Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CO-ORDINATED SCIENCES **0654/12**

Paper 1 Multiple Choice **October/November 2014**

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 20.
Electronic calculators may be used.

This document consists of **18** printed pages and **2** blank pages.

1 Which statement about cells is correct?

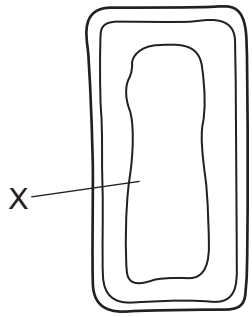
A Cell membranes are found only in animal cells.

B Cell membranes are found only in plant cells.

C Cell walls are found only in animal cells.

D Cell walls are found only in plant cells.

2 The diagram shows parts of a mesophyll cell.



What will be found in the part labelled X?

A chloroplasts and nucleus

B chloroplasts only

C nucleus only

D watery solution

3 What is the correct word equation for photosynthesis?

A carbon dioxide + sugar → oxygen + water

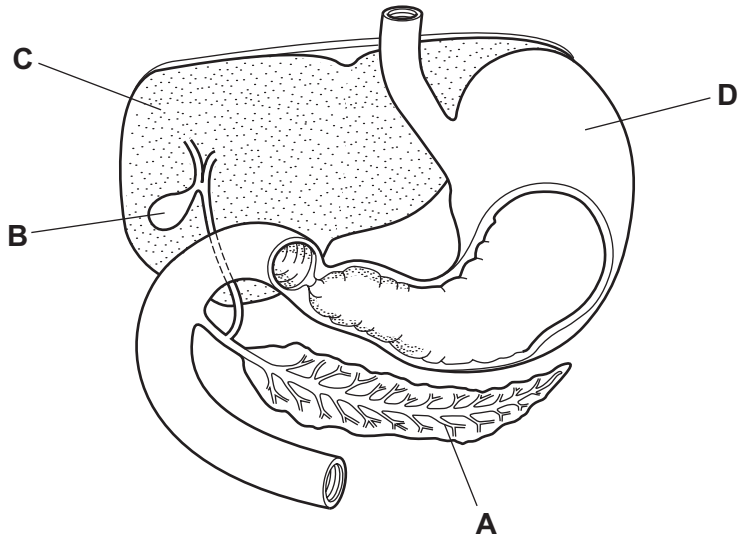
B carbon dioxide + water → oxygen + sugar

C oxygen + sugar → carbon dioxide + water

D oxygen + water → carbon dioxide + sugar

4 The diagram shows part of the digestive system.

Where is lipase produced?



5 Which statement about the pulmonary vein is correct?

A It carries deoxygenated blood away from the heart.

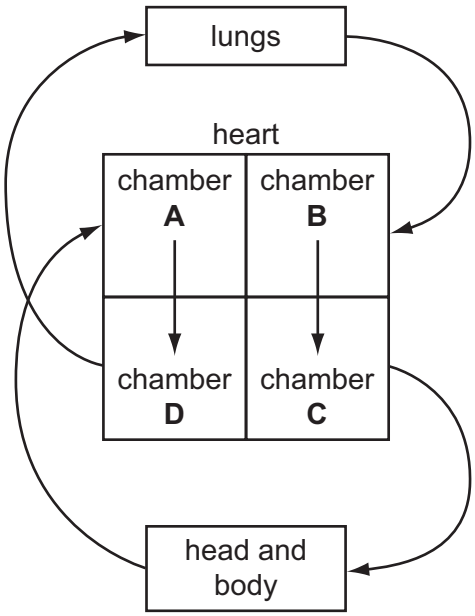
B It carries deoxygenated blood towards the heart.

C It carries oxygenated blood away from the heart.

D It carries oxygenated blood towards the heart.

6 The diagram represents the human blood system.

Which chamber of the heart is the left ventricle?



7 Why does oxygen move from an alveolus to a blood capillary?

A It diffuses through because of a difference in concentration.

B It is forced through the wall of the alveolus by air pressure.

C It passes through because carbon dioxide is coming out.

D It is pulled in by movement of blood in the capillary.

8 When a plant organ grows towards a stimulus, its response is described as 'positive'. When it grows away from a stimulus, its response is described as 'negative'.

A plant root is placed horizontally in the dark.

Which response would it show?

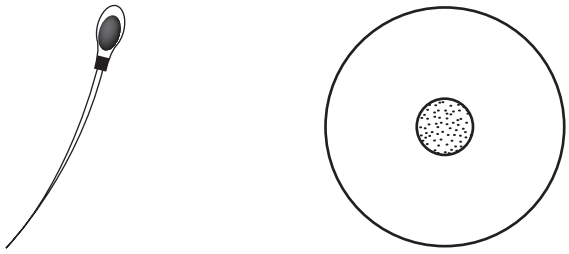
A negative geotropism

B negative phototropism

C positive geotropism

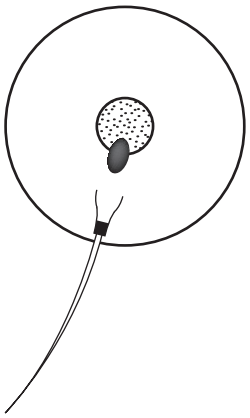
D positive phototropism

9 The diagram shows a sperm and an egg.

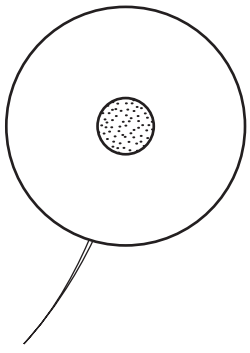


Which diagram shows fertilisation?

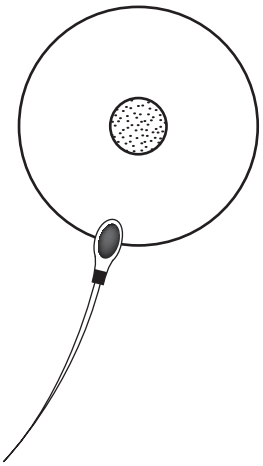
A



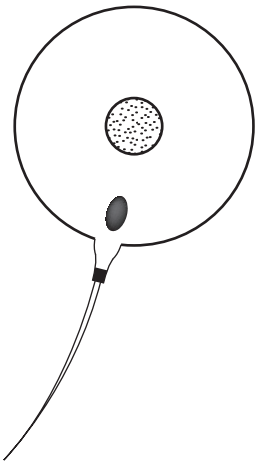
B



C



D



10 Cystic fibrosis is an inherited disease.

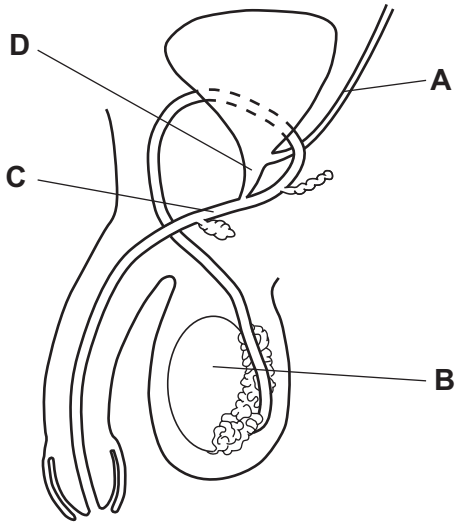
Only people who are homozygous recessive, ff, have this disease.

Which cross could **not** give rise to a child suffering from cystic fibrosis?

A ff × ff **B** Ff × ff **C** Ff × Ff **D** FF × ff

11 The diagram shows the male reproductive system of a human.

Which labelled part is found only in a male?



12 Which statements about X chromosomes are correct?

	present in body cells in males	present in body cells of females	carry genes
A	✓	✓	✓
B	✓	✗	✓
C	✓	✗	✗
D	✗	✓	✗

13 In an ecosystem, how do producers get most of their energy?

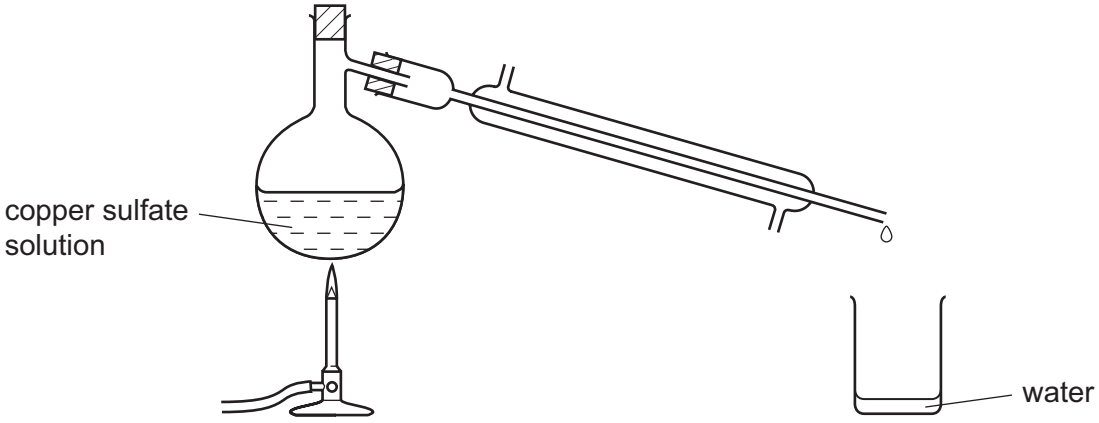
A absorbing sunlight

B eating other organisms

C feeding on dead matter

D using nutrients recycled by decay

14 Water can be separated from copper sulfate solution using the apparatus shown.



What is the name of the process?

A chromatography

B crystallisation

C distillation

D filtration

15 Which process can be used to produce sodium and chlorine from the compound sodium chloride?

A cracking

B distillation

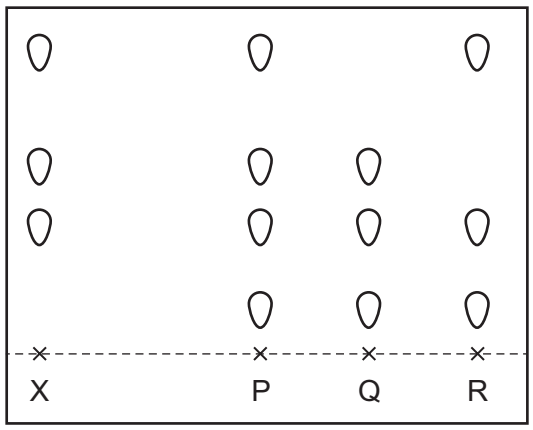
C electrolysis

D filtration

16 Dye X is a mixture of different coloured substances.

Chromatography is used to compare X with three other mixtures, P, Q and R.

The results are shown in the diagram.



Which other mixtures contain the dye X?

A P only **B** R only **C** P and Q only **D** P, Q and R

17 Sodium chloride (salt) has an ionic structure.

Which compound could be sodium chloride?

	melting point / °C	boiling point / °C	electrical conductivity
A	–114	–85	conducts when dissolved in water
B	98	880	conducts when solid
C	801	1413	conducts when dissolved in water
D	1610	2230	conducts when solid

18 Which statement describes the particles in a gas?

A As the particles move quicker the pressure of the gas decreases.

B The movement of the particles is unaffected by temperature.

C The particles are in random motion.

D The particles are ordered.

19 Metal X is extracted from its oxide by heating with carbon.

The oxide of X reacts with hydrochloric acid.

Which row shows the type of oxide and the type of reaction that occurs to the oxide when it is heated with carbon?

	type of oxide	type of reaction
A	acidic	oxidation
B	acidic	reduction
C	basic	oxidation
D	basic	reduction

20 When a match is struck, heat and light energy are produced.

Which row describes the type of change and the type of reaction taking place?

	type of change	type of reaction
A	chemical	endothermic
B	chemical	exothermic
C	physical	endothermic
D	physical	exothermic

21 Which statement about the trends in the Periodic Table is correct?

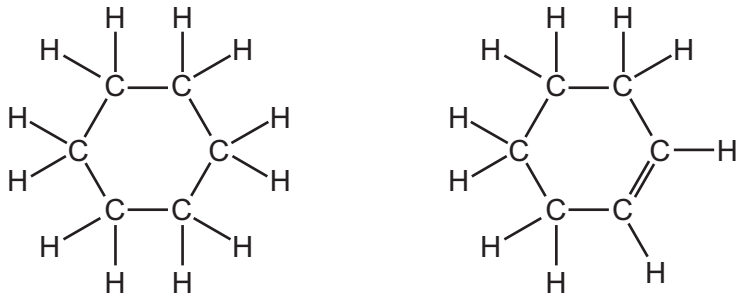
A Elements are arranged in order of nucleon number.

B Elements on the left hand side form acidic oxides.

C The melting point of the Group I elements increases down the group.

D The proton number increases from left to right across the table.

22 The structures of compounds X and Y are shown.

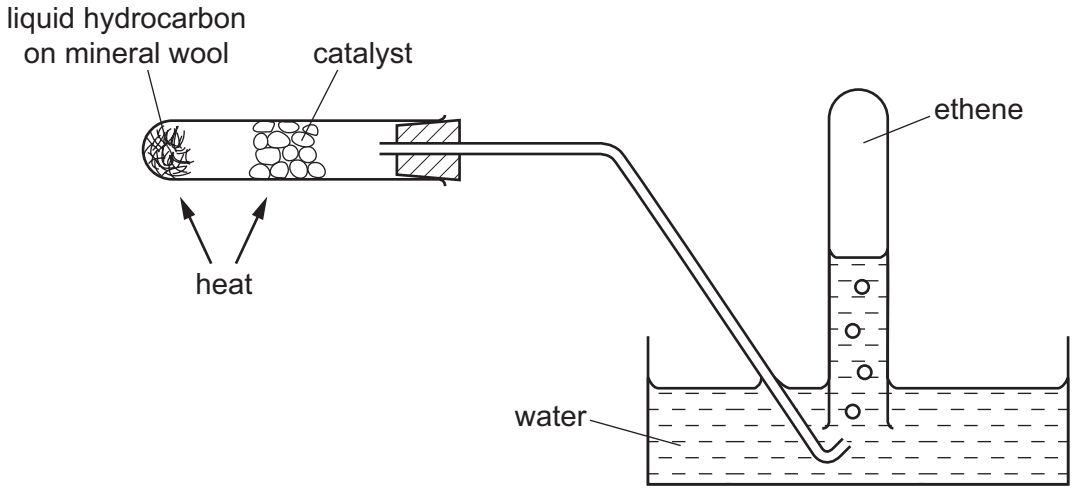


compound X compound Y

What are the correct formulae for these two compounds?

	compound X	compound Y
A	C_6H_{14}	C_6H_{10}
B	C_6H_{14}	C_6H_{12}
C	C_6H_{12}	C_6H_{10}
D	C_6H_{12}	C_6H_{12}

23 The diagram shows an experiment on a liquid hydrocarbon.



Which change takes place?

A combustion

B cracking

C fractional distillation

D polymerisation

24 The first row of the transition elements is shown.

Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn

Which statement about transition metals is **not** correct?

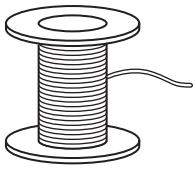
A They are often used as catalysts.

B They form colourless compounds.

C They have high densities.

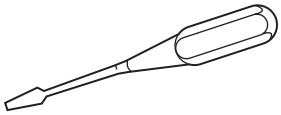
D They have high melting points.

25 Some uses of alloys are shown.



solder

coins



tools

Which statement about alloys is correct?

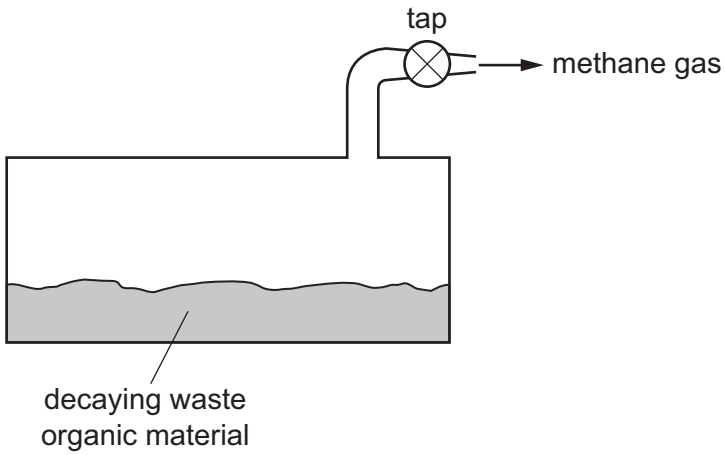
A They are always stronger than the metals from which they are made.

B They are made from metals because metals are poor electrical conductors.

C They contain mixtures of compounds that contain metals.

D They have different properties to the metals from which they are made.

26 The diagram shows waste organic material decaying.



What is formed when the gas, methane, is burned?

A carbon dioxide and water

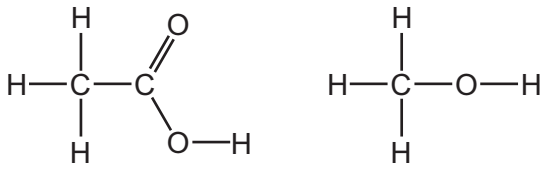
B carbon dioxide only

C carbon monoxide

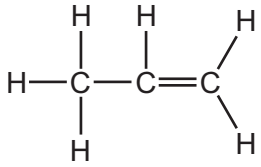
D water only

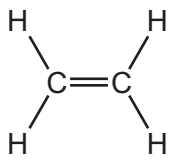
27 In which pair are **both** molecules unsaturated?

A

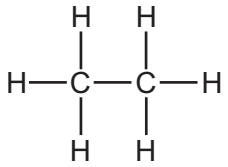


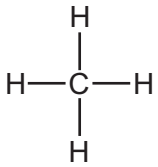
B



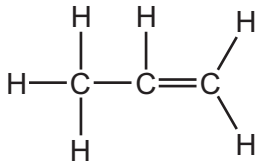


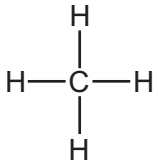
C





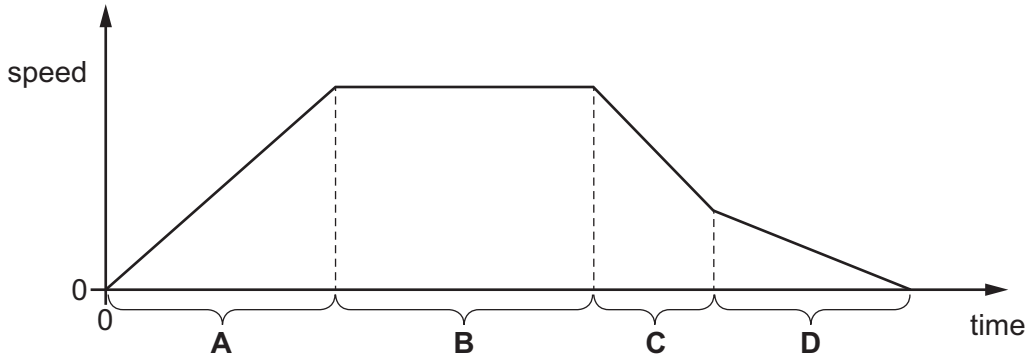
D





28 The diagram shows the speed / time graph for a car.

During which period is the car moving at constant speed?



29 Which energy resource does **not** provide energy originally derived from the Sun?

A coal

B geothermal

C tides

D waves

30 Three forces act on a block.

What is the resultant force and what is its direction?

A 3 N to the right

B 6 N to the left

C 15 N to the left

D 18 N to the right

31 A flask contains a hot liquid. The flask has double walls with a vacuum between them. The vacuum reduces loss of thermal energy from the hot liquid.

Which types of thermal energy transfer **cannot** occur through the vacuum?

A conduction and convection only

B conduction and radiation only

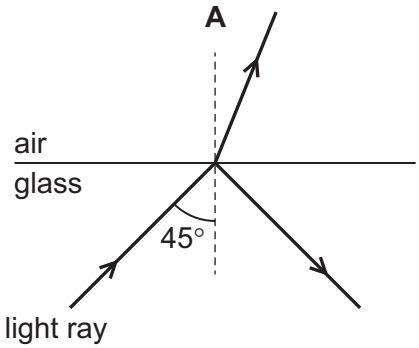
C convection and radiation only

D conduction, convection and radiation

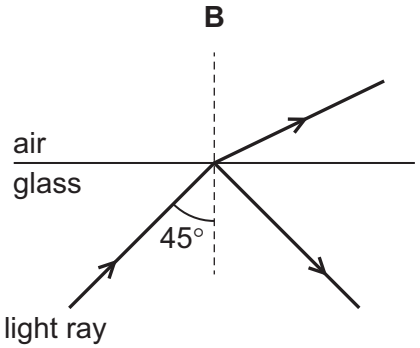
32 A ray of light travels in glass towards a glass / air boundary. The critical angle for glass is 42°.

Which diagram shows what happens to the ray?

A



B



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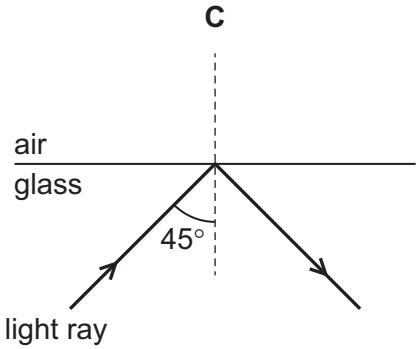
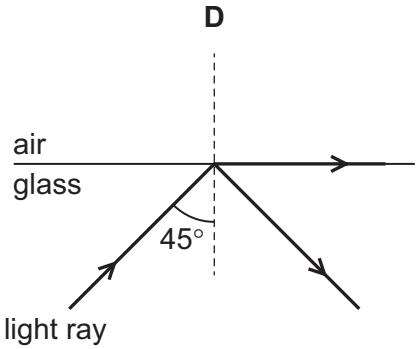


D



33 Which waves are longitudinal?

A light waves from a lamp

B sound waves from a piano

C ultraviolet waves from the Sun

D X-rays from a security scanner

34 Music is produced by the loudspeaker of a radio.

Which property of the sound waves from the loudspeaker increases when the music is made louder?

A amplitude

B frequency

C speed

D wavelength

35 Which type of waves are used for intruder alarms?

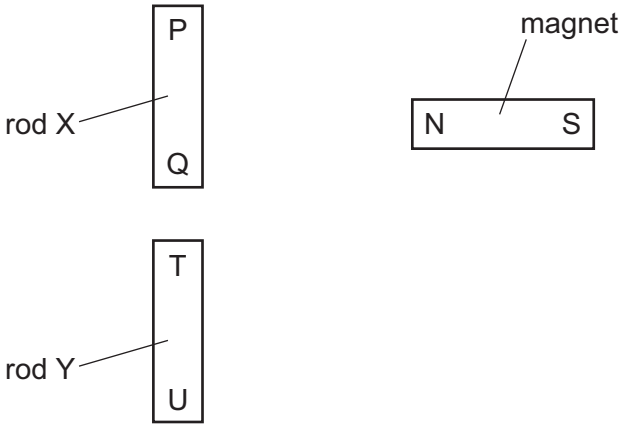
A γ-rays

B infra-red waves

C ultraviolet waves

D X-rays

36 Two rods, X and Y, look the same.



The N pole of a magnet is brought close, in turn, to P, Q, T and U. The results of these four actions are shown in the table.

end tested	result
P	attraction
Q	attraction
T	attraction
U	repulsion

Which of the rods is a permanent magnet, with a pole at each end?

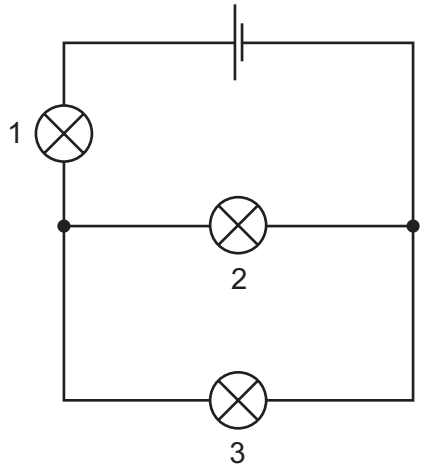
A both of the rods

B neither of the rods

C rod X only

D rod Y only

37 In the circuit all the lamps are lit.

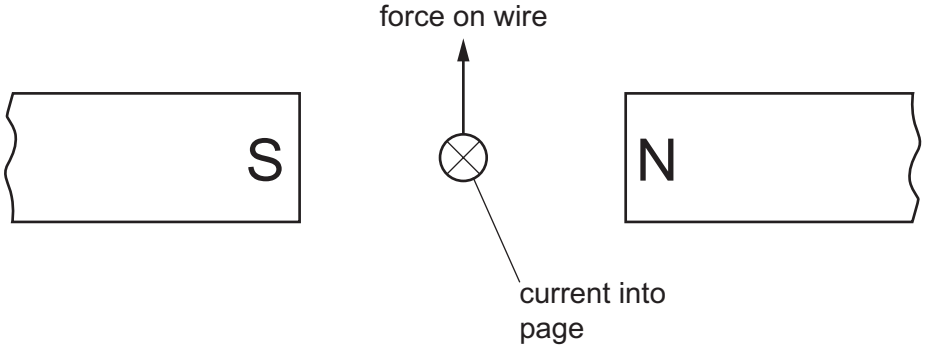


Lamp 2 is removed.

What happens to each of the other lamps?

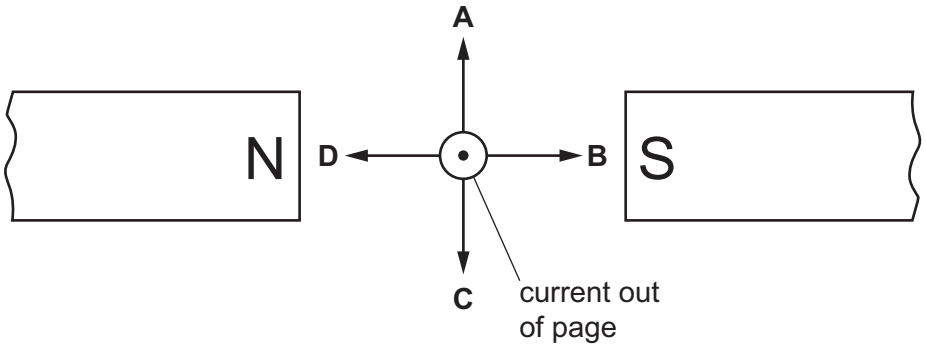
	lamp 1	lamp 3
A	goes out	goes out
B	goes out	stays lit
C	stays lit	goes out
D	stays lit	stays lit

38 A wire carries an electric current. The wire is placed between the poles of a magnet. This causes a force that pushes the wire upwards.



The poles of the magnet and the direction of the current are both reversed.

Which arrow now shows the direction of the force on the wire?

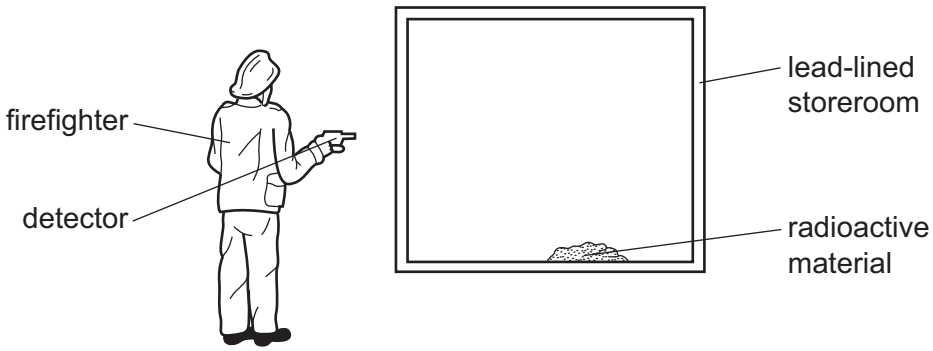


39 The current in a resistor is 0.50 A and the potential difference across the resistor is 4.6 V.

What is the resistance of the resistor?

A 0.11 Ω **B** 2.3 Ω **C** 5.1 Ω **D** 9.2 Ω

40 During a fire in a laboratory storeroom, some radioactive material is spilt. A firefighter detects radiation through the lead-lined walls of the storeroom. The radiation is emitted by the radioactive material.



Which type of radiation from the radioactive material is detected?

A α-particles

B β-particles

C γ-rays

D X-rays

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DATA SHEET
The Periodic Table of the Elements

Group																		
I	II										III	IV	V	VI	VII	0
																4 **He** Helium 2
					1 **H** Hydrogen 1						11 **B** Boron 5	12 **C** Carbon 6	14 **N** Nitrogen 7	16 **O** Oxygen 8	19 **F** Fluorine 9	20 **Ne** Neon 10
7 **Li** Lithium 3	9 **Be** Beryllium 4										27 **Al** Aluminium 13	28 **Si** Silicon 14	31 **P** Phosphorus 15	32 **S** Sulfur 16	35.5 **Cl** Chlorine 17	40 **Ar** Argon 18
23 **Na** Sodium 11	24 **Mg** Magnesium 12										70 **Ga** Gallium 31	73 **Ge** Germanium 32	75 **As** Arsenic 33	79 **Se** Selenium 34	80 **Br** Bromine 35	84 **Kr** Krypton 36
39 **K** Potassium 19	40 **Ca** Calcium 20	45 **Sc** Scandium 21	48 **Ti** Titanium 22	51 **V** Vanadium 23	52 **Cr** Chromium 24	55 **Mn** Manganese 25	56 **Fe** Iron 26	59 **Co** Cobalt 27	59 **Ni** Nickel 28	64 **Cu** Copper 29	65 **Zn** Zinc 30	115 **In** Indium 49	119 **Sn** Tin 50	122 **Sb** Antimony 51	128 **Te** Tellurium 52	127 **I** Iodine 53	131 **Xe** Xenon 54
85 **Rb** Rubidium 37	88 **Sr** Strontium 38	89 **Y** Yttrium 39	91 **Zr** Zirconium 40	93 **Nb** Niobium 41	96 **Mo** Molybdenum 42	**Tc** Technetium 43	101 **Ru** Ruthenium 44	103 **Rh** Rhodium 45	106 **Pd** Palladium 46	108 **Ag** Silver 47	112 **Cd** Cadmium 48	204 **Tl** Thallium 81	207 **Pb** Lead 82	209 **Bi** Bismuth 83	**Po** Polonium 84	**At** Astatine 85	**Rn** Radon 86
133 **Cs** Caesium 55	137 **Ba** Barium 56	139 **La** Lanthanum 57 *	178 **Hf** Hafnium 72	181 **Ta** Tantalum 73	184 **W** Tungsten 74	186 **Re** Rhenium 75	190 **Os** Osmium 76	192 **Ir** Iridium 77	195 **Pt** Platinum 78	197 **Au** Gold 79	201 **Hg** Mercury 80						
	226 **Ra** Radium 88	227 **Ac** Actinium 89 †															

140 **Ce** Cerium 58	141 **Pr** Praseodymium 59	144 **Nd** Neodymium 60	**Pm** Promethium 61	150 **Sm** Samarium 62	152 **Eu** Europium 63	157 **Gd** Gadolinium 64	159 **Tb** Terbium 65	162 **Dy** Dysprosium 66	165 **Ho** Holmium 67	167 **Er** Erbium 68	169 **Tm** Thulium 69	173 **Yb** Ytterbium 70	175 **Lu** Lutetium 71
232 **Th** Thorium 90	**Pa** Protactinium 91	238 **U** Uranium 92	**Np** Neptunium 93	**Pu** Plutonium 94	**Am** Americium 95	**Cm** Curium 96	**Bk** Berkelium 97	**Cf** Californium 98	**Es** Einsteinium 99	**Fm** Fermium 100	**Md** Mendelevium 101	**No** Nobelium 102	**Lr** Lawrencium 103

*58-71 Lanthanoid series
†90-103 Actinoid series

Key: a = relative atomic mass; X = atomic symbol; b = proton (atomic) number

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