



**Cambridge Assessment International Education**  
Cambridge International General Certificate of Secondary Education

**CO-ORDINATED SCIENCES**

**0654/11**

Paper 1 Multiple Choice (Core)

**October/November 2019**

**45 minutes**

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

\* 2 6 3 5 1 9 9 5 5 0 \*

**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.

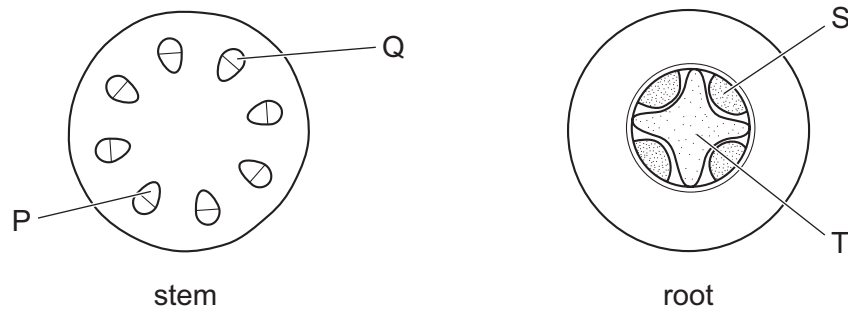
A copy of the Periodic Table is printed on page 16.

Electronic calculators may be used.

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

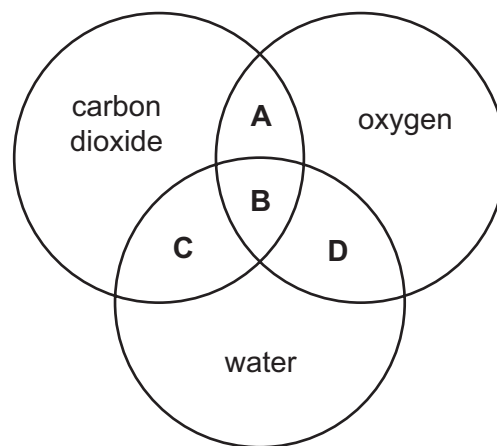
- 1 Which process do all living organisms carry out?
- A asexual reproduction
  - B excretion
  - C ingestion
  - D photosynthesis
- 2 Which statement about animal cells and plant cells is correct?
- A Only animal cells possess cell membranes.
  - B Only animal cells possess cell walls.
  - C Only plant cells possess cell membranes.
  - D Only plant cells possess cell walls.
- 3 Which result with the biuret test shows that protein is present?
- A blue
  - B green
  - C orange
  - D purple
- 4 Which statements are correct for all enzymes?
- 1 They are proteins.
  - 2 They are unaffected by temperature.
  - 3 They speed up chemical reactions.
  - 4 They work best at a high pH.
- A 1, 2 and 4    B 1, 3 and 4    C 1 and 3 only    D 2 and 4 only
- 5 What is the word equation for photosynthesis?
- A carbon dioxide + glucose → oxygen + water
  - B carbon dioxide + water → oxygen + glucose
  - C oxygen + glucose → carbon dioxide + water
  - D oxygen + water → carbon dioxide + glucose

- 6 Which process can be defined as the movement of small, water-soluble food molecules through the wall of the intestine into the blood?
- A absorption  
 B assimilation  
 C digestion  
 D egestion
- 7 The diagrams show sections through a stem and a root.



Which indicate the positions of the xylem?

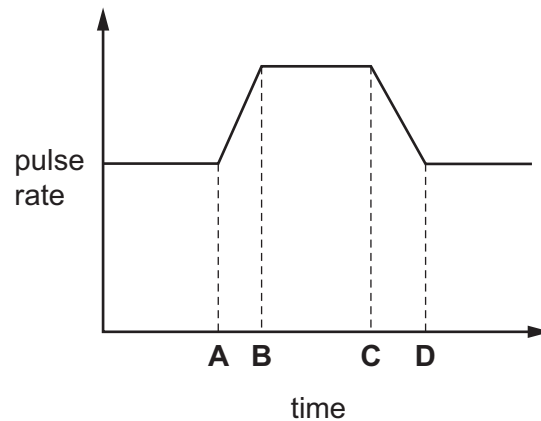
- A P and S      B P and T      C Q and S      D Q and T
- 8 Which area represents the substances produced in aerobic respiration?



4

9 The graph shows the pulse rate over a period of time.

At which point was adrenaline released into the blood?

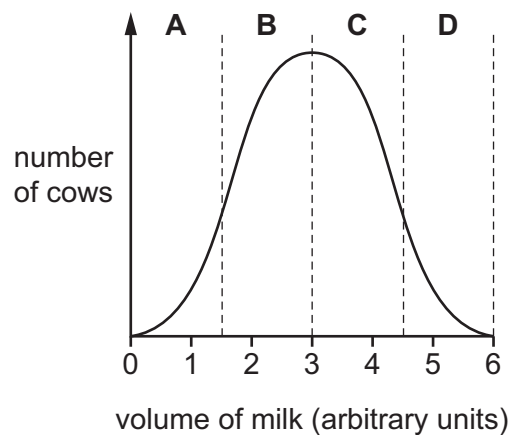


10 Which row is correct about human gametes?

	site of female gamete production	site of male gamete production
<b>A</b>	ovaries	sperm ducts
<b>B</b>	ovaries	testes
<b>C</b>	oviduct	sperm ducts
<b>D</b>	oviduct	testes

11 The graph shows the number of cows producing different volumes of milk.

Which group of cows should be used in a programme to breed more cows with the highest milk yield?



12 The diagram shows a food chain.

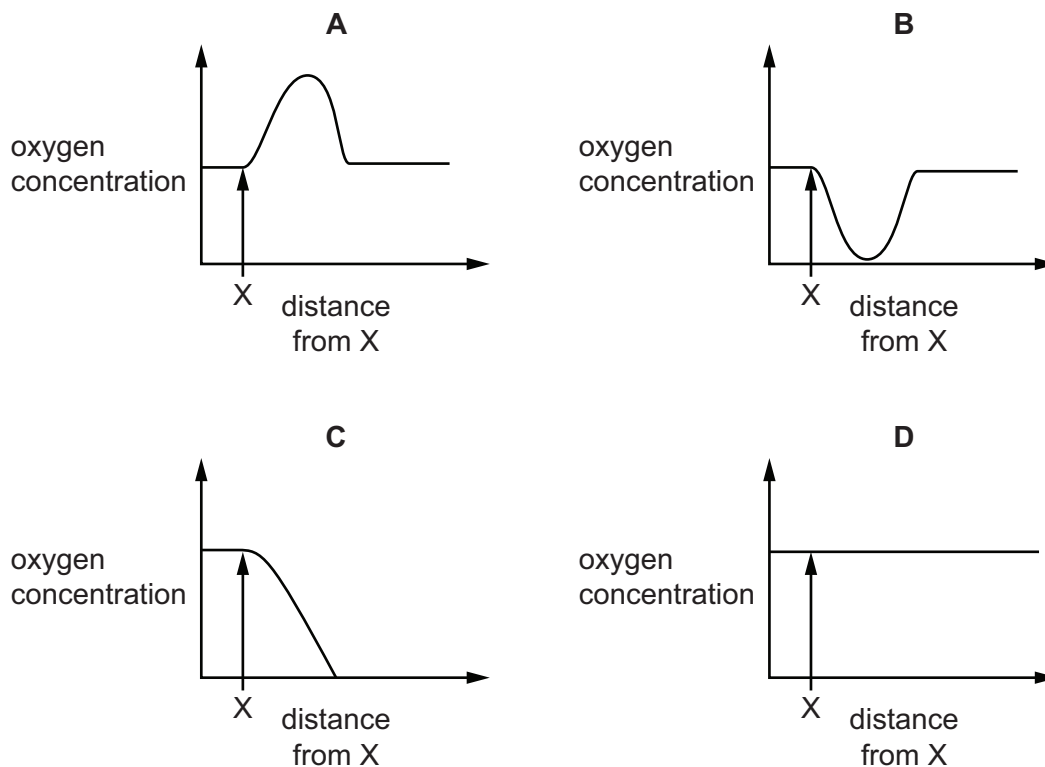
grass → grasshopper → frog → snake → buzzard

Which is correct?

- A The buzzard is a producer.
- B The frog is a primary consumer.
- C The grasshopper is a secondary consumer.
- D The snake is a tertiary consumer.

13 Untreated sewage is released into a river at point X.

Which graph correctly shows changes in oxygen concentration of the water as the river flows away from X?



14 Which statement describes the arrangement of particles in a solid?

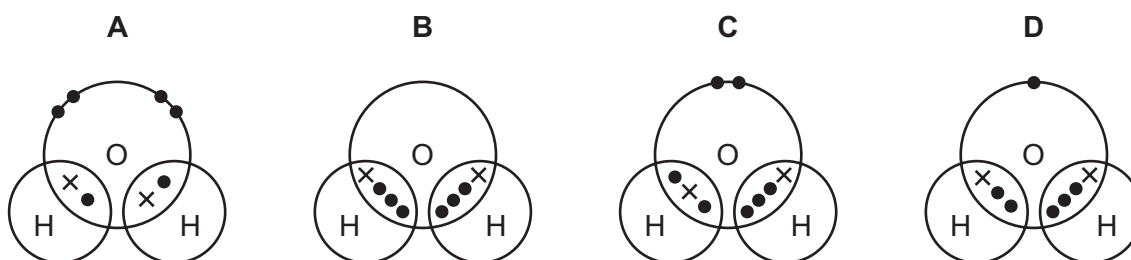
- A The particles are close together and move randomly.
- B The particles are close together and vibrate about a fixed point.
- C The particles are far apart and move randomly.
- D The particles are far apart and vibrate about a fixed point.

15 Which processes are chemical changes?

- 1 conversion of steam to liquid water
- 2 cracking of alkanes
- 3 fractional distillation of petroleum
- 4 thermal decomposition of calcium carbonate

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

16 What is the dot-and-cross diagram for a water molecule?



17 Hydrogen peroxide is a compound.

A molecule of hydrogen peroxide can be represented as shown.



key

● = oxygen

○ = hydrogen

What is the formula of hydrogen peroxide?

A HO      B H<sub>2</sub>O<sub>2</sub>      C (OH)<sub>2</sub>      D 2OH

18 Concentrated aqueous sodium chloride is electrolysed using inert electrodes.

Which row identifies the product at each electrode?

	product at anode	product at cathode
<b>A</b>	chlorine	sodium
<b>B</b>	hydrogen	chlorine
<b>C</b>	sodium	chlorine
<b>D</b>	chlorine	hydrogen

19 The table shows the temperature of some water before and after a solid is dissolved in it.

Which change is the most exothermic?

	temperature before /°C	temperature after /°C
<b>A</b>	20	18
<b>B</b>	20	40
<b>C</b>	25	18
<b>D</b>	25	42

20 Hydrogen peroxide decomposes very slowly.

When element X is added, hydrogen peroxide decomposes much faster.

Element X is unchanged at the end of this reaction.

What is element X?

I	II		III	IV	V	VI	VII	0
								<b>B</b>
							<b>C</b>	
<b>A</b>								
				<b>D</b>				

21 The pH values of four liquids are 1, 4, 7 and 13.

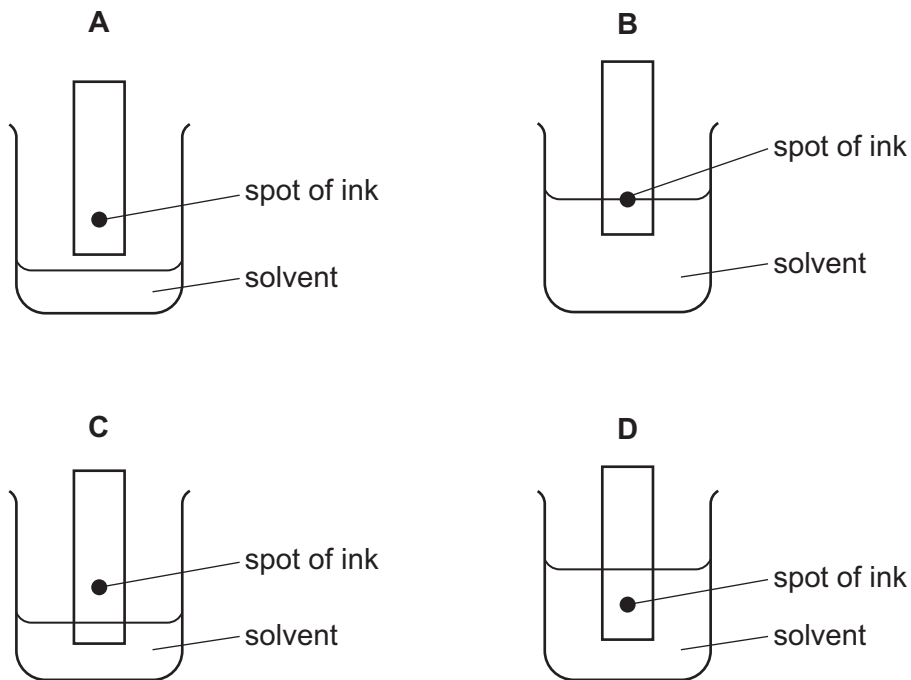
The four liquids are distilled water, nitric acid, potassium hydroxide and vinegar.

Which row shows the pH values of the liquids?

	distilled water	nitric acid	potassium hydroxide	vinegar
<b>A</b>	4	7	13	1
<b>B</b>	4	13	7	1
<b>C</b>	7	1	4	13
<b>D</b>	7	1	13	4

22 The colours in an ink can be separated by chromatography.

Which diagram shows the correct way to set up the apparatus?



23 Which statement about the Periodic Table is correct?

- A Elements are listed in order of neutron number.
- B Elements are listed in order of nucleon number.
- C Elements are listed in order of proton number.
- D Elements are listed in order of relative atomic mass.

24 Four properties of metals are listed.

- 1 high melting point
- 2 low density
- 3 resistance to corrosion
- 4 conducts electricity

Which properties make aluminium suitable for use in cans containing drinks?

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



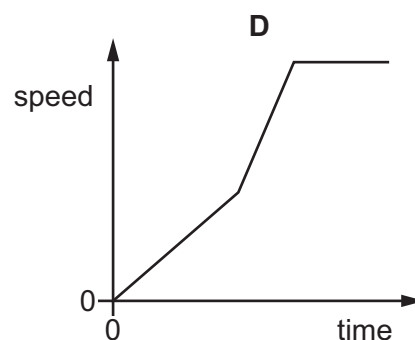
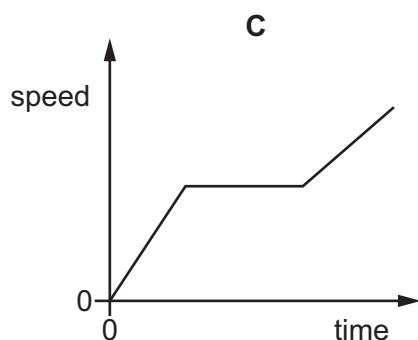
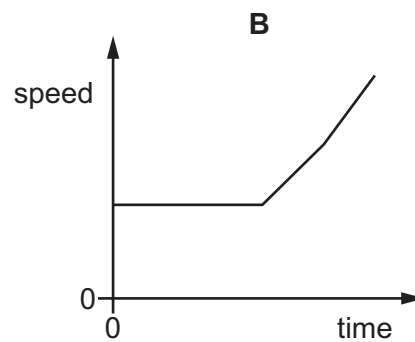
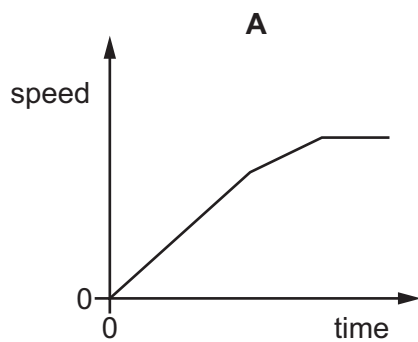
- 25 Which three elements are needed in fertilisers to help plants grow?
- A nitrogen, phosphorus, potassium
  - B nitrogen, phosphorus, sodium
  - C nitrogen, sodium, potassium
  - D sodium, phosphorus, potassium
- 26 Which statement about the manufacture of lime from limestone is **not** correct?
- A A high pressure is used.
  - B A high temperature is used.
  - C Carbon dioxide is produced.
  - D Thermal decomposition occurs.
- 27 Petroleum is separated into useful fractions by fractional distillation.

Which row matches the fractions to their uses?

	fuel	heating and cooking	making chemicals
A	bitumen	naphtha	refinery gas
B	gasoline	bitumen	naphtha
C	gasoline	refinery gas	naphtha
D	naphtha	refinery gas	gasoline

28 The speed-time graphs represent the motion of a car moving in a straight line.

Which graph represents the car moving first with a constant acceleration, then with a larger constant acceleration and then with a constant speed?



29 An object has a mass of 20 kg and a density of  $8400 \text{ kg/m}^3$ .

What is the volume of the object?

- A**  $2.4 \times 10^{-3} \text{ m}^3$
- B**  $4.2 \times 10^2 \text{ m}^3$
- C**  $1.6 \times 10^5 \text{ m}^3$
- D**  $1.7 \times 10^5 \text{ m}^3$

30 An engine is doing work on a car as the car moves along a road.

Which two changes **must** result in less work being done on the car by the engine?

- A** decreasing the engine's force on the car and decreasing the distance moved by the car
- B** decreasing the engine's force on the car and increasing the distance moved by the car
- C** increasing the engine's force on the car and decreasing the distance moved by the car
- D** increasing the engine's force on the car and increasing the distance moved by the car

31 The table shows four sources of energy used to generate electricity.

Which source is shown with a statement of whether it is renewable and whether it is reliable at all times?

	source	renewable	reliable at all times
<b>A</b>	coal	yes	no
<b>B</b>	nuclear fission	no	yes
<b>C</b>	tides	no	no
<b>D</b>	wind	yes	yes

32 The more energetic molecules of a liquid are escaping from its surface, causing the liquid to cool.

What is happening to the liquid?

- A** It is boiling.
- B** It is condensing.
- C** It is evaporating.
- D** It is melting.

33 A substance is a gas when its temperature is  $65^{\circ}\text{C}$ .

How do the boiling point and the melting point of this substance compare with  $65^{\circ}\text{C}$ ?

	boiling point	melting point
<b>A</b>	above $65^{\circ}\text{C}$	above $65^{\circ}\text{C}$
<b>B</b>	above $65^{\circ}\text{C}$	below $65^{\circ}\text{C}$
<b>C</b>	below $65^{\circ}\text{C}$	above $65^{\circ}\text{C}$
<b>D</b>	below $65^{\circ}\text{C}$	below $65^{\circ}\text{C}$

34 Which material is a good thermal conductor?

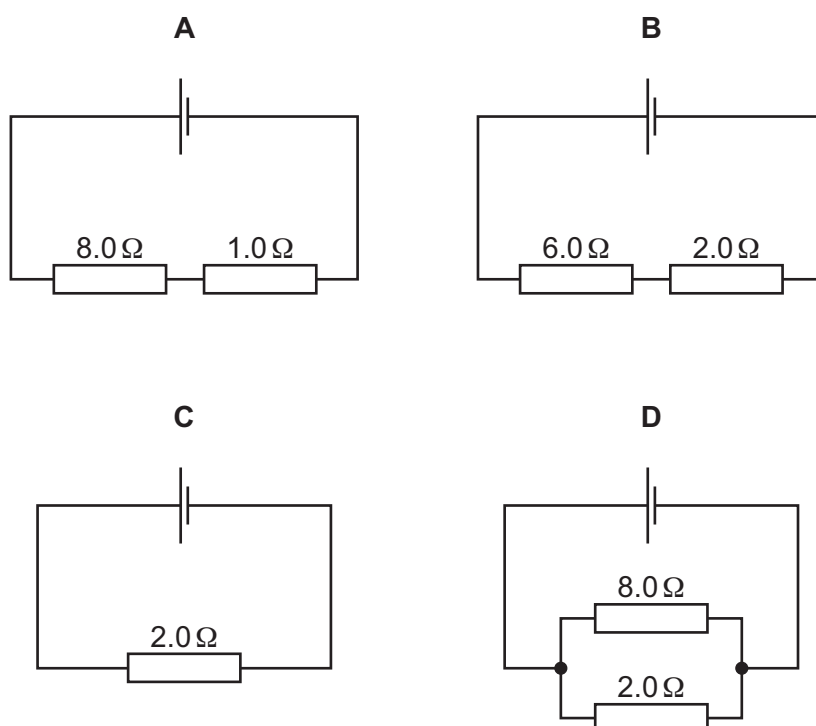
- A** aluminium
- B** cardboard
- C** rubber
- D** wool

35 There is a battery of e.m.f.  $V$  in a circuit of total resistance  $R$ .

Which pair of changes **must** result in a larger current in the circuit?

- A decreasing  $V$  and decreasing  $R$
- B decreasing  $V$  and increasing  $R$
- C increasing  $V$  and decreasing  $R$
- D increasing  $V$  and increasing  $R$

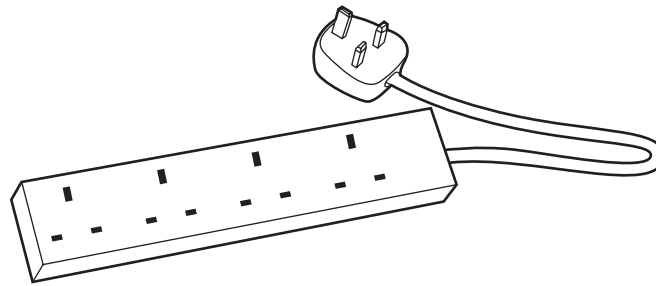
36 Which circuit has the smallest resistance?



37 Which row shows how lamps are connected in a lighting circuit in a house and gives an advantage of connecting them in this way?

	how lamps are connected	advantage of connecting them in this way
<b>A</b>	in parallel	they can be switched separately
<b>B</b>	in parallel	they share the voltage
<b>C</b>	in series	they can be switched separately
<b>D</b>	in series	they share the voltage

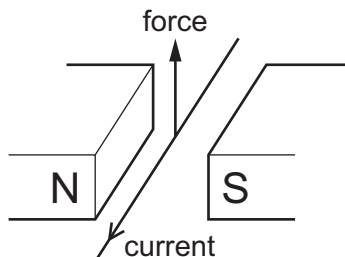
- 38 An electrical extension block has four sockets, a cable which can safely take a current of 6 A and a plug. It is protected by a fuse rated at 5 A.



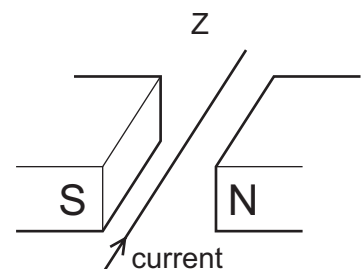
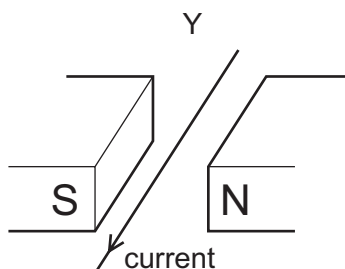
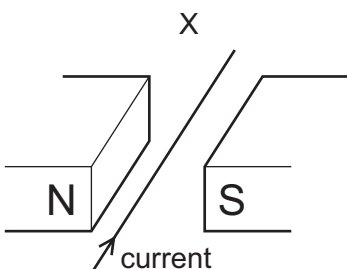
The extension block is used with four appliances and the 5 A fuse blows. The owner replaces the 5 A fuse with a 13 A fuse.

Why is the extension block now dangerous?

- A The appliances may overheat before the fuse blows.  
 B The cable may overheat before the fuse blows.  
 C The sockets may burn out before the fuse blows.  
 D The 13 A fuse may blow too soon.
- 39 A wire is placed between two magnetic poles. There is a current in the wire in the direction shown. The wire experiences an upward force.



There is also a force on the wire in arrangements X, Y and Z.



In which of the arrangements is the force upwards?

- A X only      B X and Y only      C Z only      D X, Y and Z

40 Which type of radiation has the greatest ionising effect, and which is the most penetrating?

	greatest ionising effect	most penetrating
<b>A</b>	$\alpha$ -particles	$\alpha$ -particles
<b>B</b>	$\alpha$ -particles	$\gamma$ -rays
<b>C</b>	$\gamma$ -rays	$\alpha$ -particles
<b>D</b>	$\gamma$ -rays	$\gamma$ -rays

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## The Periodic Table of Elements

		Group											
I	II	III	IV	V	VI	VII	VIII						
3 Li lithium 7	4 Be beryllium 9	11 Na sodium 23	12 Mg magnesium 24	19 K potassium 39	20 Ca calcium 40	37 Rb rubidium 85	55 Cs caesium 133	87 Fr francium —	1 H hydrogen 1	2 He helium 4			
57 La lanthanum 139	89 Ac actinium —	72 Hf hafnium 178	74 W tungsten 184	76 Os osmium 190	77 Ir iridium 192	78 Pt platinum 195	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 —
58 Ce cerium 140	90 Th thorium 232	73 Ta tantalum 181	75 Re rhenium 186	79 Au gold 197	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 Ac actinium —
59 Pr praseodymium 141	91 Pa protactinium 231	74 Zr zirconium 91	76 Ru ruthenium 101	78 Pd palladium 106	80 Zn zinc 65	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 —
60 Nd neodymium 144	92 U uranium 238	75 Nb niobium 93	77 Rh rhodium 103	79 Au gold 197	80 Zn zinc 65	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 —
61 Pm promethium —	93 Np neptunium —	76 Mo molybdenum 96	78 Pd palladium 106	80 Zn zinc 65	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 Ac actinium —
62 Sm samarium 150	94 Pu plutonium —	77 Co cobalt 59	79 Au gold 197	80 Zn zinc 65	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 Ac actinium —
63 Eu europium 152	95 Am americium —	78 Ni nickel 59	80 Zn zinc 65	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 Ac actinium —	90 Th thorium 232
64 Gd gadolinium 157	96 Cm curium —	79 Cu copper 64	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 Ac actinium —	90 Th thorium 232	91 Pa protactinium 231
65 Tb terbium 159	97 Bk berkelium —	80 Zn zinc 65	82 Pb lead 207	83 Bi bismuth 209	84 Po polonium —	85 At astatine —	86 Rn radon —	87 Fr francium —	88 Ra radium —	89 Ac actinium —	90 Th thorium 232	91 Pa protactinium 231	92 U uranium 238
66 Dy dysprosium 163	98 Cf californium —	81 Tl thallium 204	83 Bi bismuth 209	84 Po polonium —	85 At astatine —	86 Rn radon —	87 Fr francium —	88 Ra radium —	89 Ac actinium —	90 Th thorium 232	91 Pa protactinium 231	92 U uranium 238	93 Np neptunium —
67 Ho holmium 165	99 Es einsteinium —	82 Pb lead 207	84 Po polonium —	85 At astatine —	86 Rn radon —	87 Fr francium —	88 Ra radium —	89 Ac actinium —	90 Th thorium 232	91 Pa protactinium 231	92 U uranium 238	93 Np neptunium —	94 Pu plutonium —
68 Er erbium 167	100 Fm fermium —	83 Bi bismuth 209	85 At astatine —	86 Rn radon —	87 Fr francium —	88 Ra radium —	89 Ac actinium —	90 Th thorium 232	91 Pa protactinium 231	92 U uranium 238	93 Np neptunium —	94 Pu plutonium —	95 Am americium —
69 Tm thulium 169	101 Md mendelevium —	84 Po polonium —	86 Rn radon —	87 Fr francium —	88 Ra radium —	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 —
70 Yb ytterbium 173	102 No nobelium —	85 At astatine —	87 Fr francium —	88 Ra radium —	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 —
71 Lu lutetium 175	103 Lr lawrencium —	86 Rn radon —	88 Ra radium —	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 —

## Key

atomic number  
atomic symbol  
name  
relative atomic mass

lanthanoids

actinoids

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