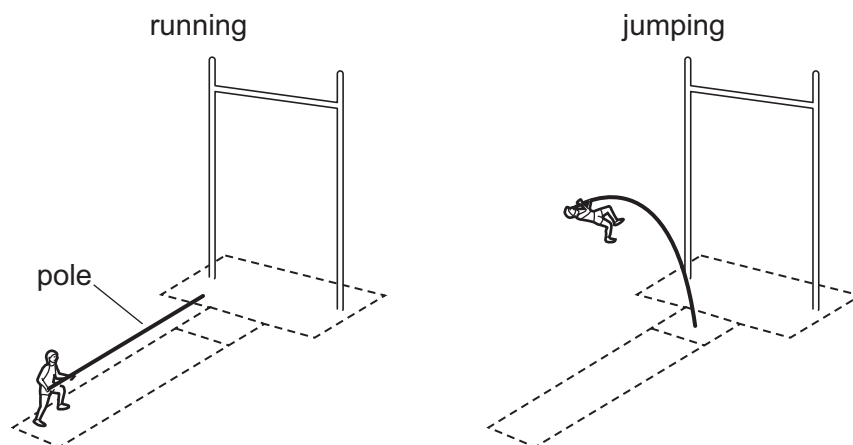
- A acceleration
- B average velocity
- C distance travelled
- D initial velocity

- 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 |
|----------|---------------|-----------------|
| A | decreased | decreased |
| B | decreased | unchanged |
| C | unchanged | decreased |
| D | 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.



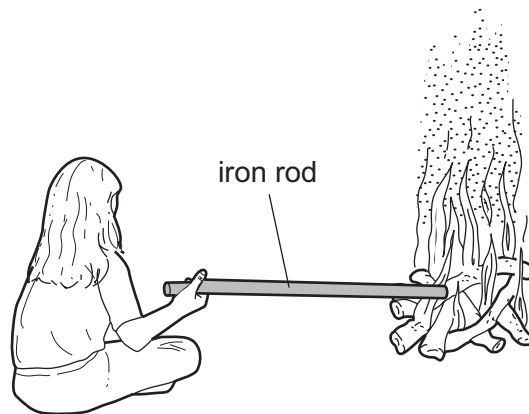
Which form of energy is stored in the pole because it is bent?

- 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 |
|----------|------------------|------------------|
| A | -219 | -183 |
| B | -7 | 58 |
| C | 98 | 890 |
| D | 1083 | 2582 |

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

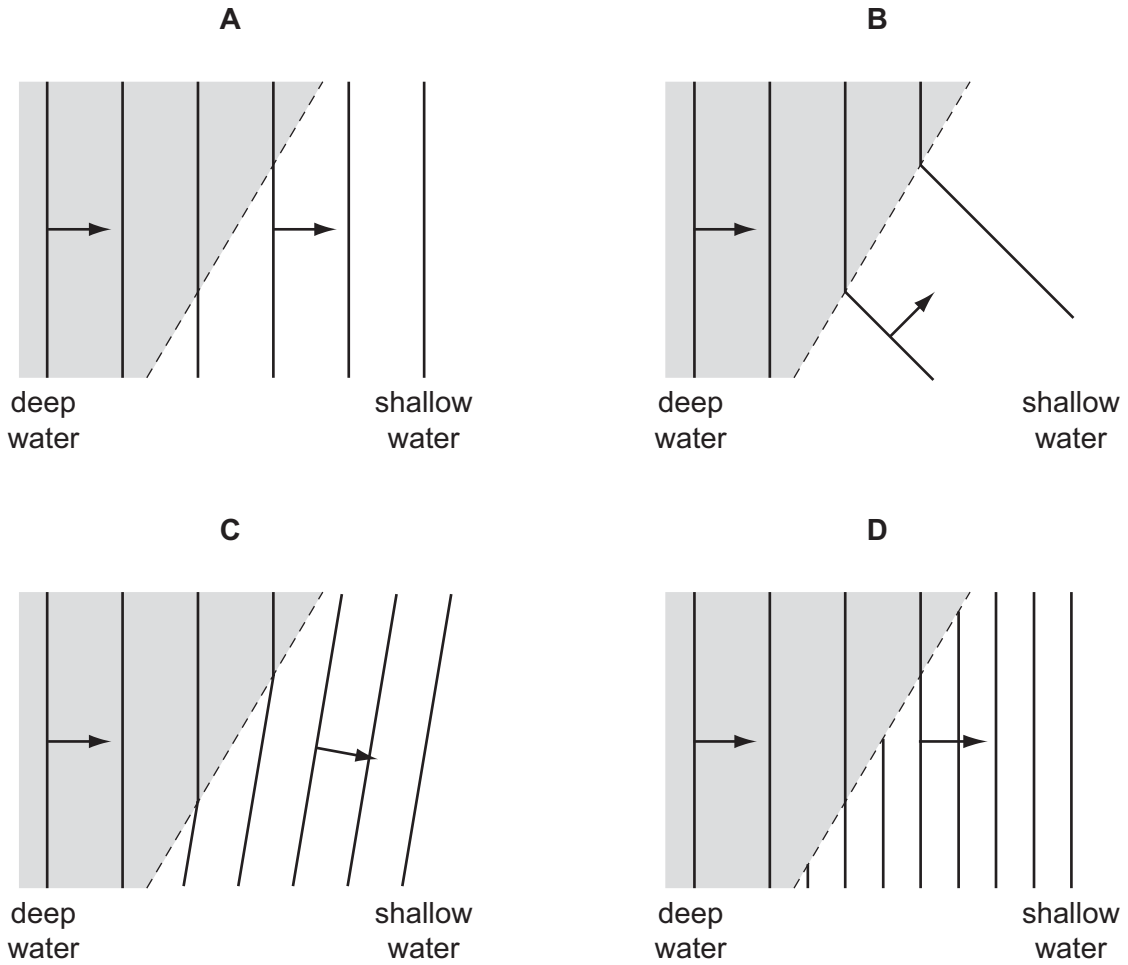


Heat from the fire reaches her hand.

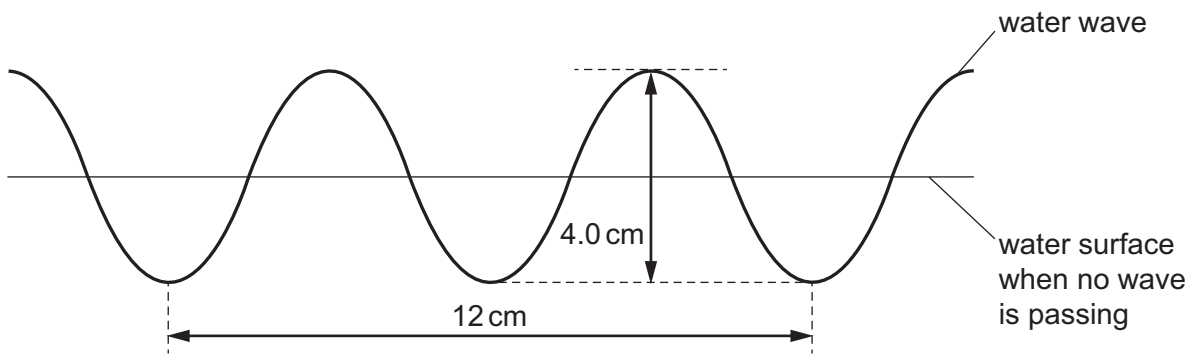
How does heat from the fire reach her hand?

- 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?

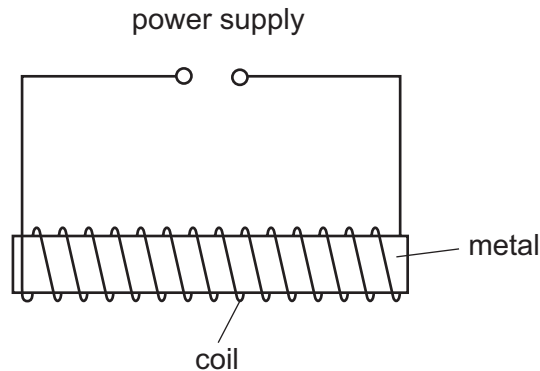
| | | | | | | |
|----------|------------|----------|---------------|----------|----------|------------|
| A | microwaves | B | visible light | C | D | gamma-rays |
|----------|------------|----------|---------------|----------|----------|------------|

- 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?

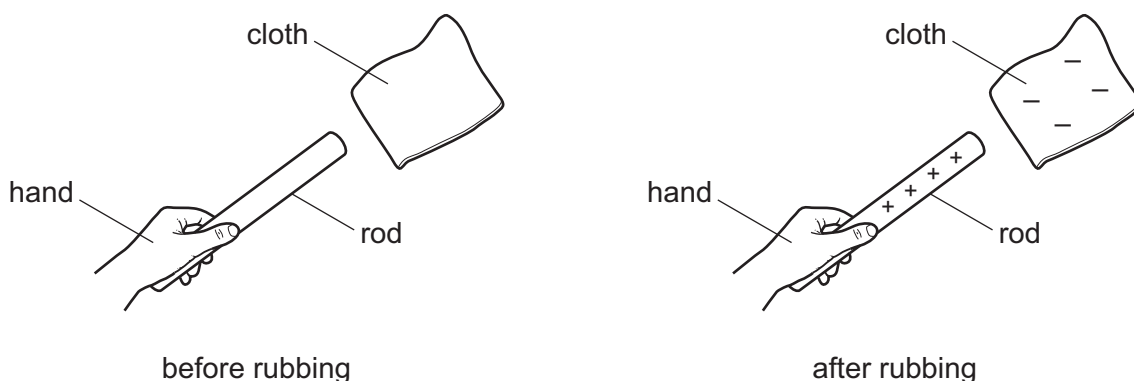
- A** 5 Hz and 50 000 Hz only
B 5 Hz and 5000 Hz only
C 500 Hz and 50 000 Hz only
D 500 Hz and 5000 Hz only
- 33 The diagram shows apparatus that is used to make a permanent magnet.



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

| | metal | power supply |
|----------|-------|--------------|
| A | iron | a.c. |
| B | iron | d.c. |
| C | steel | a.c. |
| D | 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.



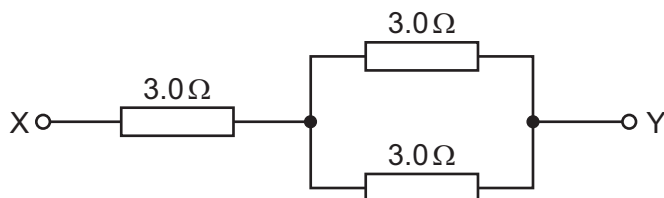
Which row shows whether the rod is an insulator or a conductor, and which particles move while the rod is rubbed with the cloth?

| | rod | charges that move |
|----------|-----------|-------------------|
| A | conductor | electrons |
| B | conductor | protons |
| C | insulator | electrons |
| D | insulator | protons |

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

| | current | e.m.f. |
|----------|---------|--------|
| A | ampere | newton |
| B | ampere | volt |
| C | volt | ampere |
| D | volt | newton |

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



What is the resistance between point X and point Y?

- A** 3.0Ω
- B** between 3.0Ω and 6.0Ω
- C** between 6.0Ω and 9.0Ω
- D** 9.0Ω

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 H hydrogen 1 | | | | | | | | | | | 2 He helium 4 |
| | | | | | | | | | | | | Key atomic number atomic symbol name relative atomic mass | | | | | | 5 B boron 11 | 6 C carbon 12 | 7 N nitrogen 14 | 8 O oxygen 16 | 9 F fluorine 19 | 10 Ne neon 20 |
| 3 Li lithium 7 | 4 Be beryllium 9 | | | | | | | | | | | 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 – | | | 114 Fl flerovium – | | | 116 Lv livermorium – | | | | | | |

| | | | | | | | | | | | | | | | |
|-------------|-------------------------------------|-----------------------------------|--|-------------------------------------|------------------------------------|------------------------------------|------------------------------------|--------------------------------------|-----------------------------------|--------------------------------------|-------------------------------------|----------------------------------|--------------------------------------|-------------------------------------|-------------------------------------|
| 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 dm³ at room temperature and pressure (r.t.p.).

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