



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

COMBINED SCIENCE

5129/12

Paper 1 Multiple Choice

May/June 2013

1 hour

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, highlighters, 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.

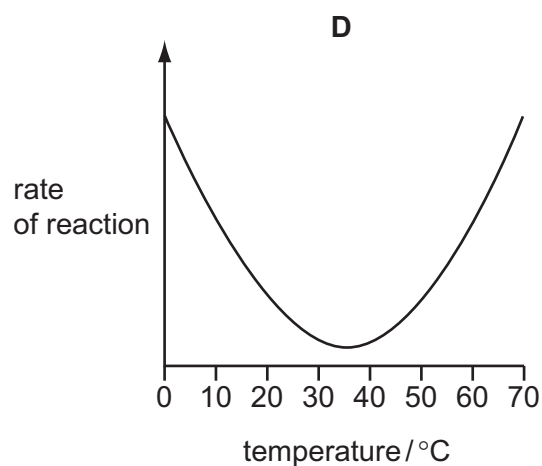
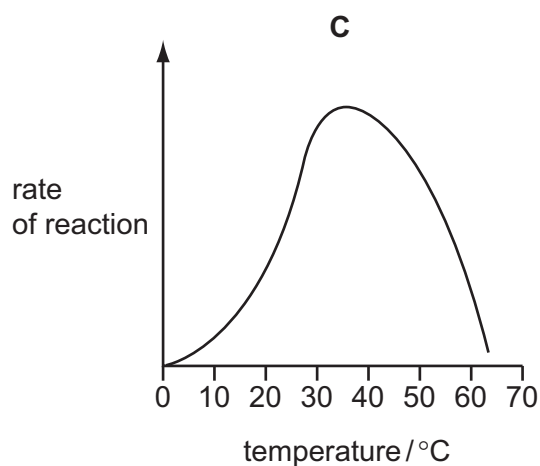
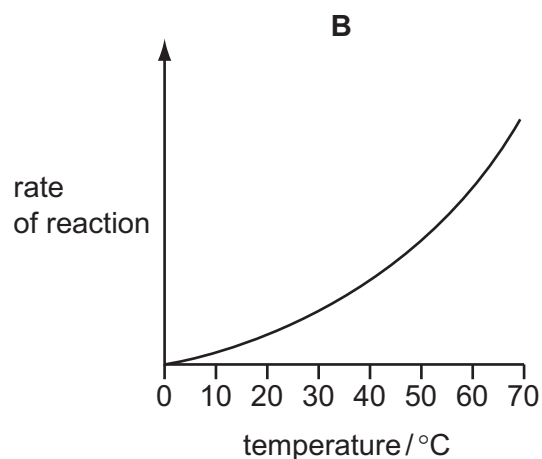
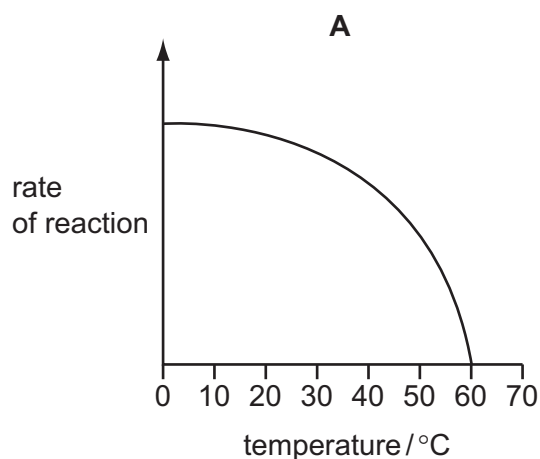


- 1 When a red stain is added to a culture containing both living and dead cells, only the dead cells take up the stain.

Which structure prevents the stain entering the living cells?

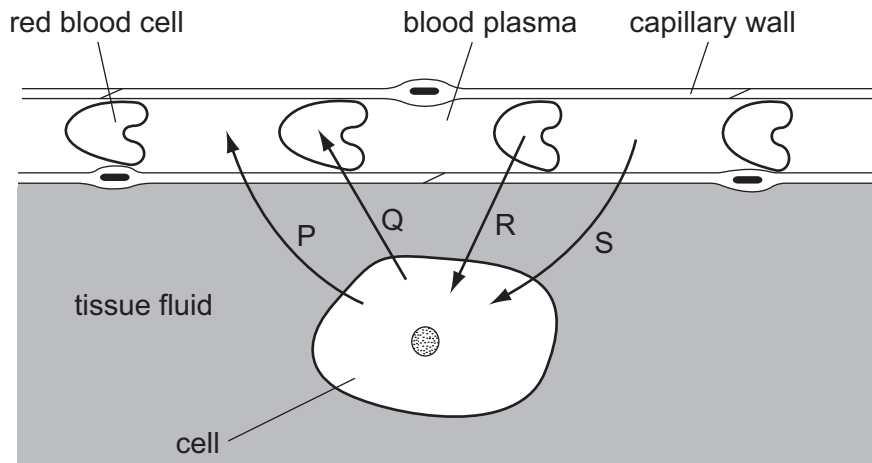
- A cell membrane
 - B cell wall
 - C cytoplasm
 - D vacuole
- 2 What causes water to enter plant roots from the soil?
- A Water concentrations in root hairs and the soil are equal.
 - B Water concentrations in root hairs and xylem are equal.
 - C Water concentration in root hairs is higher than in the soil.
 - D Water concentration in root hairs is lower than in the soil.

- 3 Which graph shows how the activity (rate of reaction) of an enzyme-catalysed reaction in the alimentary canal varies with temperature?



- 4 Where does most photosynthesis occur in a typical leaf?
- A epidermis
 - B guard cells
 - C palisade mesophyll
 - D spongy mesophyll
- 5 In which regions of the alimentary canal does amylase break down starch?
- A mouth cavity and pancreas
 - B mouth cavity and ileum
 - C stomach and pancreas
 - D stomach and ileum
- 6 What is transpiration?
- A absorption of water by root hairs
 - B loss of water vapour from stomata
 - C movement of water up through a plant
 - D wilting

- 7 The diagram represents a blood capillary with an adjacent cell. The arrows represent the transfer of substances between the capillary and the cell.



Which arrows represent glucose, carbon dioxide and oxygen?

	glucose	carbon dioxide	oxygen
A	P	R	Q
B	Q	S	P
C	R	Q	S
D	S	P	R

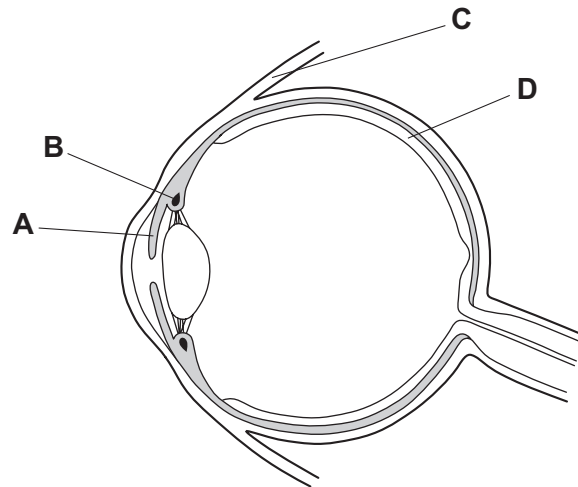
- 8 The following changes take place in an athlete's body during a 100 m race.

Which of these changes occurs first?

- A** increased availability of oxygen to muscles
- B** increased breathing rate
- C** increased carbon dioxide concentration in the blood
- D** increased production of carbon dioxide by muscles

- 9 The diagram shows an eye in section.

Which structure is mainly responsible for changing focus from a distant to a near object?



- 10 Which is a result of deforestation and an effect it has on the environment?

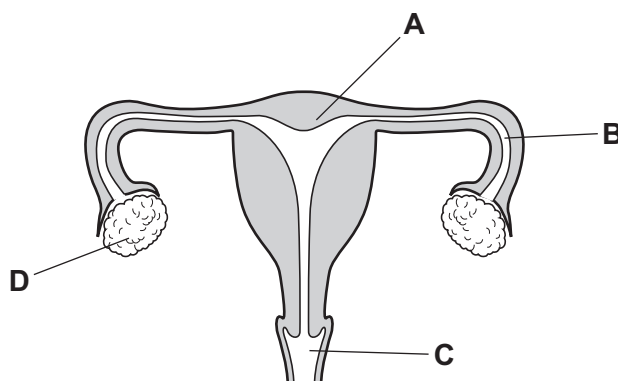
	result of deforestation	effect of deforestation on environment
A	fewer flowering plants	reduced CO ₂ in air
B	fewer trees	increased humidity of air
C	more ground cover	wind removes soil
D	more water drains away	soil washed away

- 11 What will be the effect of increasing nitrate levels in rivers?

- A** Animals will absorb the nitrates and make more protein.
- B** Animals will absorb the nitrates and make more urea.
- C** Plants will absorb the nitrates and make more protein.
- D** Plants will absorb the nitrates and make more urea.

12 The diagram shows the reproductive system of a human female.

Where does fertilisation take place?

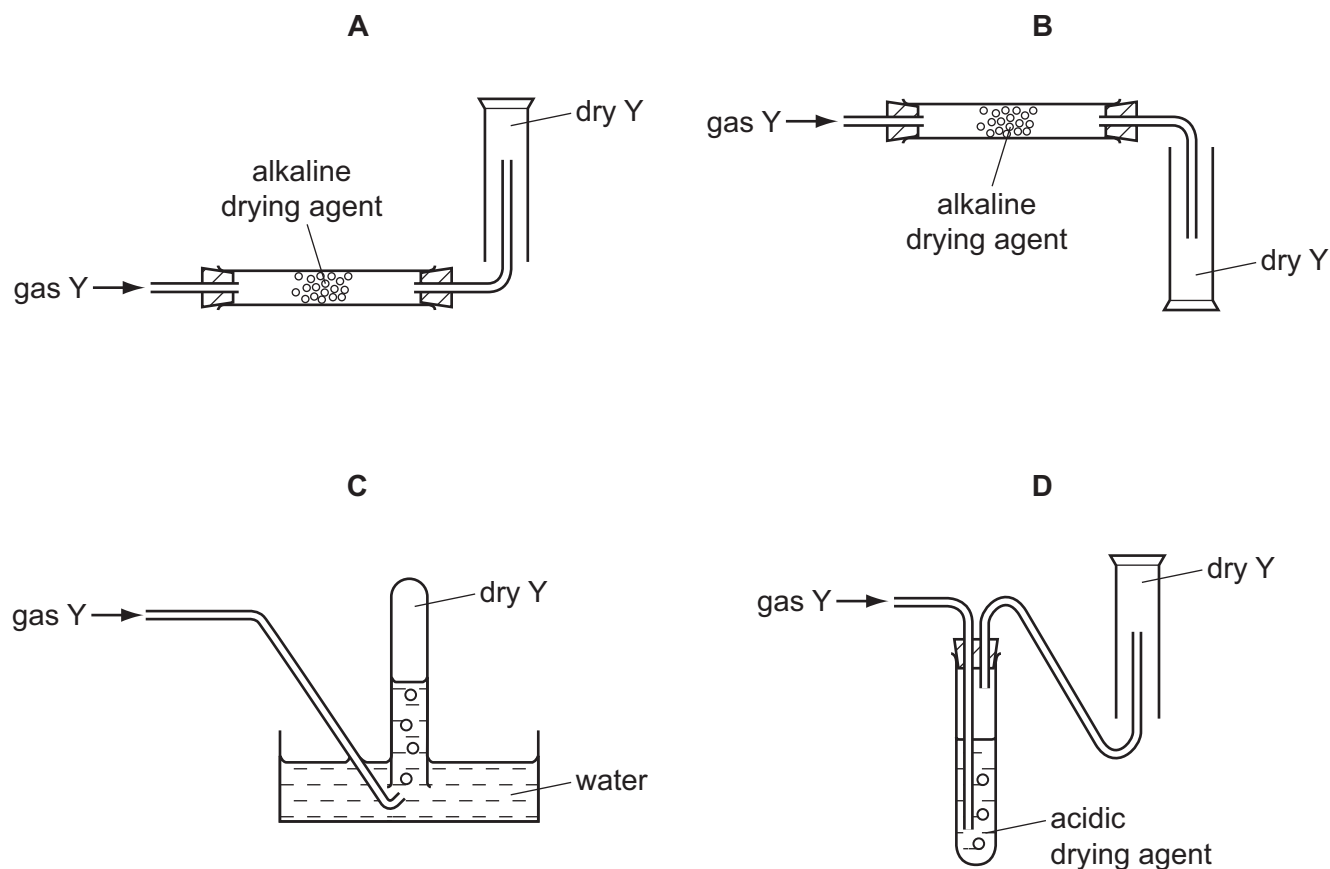


13 Which form of birth control can provide the greatest protection against catching syphilis?

- A** chemical (spermicides)
- B** hormonal
- C** mechanical
- D** surgical

- 14** Gas Y is less dense than air and very soluble in water, forming an alkaline solution.

Which method is used to collect a dry sample of the gas?



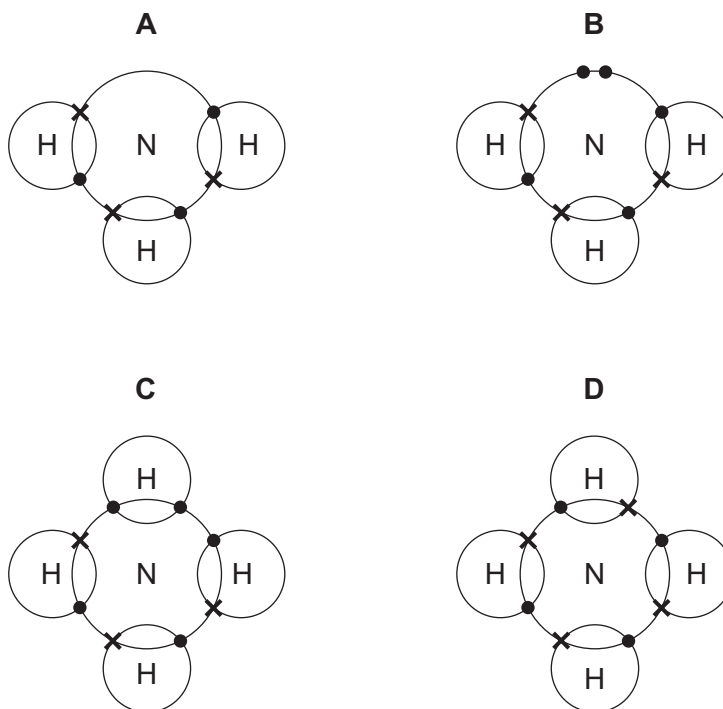
- 15** Chlorine consists of two naturally occurring isotopes, $^{35}_{17}\text{Cl}$ and $^{37}_{17}\text{Cl}$.

These two isotopes have different

- A** arrangements of their electrons.
 - B** chemical properties.
 - C** numbers of neutrons.
 - D** numbers of protons.
- 16** Which substance could be sodium chloride?

	melting point/ $^{\circ}\text{C}$	conduction of electricity	
		when liquid	in aqueous solution
A	-114	none	none
B	-114	none	good
C	180	none	insoluble
D	808	good	good

17 Which dot and cross diagram is correct for ammonia?



18 When iron(II) chloride reacts with sodium hydroxide, iron(II) hydroxide and sodium chloride are produced.

What is the balanced equation for this reaction?

- A** $2\text{FeCl}_2 + \text{NaOH} \rightarrow 2\text{Fe(OH)}_2 + \text{NaCl}$
- B** $\text{FeCl}_2 + 2\text{NaOH} \rightarrow \text{Fe(OH)}_2 + 2\text{NaCl}$
- C** $\text{FeCl}_2 + 2\text{NaOH} \rightarrow 2\text{Fe(OH)}_2 + \text{NaCl}$
- D** $2\text{FeCl}_2 + \text{NaOH} \rightarrow \text{Fe(OH)}_2 + 2\text{NaCl}$

19 Which element forms an oxide that reacts with water to give an acidic solution?

- A** aluminium
- B** sodium
- C** sulfur
- D** zinc

20 Li, Na and K are in Group I of the Periodic Table.

Which statement about these elements is correct?

- A K will have the lowest melting point.
- B Li has the largest atomic radius.
- C Li will have the most vigorous reaction with water.
- D Na is denser than water.

21 Brass is an alloy used for ornaments and coins.

Which statement about brass is correct?

Brass is

- A a compound of copper and tin.
- B a compound of copper and zinc.
- C a mixture of copper and tin.
- D a mixture of copper and zinc.

22 The order of reactivity of some metals is shown below.

most reactive	magnesium
	aluminium
	zinc
	iron
	lead
	copper
least reactive	

Which reaction is possible based on this information?

- A $\text{copper} + \text{zinc oxide} \rightarrow \text{copper(II) oxide} + \text{zinc}$
- B $\text{iron(III) oxide} + \text{lead} \rightarrow \text{lead(II) oxide} + \text{iron}$
- C $\text{magnesium} + \text{zinc oxide} \rightarrow \text{magnesium oxide} + \text{zinc}$
- D $\text{magnesium oxide} + \text{aluminium} \rightarrow \text{magnesium} + \text{aluminium oxide}$

23 The global atmospheric concentration of carbon dioxide has increased in the last 200 years.

What could be causing this increase?

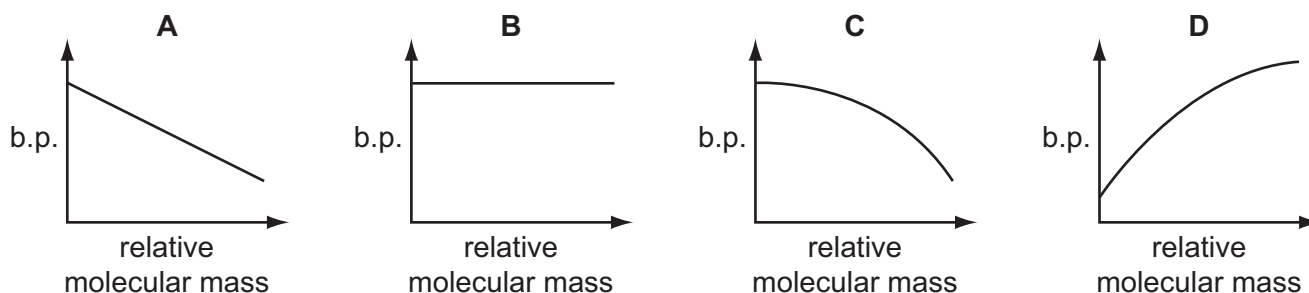
- 1 emissions from motor vehicles
- 2 photosynthesis
- 3 power stations using coal and oil

- A** 1, 2 and 3
- B** 1 and 2
- C** 1 and 3
- D** 2 and 3

24 How many elements are there in the compound ammonia?

- A** 2
- B** 3
- C** 4
- D** 5

25 Which graph represents the change in boiling point of the alkanes as their relative molecular mass increases?



26 Which can be used to distinguish between ethane and ethene?

- A** a lighted splint
- B** aqueous bromine
- C** limewater
- D** Universal Indicator

27 Ethanol is produced by the catalytic addition of steam to ethene.

What are the correct conditions for this process?

- A** 300 °C temperature and 60 atm pressure only
- B** phosphoric acid catalyst, 300 °C temperature and 60 atm pressure
- C** phosphoric acid catalyst and 60 atm pressure only
- D** phosphoric acid catalyst and 300 °C temperature only

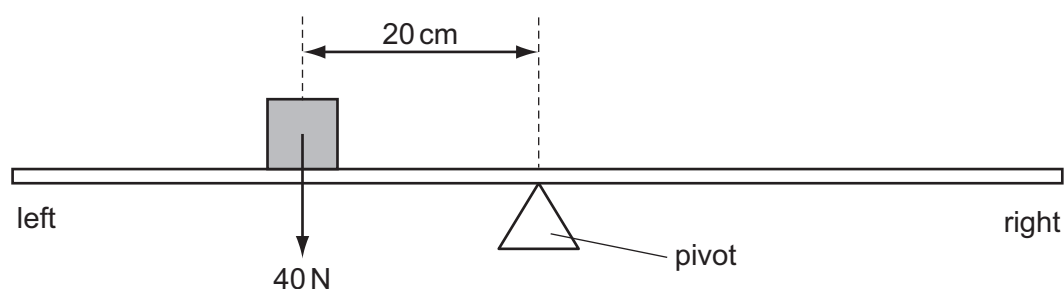
28 What gives the most accurate value for the internal diameter of a test-tube?

- A a measuring tape
- B a metre rule
- C a micrometer screw gauge
- D vernier calipers

29 What is the relationship between acceleration (a), force (F) and mass (m)?

- A $a = F \times m$ B $a = F + m$ C $a = F \div m$ D $a = m \div F$

30 A uniform beam is pivoted at its midpoint. An object is placed on the beam as shown.

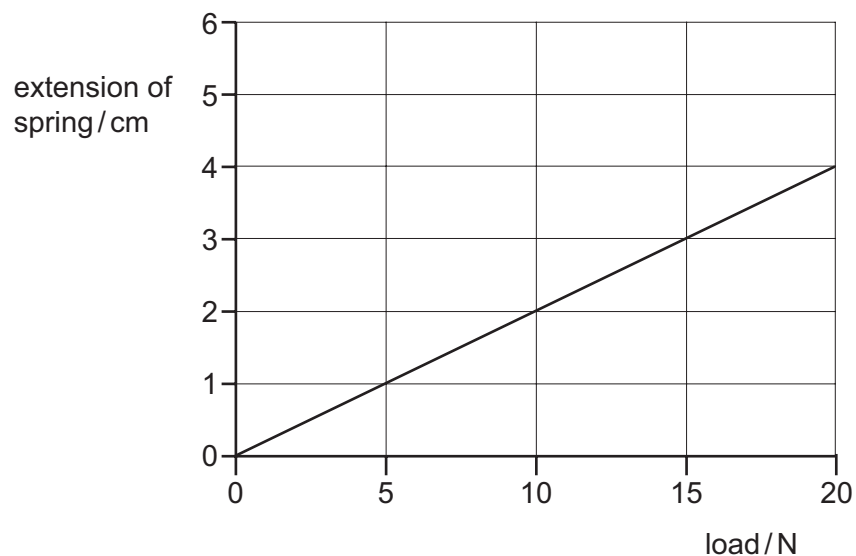


Which force and position will balance the system?

- A 20 N acting downwards, 40 cm to the right of the pivot
- B 20 N acting upwards, 40 cm to the right of the pivot
- C 50 N acting downwards, 10 cm to the left of the pivot
- D 50 N acting upwards, 10 cm to the left of the pivot

- 31** A spring balance is calibrated to give readings in newtons.

The graph shows how the extension of the spring varies with the load.



A load causes the spring of the balance to extend by 3 cm.

What is the balance reading?

- A** 3 N **B** 4 N **C** 15 N **D** 20 N
- 32** An electric motor lifts a weight of 8 N through a height of 5 m in 4 s.

What is the useful power developed?

- A** 2.5 W **B** 6.4 W **C** 10 W **D** 40 W
- 33** The heat from the hot water in a metal radiator passes through the metal and then spreads around the room.

What are the main processes by which the heat is transferred?

	through the metal radiator	around the room
A	conduction	conduction
B	conduction	convection
C	radiation	conduction
D	radiation	convection

- 34** A clinical thermometer is placed in a person's mouth and then removed to read the temperature.

Why is a clinical thermometer more suitable than a laboratory thermometer for this purpose?

- A** It has a larger range.
- B** It has a linear scale.
- C** It has a steady reading.
- D** It has a wider bore.

- 35** A ray of light strikes the surface of a glass block at an angle of incidence of 40° .

The refractive index of the glass is 1.5.

What is the angle of refraction inside the block?

- A** 25° **B** 31° **C** 40° **D** 75°

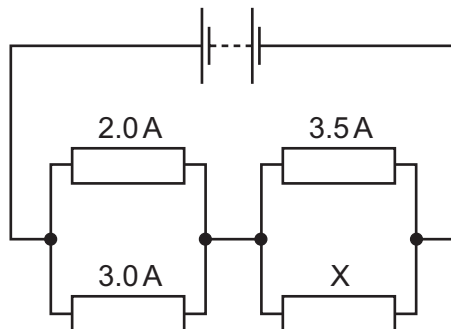
- 36** A resistor in a circuit has a value of resistance of 3.0Ω .

In 20 s, a charge of 10 C passes through the resistor.

What is the potential difference across the resistor?

- A** 0.67 V **B** 1.5 V **C** 6.0 V **D** 30 V

- 37** A circuit consists of a battery and four resistors.



The current in three of the resistors is shown.

What is the current in X?

- A** 1.5 A **B** 2.0 A **C** 3.0 A **D** 5.0 A

38 What are the materials used in the construction of an electromagnet and a permanent magnet?

	electromagnet	permanent magnet
A	iron	iron
B	iron	steel
C	steel	iron
D	steel	steel

39 Which table correctly identifies the locations of protons, neutrons and electrons in an atom?

A

	inside nucleus	outside nucleus
electrons	✓	
neutrons	✓	
protons		✓

B

	inside nucleus	outside nucleus
electrons		✓
neutrons		✓
protons	✓	

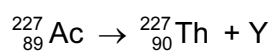
C

	inside nucleus	outside nucleus
electrons	✓	
neutrons		✓
protons		✓

D

	inside nucleus	outside nucleus
electrons		✓
neutrons	✓	
protons	✓	

40 The equation represents actinium decaying to thorium.



Which particle does Y represent?

- A** a helium nucleus
- B** a neutron
- C** an atom
- D** an electron

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DATA SHEET
The Periodic Table of the Elements

Group																	
I	II											III	IV	V	VI	VII	0
		1 H Hydrogen															
3 Li Lithium	4 Be Beryllium											5 B Boron	6 C Carbon	7 N Nitrogen	8 O Oxygen	9 F Fluorine	10 Ne Neon
11 Na Sodium	12 Mg Magnesium											13 Al Aluminium	14 Si Silicon	15 P Phosphorus	16 S Sulfur	17 Cl Chlorine	18 Ar Argon
19 K Potassium	20 Ca Calcium	21 Sc Scandium	22 Ti Titanium	23 V Vanadium	24 Cr Chromium	25 Mn Manganese	26 Fe Iron	27 Co Cobalt	28 Ni Nickel	29 Cu Copper	30 Zn Zinc	31 Ga Gallium	32 Ge Germanium	33 As Arsenic	34 Se Selenium	35 Br Bromine	36 Kr Krypton
37 Rb Rubidium	38 Sr Strontium	39 Y Yttrium	40 Zr Zirconium	41 Nb Niobium	42 Mo Molybdenum	43 Tc Technetium	44 Ru Ruthenium	45 Rh Rhodium	46 Pd Palladium	47 Ag Silver	48 Cd Cadmium	49 In Indium	50 Sn Tin	51 Sb Antimony	52 Te Tellurium	53 I Iodine	54 Xe Xenon
55 Cs Caesium	56 Ba Barium	57 La Lanthanum	72 Hf Hafnium	73 Ta Tantalum	74 W Tungsten	75 Re Rhenium	76 Os Osmium	77 Ir Iridium	78 Pt Platinum	79 Au Gold	80 Hg Mercury	81 Tl Thallium	82 Pb Lead	83 Bi Bismuth	84 Po Polonium	85 At Astatine	86 Rn Radon
87 Fr Francium	88 Ra Radium	89 Ac Actinium															
58-71 Lanthanoid series																	
90-103 Actinoid series																	

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

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

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).

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