



Cambridge International Examinations
Cambridge International General Certificate of Secondary Education



CO-ORDINATED SCIENCES

0654/01

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.

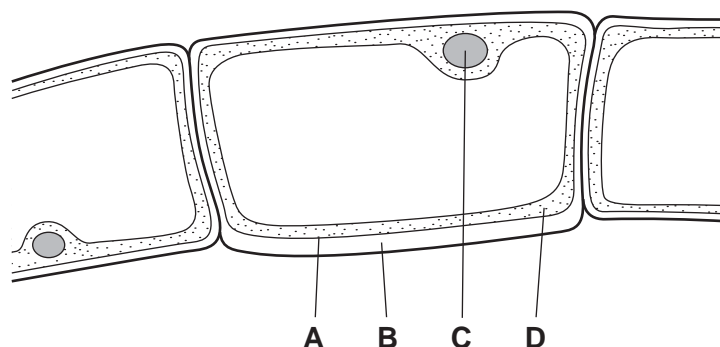
Electronic calculators may be used.

This document consists of **16** printed pages.

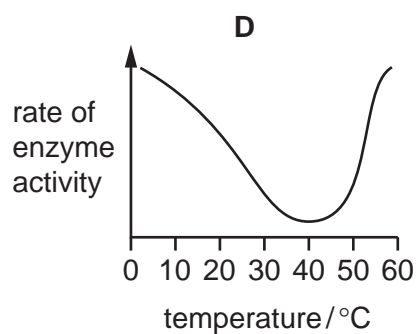
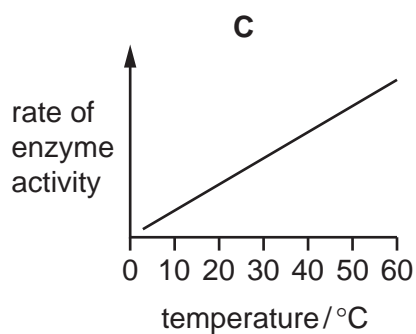
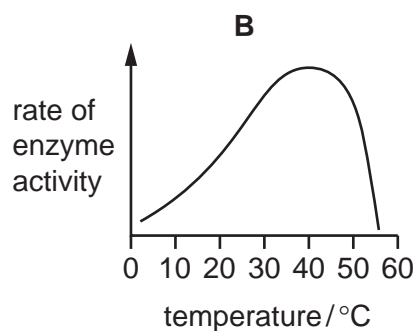
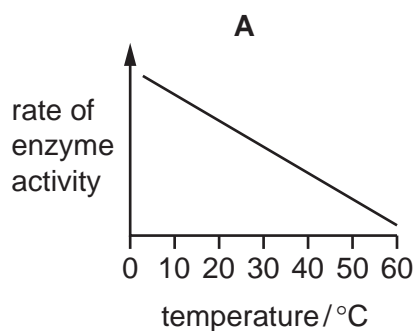
2

1 The diagram shows cells from an organism seen under a light microscope.

Which part shows that the organism **must** be a plant?



2 Which graph shows the effect of temperature on the rate of enzyme activity within the human body?



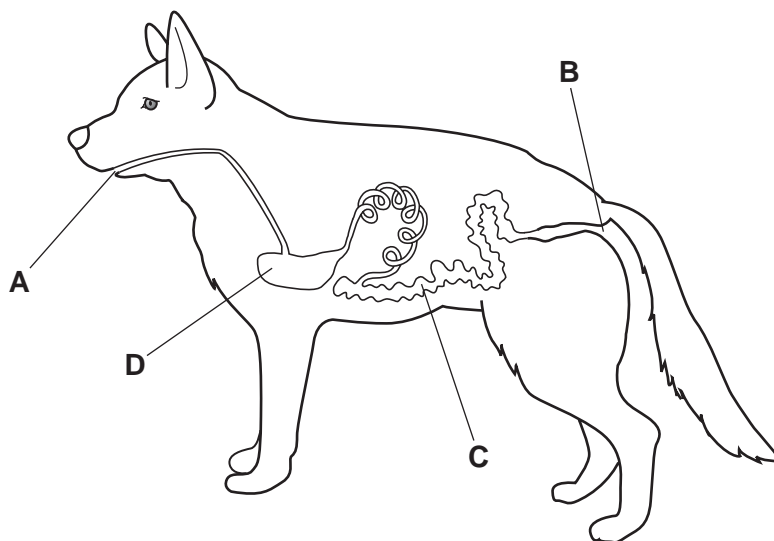
3 In a balanced diet, which constituents provide most energy?

- A carbohydrate and protein
- B fat and carbohydrate
- C fat and fibre
- D vitamins and protein

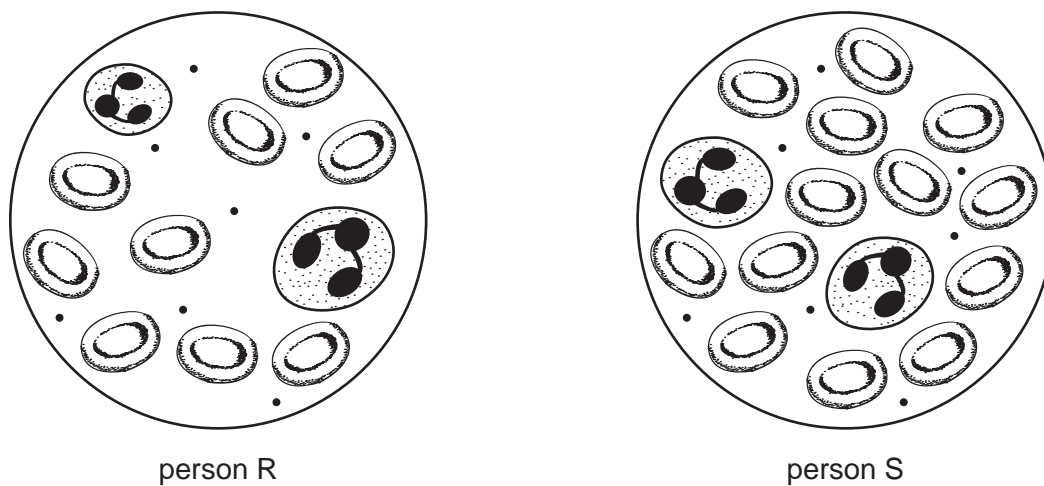
3

- 4 The diagram shows the alimentary canal of a dog.

Where does egestion occur?



- 5 The diagram shows identical volumes of samples of blood as seen under a microscope. The samples are taken from two different people.

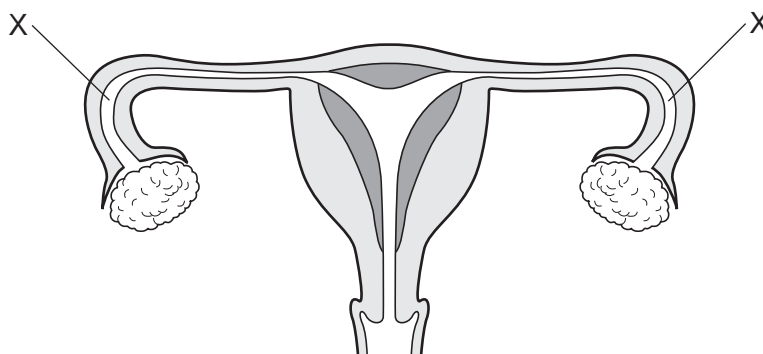


Compared with the blood of person R, the blood of person S can

- A carry out more phagocytosis.
- B clot more easily.
- C produce more antibodies.
- D transport more oxygen.

- 6 Which process in living organisms does **not** use energy from respiration?
- A growth
 - B muscle contraction
 - C photosynthesis
 - D temperature maintenance
- 7 A person touches a hot object which triggers a reflex action.
In which order does the impulse travel in the reflex arc?
- A receptor → sensory neurone → stimulus
 - B relay neurone → spinal cord → sensory neurone
 - C sensory neurone → relay neurone → motor neurone
 - D stimulus → motor neurone → spinal cord
- 8 Which of these processes best describes homeostasis?
- A breathing faster after exercise
 - B keeping internal conditions in the body constant
 - C preventing the body from getting too hot
 - D removing of carbon dioxide from the lungs
- 9 Pollination is the transfer of pollen
- A from anther to sepal.
 - B from anther to stigma.
 - C from sepal to anther.
 - D from stigma to anther.

10 The diagram shows the female reproductive system.



Sometimes the tubes at X become blocked.

What effect does this have?

- A Eggs cannot reach the uterus.
 - B Menstruation is prevented.
 - C Ovulation is prevented.
 - D Sperm cannot reach the uterus.
- 11 In mice, the allele for black fur is dominant to the allele for white fur. Two heterozygous mice mate.
- What colour are the offspring likely to be?
- A all black
 - B all grey
 - C all white
 - D some black and some white
- 12 In the carbon cycle, which process releases the **most** carbon dioxide into the atmosphere?
- A combustion
 - B feeding
 - C fossilisation
 - D photosynthesis

13 Which row shows more than one result of deforestation?

	build-up of atmospheric carbon dioxide	increased number of habitats	loss of soil
A	x	✓	x
B	✓	✓	x
C	✓	x	✓
D	x	x	✓

Key
 ✓ yes
 x no

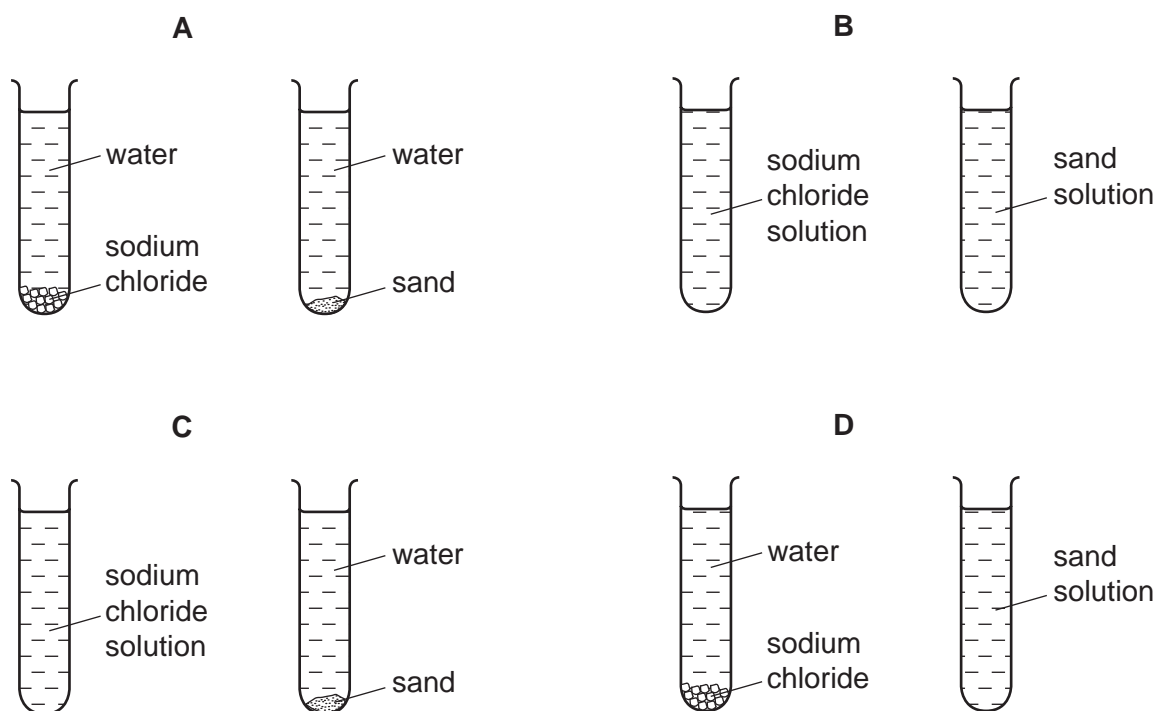
14 Hydrogen can occur as an atom, an ion and a molecule.

Which row in the table represents these particles?

	atom	ion	molecule
A	H	H ⁺	H ₂
B	H	H ₂	H ⁺
C	H ⁺	H	H ₂
D	H ₂	H ⁺	H

15 Small amounts of sodium chloride and sand are shaken with separate samples of water in two test-tubes. The test-tubes are left to stand for 24 hours.

Which diagram shows how the test-tubes appear after leaving them to stand for 24 hours?



- 16 Magnesium chloride is soluble in water. Barium sulfate is insoluble in water.

Which processes are used to obtain crystals of magnesium chloride from a mixture of magnesium chloride and barium sulfate in water?

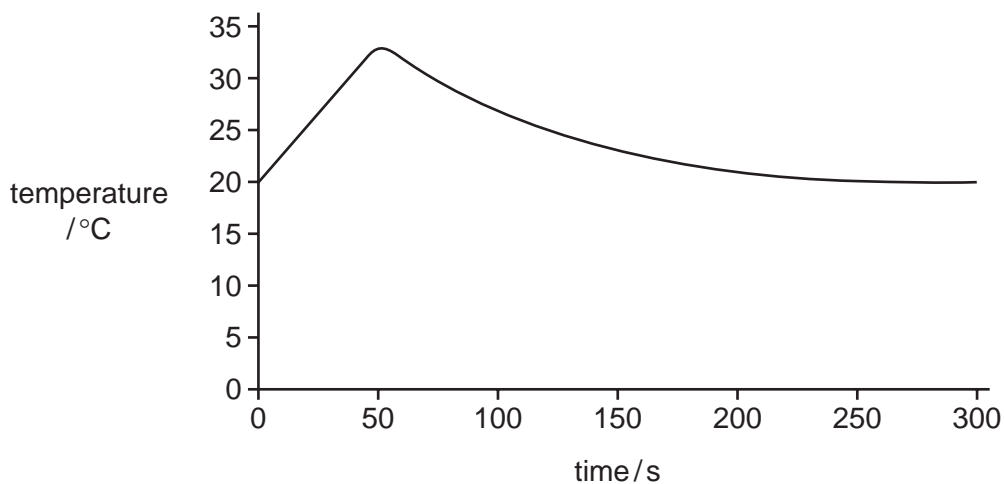
	first stage	second stage
A	crystallise	neutralise
B	evaporate	filter
C	filter	dissolve
D	filter	evaporate

- 17 When dilute sulfuric acid is electrolysed using inert electrodes, two gases are produced.

What are these two gases?

- A** hydrogen and oxygen
B hydrogen and sulfate
C hydrogen and sulfur dioxide
D oxygen and sulfur dioxide
- 18 When sodium hydroxide and hydrochloric acid are mixed, they react immediately.

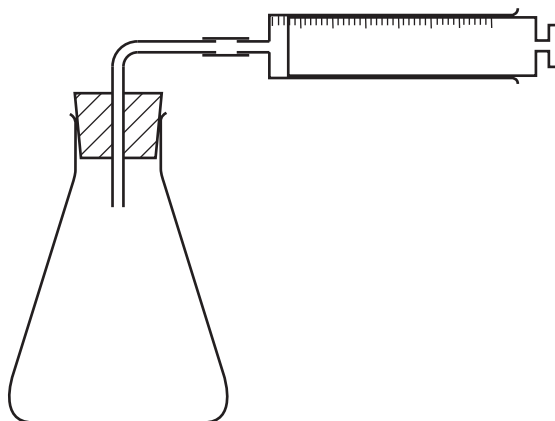
The graph shows how the temperature of the mixture changes over time.



Which type of **chemical** reaction takes place?

- A** both endothermic and exothermic
B endothermic
C exothermic
D neither endothermic nor exothermic

- 19 The apparatus below is used to investigate the rate of a chemical reaction.



For which reaction is the apparatus used to investigate the rate of the reaction?

- A gas E + gas F \rightarrow liquid G
 B solid H + solution I \rightarrow solution J
 C solid K + solution L \rightarrow solution M + gas N
 D solution P + solution Q \rightarrow solid R + solution Q
- 20 The elements from sodium to sulfur, shown below, are in the same period of the Periodic Table.

Na	Mg	Al	Si	P	S
----	----	----	----	---	---

Which trend does **not** occur across the Periodic Table from sodium to sulfur?

- A The chlorides of the elements change from covalent to ionic.
 B The elements change from good to poor electrical conductors.
 C The oxides of the elements change from basic to acidic.
 D The solid elements change from malleable to brittle.
- 21 Elements X, Y and Z are similar elements.

They are soft and they react vigorously with water to produce hydrogen.

Where in the Periodic Table are X, Y and Z found?

- A Group I
 B Transition elements
 C Group VII
 D Group VIII

22 The table shows information about some minerals.

mineral	chemical formula
bauxite	Al_2O_3
galena	PbS
hematite	Fe_2O_3
rutile	TiO_2

Which minerals contain a transition element?

- A bauxite and galena
- B bauxite and hematite
- C galena and rutile
- D hematite and rutile

23 A cup is made of copper.

Why is the cup **not** used for hot drinks?

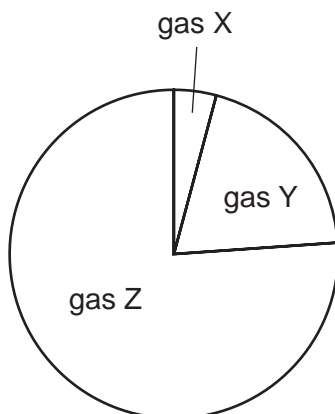
- A Copper is a good conductor of heat.
- B Copper is a good electrical conductor.
- C Copper is brightly coloured.
- D Copper is malleable.

24 Why is chlorine used in the treatment of the water supply?

- A to improve the taste
- B to kill microorganisms
- C to neutralise acids
- D to remove solids

25 Air is a mixture of gases.

The diagram shows the composition of clean air.



What are gases X, Y and Z?

	gas X	gas Y	gas Z
A	N ₂	O ₂	noble gases, CO ₂ , H ₂ O
B	noble gases, CO ₂ , H ₂ O	N ₂	O ₂
C	noble gases, CO ₂ , H ₂ O	O ₂	N ₂
D	O ₂	noble gases, CO ₂ , H ₂ O	N ₂

26 A fuel used for cooking food is the hydrocarbon¹..... that burns in an²..... reaction.

Which phrases correctly complete gaps 1 and 2?

	1	2
A	ethanol, C ₂ H ₅ OH	endothermic
B	ethanol, C ₂ H ₅ OH	exothermic
C	methane CH ₄	endothermic
D	methane CH ₄	exothermic

27 The hydrocarbon dodecane has the formula C₁₂H₂₆.

A reaction of dodecane produces small alkene molecules.

What is the name of this process?

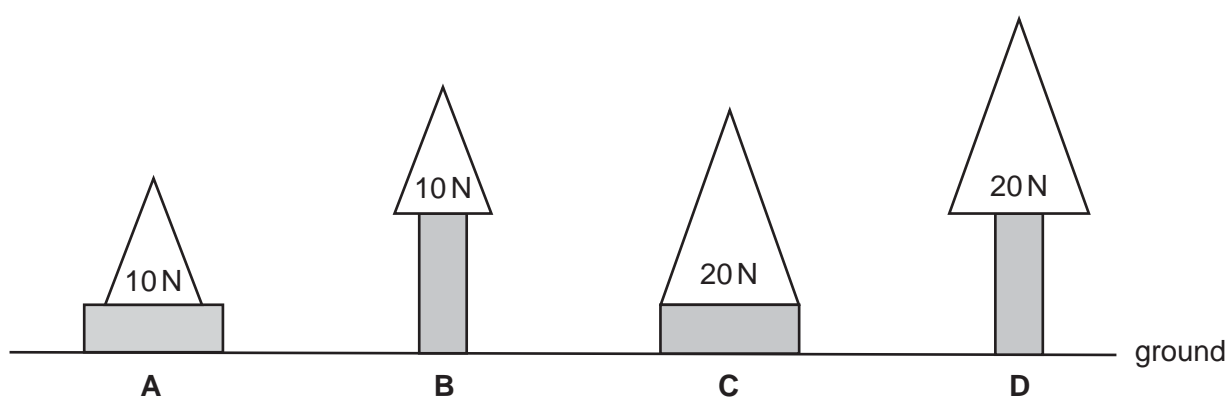
- A** cracking
- B** distillation
- C** evaporation
- D** fractional distillation

- 28 The circuit of a motor racing track is 3.0 km in length. In a race, a car goes 25 times round the circuit in 30 minutes.

What is the average speed of the car?

- A 75 km/hour
 B 90 km/hour
 C 150 km/hour
 D 750 km/hour
- 29 The diagrams show different weights resting on wooden blocks. All the wooden blocks have the same dimensions and weight.

In which diagram is the greatest pressure exerted on the ground?



- 30 What is the source of the energy converted by a hydroelectric power station?

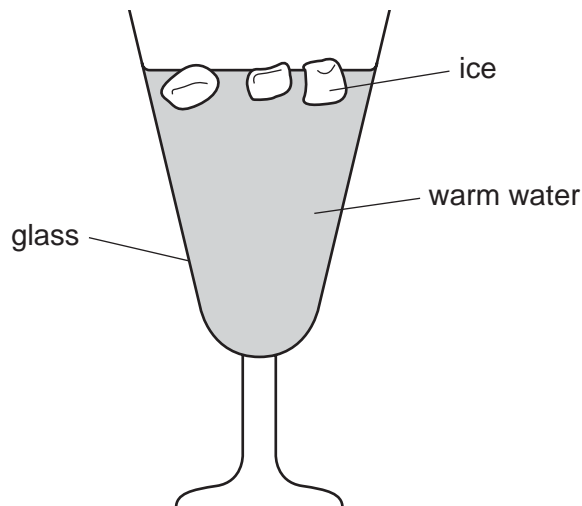
- A chemical energy of oil
 B gravitational potential energy of water
 C kinetic energy of waves
 D thermal energy of hot rocks

- 31 Molecules escape from a liquid as it evaporates.

Which row in the table describes the energy of the molecules that escape and the effect on the temperature of the remaining liquid?

	molecules that escape	effect on temperature of remaining liquid
A	high energy	decreases
B	high energy	increases
C	low energy	decreases
D	low energy	increases

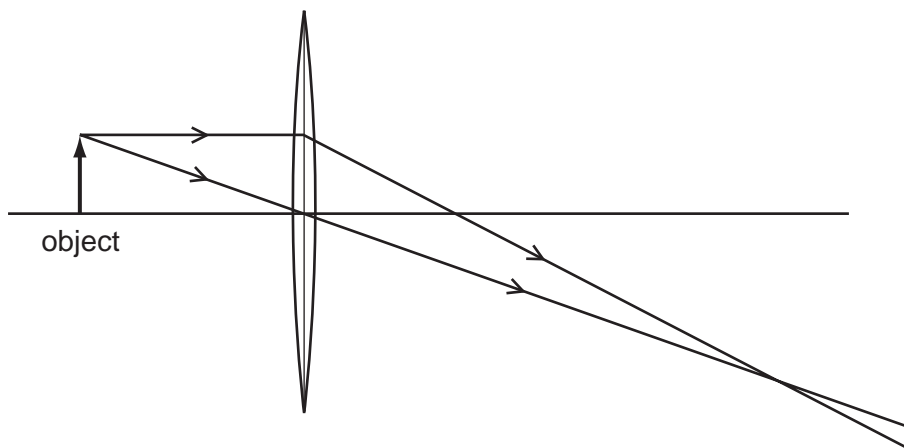
32 The diagram shows some ice being used to lower the temperature of some warm water.



What is the main process by which the water at the bottom of the glass becomes cool?

- A condensation
- B conduction
- C convection
- D radiation

33 The diagram shows two rays of light passing through a converging lens.



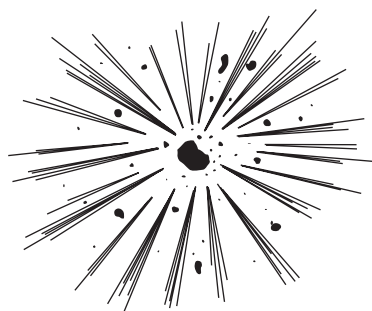
Which type of image is formed?

- A inverted and larger than the object
- B inverted and smaller than the object
- C upright and larger than the object
- D upright and smaller than the object

- 34 Which row shows how the speed and the wavelength of microwaves compare with the speed and the wavelength of X-rays?

	speed of microwaves	wavelength of microwaves
A	less than X-rays	greater than X-rays
B	less than X-rays	less than X-rays
C	the same as X-rays	greater than X-rays
D	the same as X-rays	less than X-rays

- 35 An explosion experiment is carried out on Earth. The experiment is repeated by an astronaut in space where there is no gas or air.



How does the explosion sound to the astronaut in space?

- A** slightly louder than on Earth
 - B** the same loudness as on Earth
 - C** slightly quieter than on Earth
 - D** completely silent
- 36 A student makes a permanent magnet using a piece of metal and a magnetising coil.

Which metal should she use?

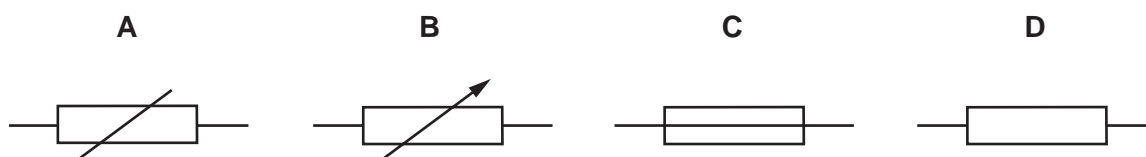
- A** aluminium
- B** copper
- C** iron
- D** steel

37 A polythene rod repels an inflated balloon hanging from a nylon thread.

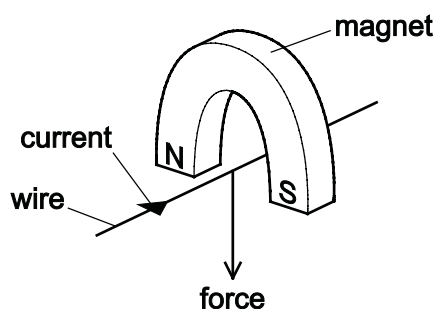
Why do the rod and balloon repel?

- A The rod and the balloon have opposite charges.
- B The rod and the balloon have like charges.
- C The rod is charged but the balloon is not.
- D The balloon is charged but the rod is not.

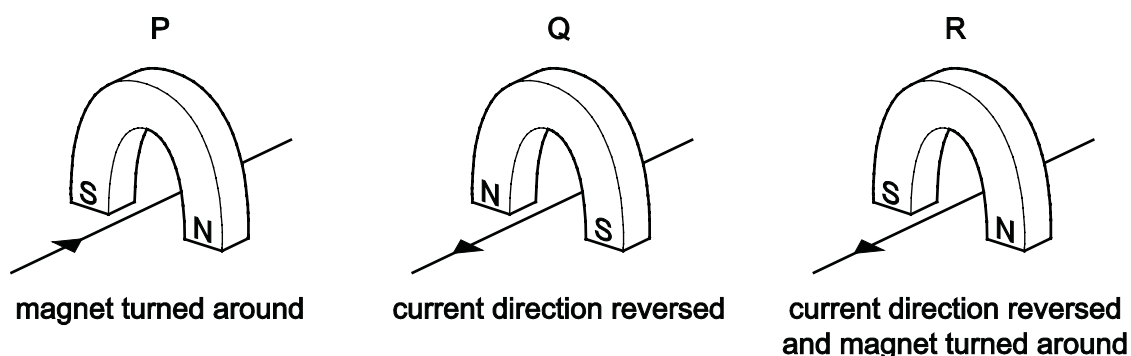
38 What is the symbol for a fuse?



39 A wire is placed between the poles of a horseshoe magnet. There is a current in the wire in the direction shown, and this causes a force to act on the wire.



Three other arrangements P, Q and R of the wire and magnet are set up as shown.



Which arrangement or arrangements will cause a force in the same direction as the original arrangement?

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

15

40 A powder contains 2.4 g of a radioactive isotope.

The half-life of the isotope is 2.0 days.

What mass of this isotope remains after 6.0 days?

- A 0 g
- B 0.30 g
- C 0.80 g
- D 1.2 g

The Periodic Table of Elements

Group																													
I	II											III	IV	V	VI	VII	VIII												
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> <p style="text-align: center;">Key</p> <p style="text-align: center;">atomic number atomic symbol name relative atomic mass</p> </div>												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 –			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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