



Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

COMBINED SCIENCE

Paper 1 Multiple Choice

0653/11

May/June 2015

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 **17** printed pages and **3** blank pages.

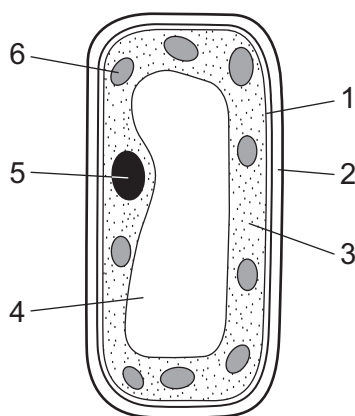


- 1 A biologist keeps a potted plant in a laboratory.

Which feature of the potted plant shows that it is a living organism?

- A It grows larger over time.
- B It has green leaves.
- C The compost in the pot dries after he waters it.
- D The stems contain xylem.

- 2 The diagram shows a palisade cell.



Which parts are found in plant cells and **not** in animal cells?

	1	2	3	4	5	6
A	✓	x	✓	✓	x	x
B	✓	x	✓	x	✓	x
C	x	✓	x	✓	x	✓
D	x	✓	x	x	✓	✓

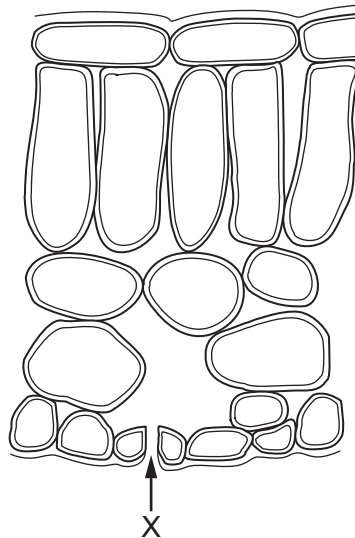
- 3 Which substances may diffuse into and out of plant cells?

	into plant cells	out of plant cells
A	chlorophyll	oxygen
B	oxygen	water
C	starch	chlorophyll
D	water	starch

4 Proteins that function as biological catalysts are called

- A enzymes
- B hormones
- C solvents
- D vitamins

5 The diagram shows a section through part of a leaf.



The leaf is photosynthesising in bright light.

What enters the leaf at X?

- A carbon dioxide
- B light
- C oxygen
- D water

- 6 Diagram 1 shows a water plant exposed to sunlight.

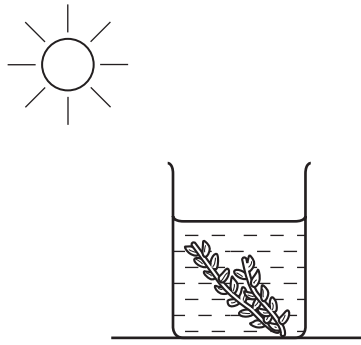


diagram 1

What change would take place if a black box is placed over the plant, as in diagram 2, and left for eight hours?

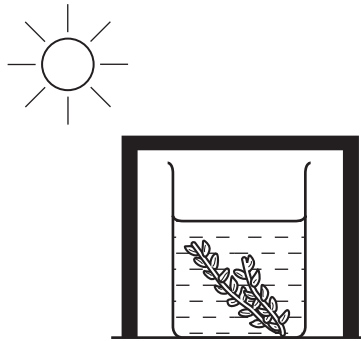
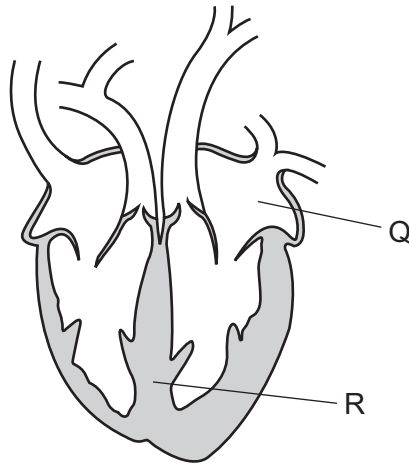


diagram 2

- A Carbon dioxide production would fall.
 - B Oxygen production would fall.
 - C Stomata would open wider.
 - D Respiration would stop.
- 7 A tree has lost most of its leaves.
- How does this affect the rate at which water is taken up by the trees?
- A Water uptake decreases but does not stop.
 - B Water uptake increases.
 - C Water uptake remains the same.
 - D Water uptake stops.

- 8 The diagram shows a heart in section and some of its blood vessels.



What are the parts Q and R?

	Q	R
A	aorta	septum
B	aorta	vena cava
C	atrium	septum
D	atrium	vena cava

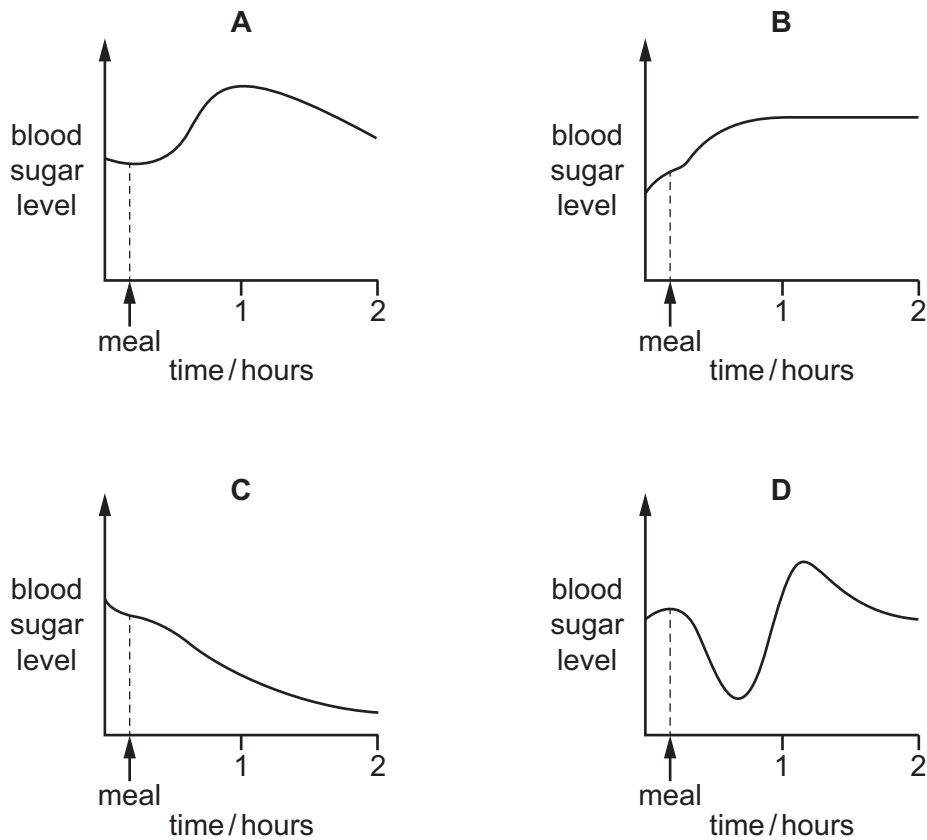
- 9 Monstera is a climbing plant. Some of its shoots grow away from light, which helps the plant to find support.

What is this an example of?

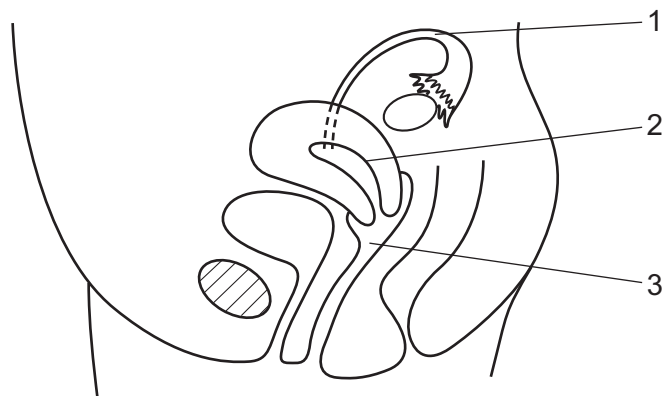
- A** geotropism
- B** photosynthesis
- C** phototropism
- D** respiration

10 A healthy person does not eat for several hours but then has a meal rich in carbohydrate.

Which graph shows how the person's blood sugar level changes after the meal?



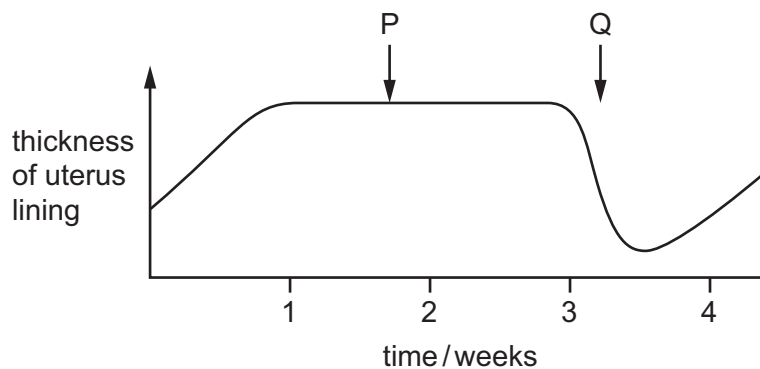
11 The diagram shows a side view of the female reproductive system in a human.



Where do fertilisation and implantation occur?

	fertilisation	implantation
A	1	2
B	2	1
C	2	3
D	3	2

- 12 The diagram shows the thickness of the uterus lining of a woman over a 4-week period.



What happens at P and Q?

	P	Q
A	fertilisation	ovulation
B	menstruation	fertilisation
C	menstruation	ovulation
D	ovulation	menstruation

- 13 An oxpecker bird perches on the back of a buffalo while the buffalo feeds on grass. The bird eats ticks that feed on the blood of the buffalo.

Which food chain represents these feeding relationships?

- A** grass → buffalo → oxpecker → ticks
B grass → buffalo → ticks → oxpecker
C oxpecker → ticks → buffalo → grass
D ticks → oxpecker → buffalo → grass

- 14 Which method is used to obtain a solid salt from the salt solution?

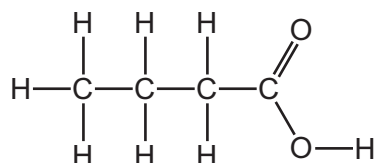
- A** crystallisation
B distillation
C filtration
D fractional distillation

- 15** Fluorine and chlorine are in Group VII of the Periodic Table.

Which number increases by eight from fluorine to chlorine?

- A** the number of atoms in one molecule
- B** the number of electrons in one atom
- C** the number of electrons in one molecule
- D** the number of nucleons in one atom

- 16** The structure of an organic compound is shown.



What is the formula of the compound?

- A** $C_3H_8O_2$ **B** C_4H_8O **C** $C_4H_8O_2$ **D** $C_3H_7O_2$

- 17** Which substances are formed at the electrodes during the electrolysis of aqueous copper chloride?

	anode	cathode
A	chlorine	copper
B	chlorine	hydrogen
C	copper	chlorine
D	hydrogen	copper

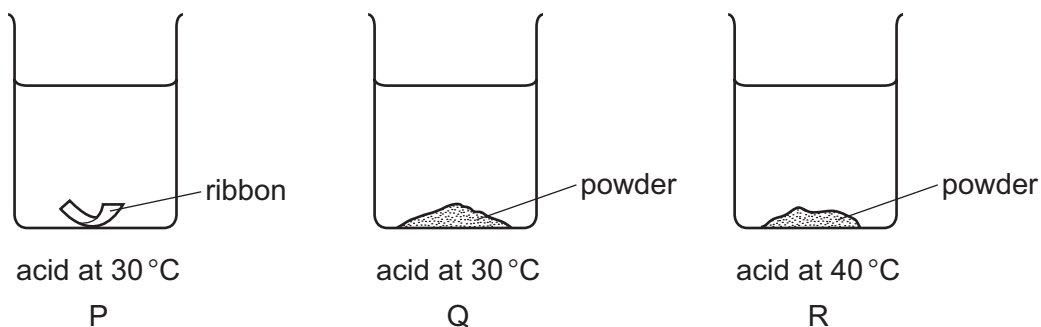
- 18** Sherbet is a mixture of citric acid and sodium hydrogencarbonate.

When sherbet is eaten, the chemicals react and cool the tongue.

Which word describes this type of reaction?

- A** combustion
- B** crystallisation
- C** endothermic
- D** exothermic

- 19 The diagram shows equal masses of magnesium added to equal volumes of acid of the same concentration.



What is the order of the speed of reaction?

	fastest	→	slowest
A	P	R	Q
B	Q	R	P
C	R	P	Q
D	R	Q	P

- 20 In the blast furnace, iron(III) oxide reacts with carbon forming iron and carbon monoxide.

What happens to the iron(III) oxide?

- A** It is oxidised by gaining oxygen.
B It is oxidised by losing oxygen.
C It is reduced by gaining oxygen.
D It is reduced by losing oxygen.

- 21 The table shows the results of tests on an aqueous solution of X.

test	result
blue litmus paper	turns red
aqueous silver nitrate	white precipitate formed

What is X?

- A** HCl **B** HNO_3 **C** NaCl **D** NaOH

22 Which element has similar chemical properties to bromine?

- A** argon
- B** iodine
- C** selenium
- D** sulfur

23 An electrical cable contains a copper wire surrounded by a layer of plastic.

Which properties explain why copper and plastic are used in this cable?

	copper	plastic
A	electrical conductor	electrical insulator
B	high melting point	low melting point
C	no reaction with acids	no reaction with acids
D	shiny surface	dull surface

24 A new alloy is resistant to corrosion.

It costs about the same as aluminium but it is slightly poisonous.

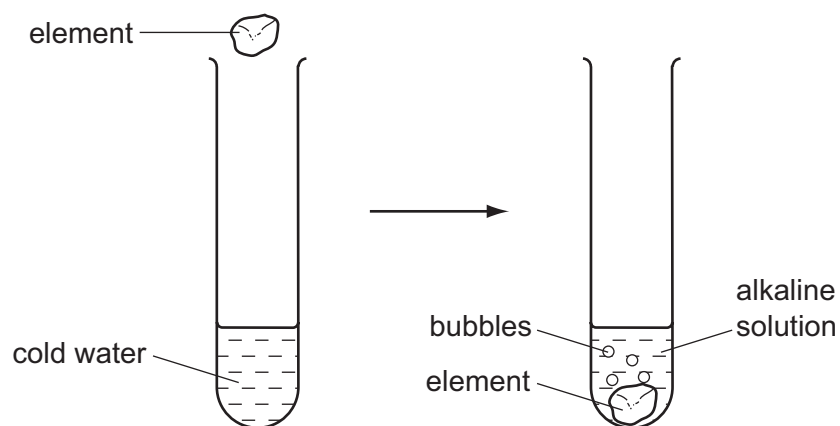
Its density, compared with stainless steel and aluminium, is shown.

	aluminium	new alloy	stainless steel
<u>density</u> g/cm ³	2.7	2.8	7.9

What is this new alloy used to make?

- A** aircraft frames
- B** cutlery
- C** electrical insulators
- D** food containers

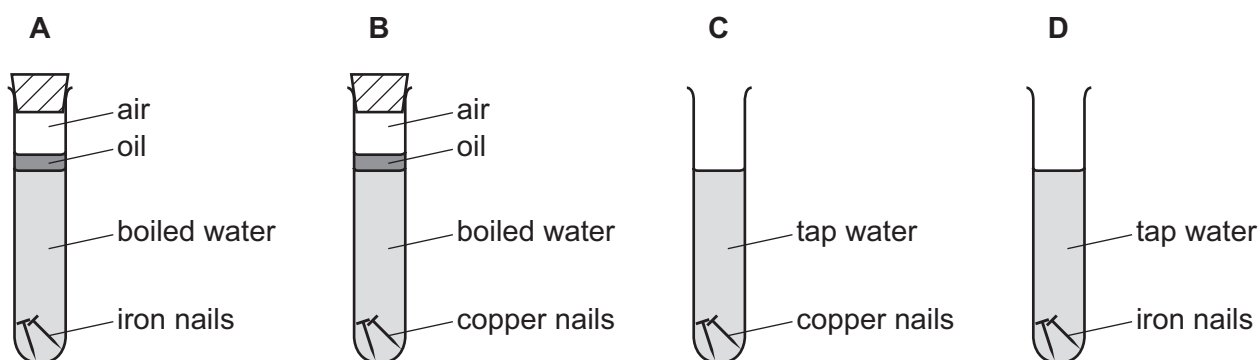
25 The diagram shows an element being added to cold water to form a gas and an alkaline solution.



What is the element?

- A calcium
- B carbon
- C copper
- D sulfur

26 In which test-tube does a chemical change take place most quickly?



27 Which compound is the main constituent of natural gas?

- A butane
- B ethane
- C methane
- D propane

- 28 An athlete runs 10 000 metres in 30 minutes.

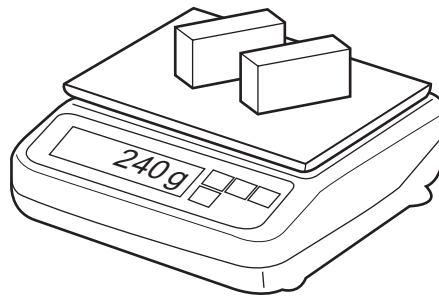
What is her average speed?

- A 3 km/hour
- B 5 km/hour
- C 10 km/hour
- D 20 km/hour

- 29 A shop-keeper places **two** identical blocks of cheese on a balance.

The combined mass of the two blocks of cheese is 240 g.

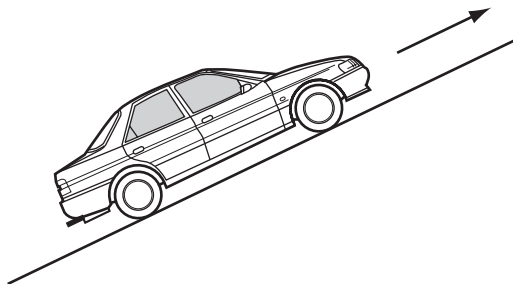
Each block measures $2.0\text{ cm} \times 5.0\text{ cm} \times 10.0\text{ cm}$.



What is the density of the cheese?

- A 0.42 g/cm^3
- B 0.83 g/cm^3
- C 1.2 g/cm^3
- D 2.4 g/cm^3

- 30 The speed of a car increases as it moves up a hill.



Which energy changes are taking place?

	gravitational energy	kinetic energy
A	decreasing	decreasing
B	increasing	decreasing
C	decreasing	increasing
D	increasing	increasing

31 Cold water evaporates as molecules leave it.

Which molecules leave the water and from which part of the water do they leave?

	molecules that leave the water	where they leave from
A	least energetic	the surface only
B	least energetic	throughout the water
C	most energetic	the surface only
D	most energetic	throughout the water

32 The table shows the melting points and boiling points of four substances.

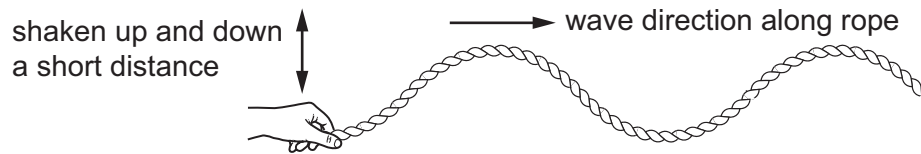
Which substance is a liquid at a room temperature of 20 °C?

	melting point/°C	boiling point/°C
A	–101	–35
B	–39	357
C	30	2100
D	327	1750

33 Which row is correct?

	conduction of heat	convection of heat
A	can happen in a solid	can happen in a solid
B	can happen in a solid	only happens in liquids and gases
C	only happens in liquids and gases	can happen in a solid
D	only happens in liquids and gases	only happens in liquids and gases

- 34 A student shakes one end of a long rope up and down. A wave travels along the rope in the direction shown.

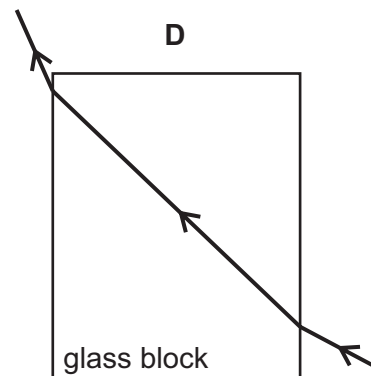
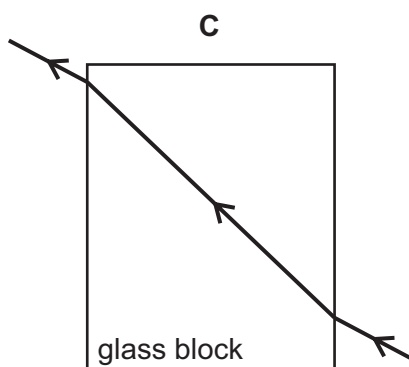
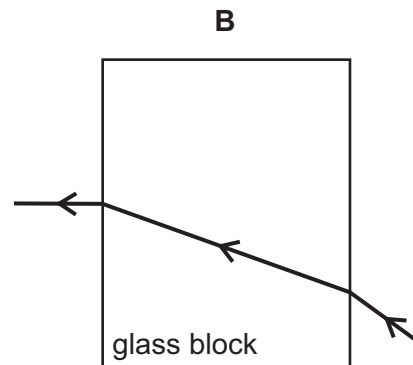
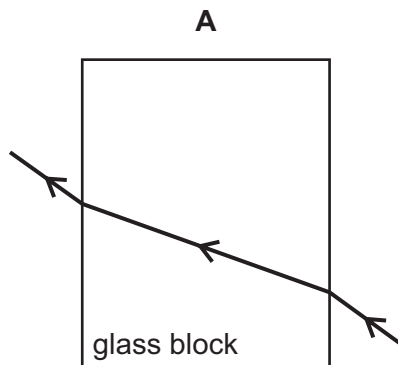


The student now moves the rope up and down through a larger distance. He also shakes it fewer times each minute.

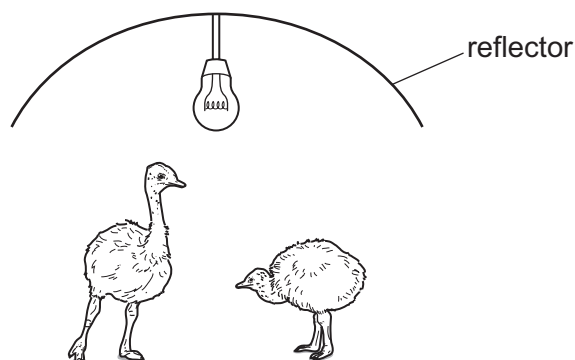
Which row shows the effects of these two changes?

	amplitude of the wave	frequency of the wave
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

- 35 Which diagram shows a ray of light passing through a glass block in air?



- 36 A filament lamp is used in a zoo to keep young animals warm.



What are the main types of wave given out by the lamp?

- A visible light and infra-red
 - B visible light and microwaves
 - C visible light and radio waves
 - D visible light and X-rays
- 37 A loudspeaker is made to vibrate at four different frequencies.

Which frequency **cannot** produce a sound that a human can hear?

- A 60 Hz B 600 Hz C 6.0 kHz D 60 kHz

- 38 A mains circuit can safely supply a current of 40 A.

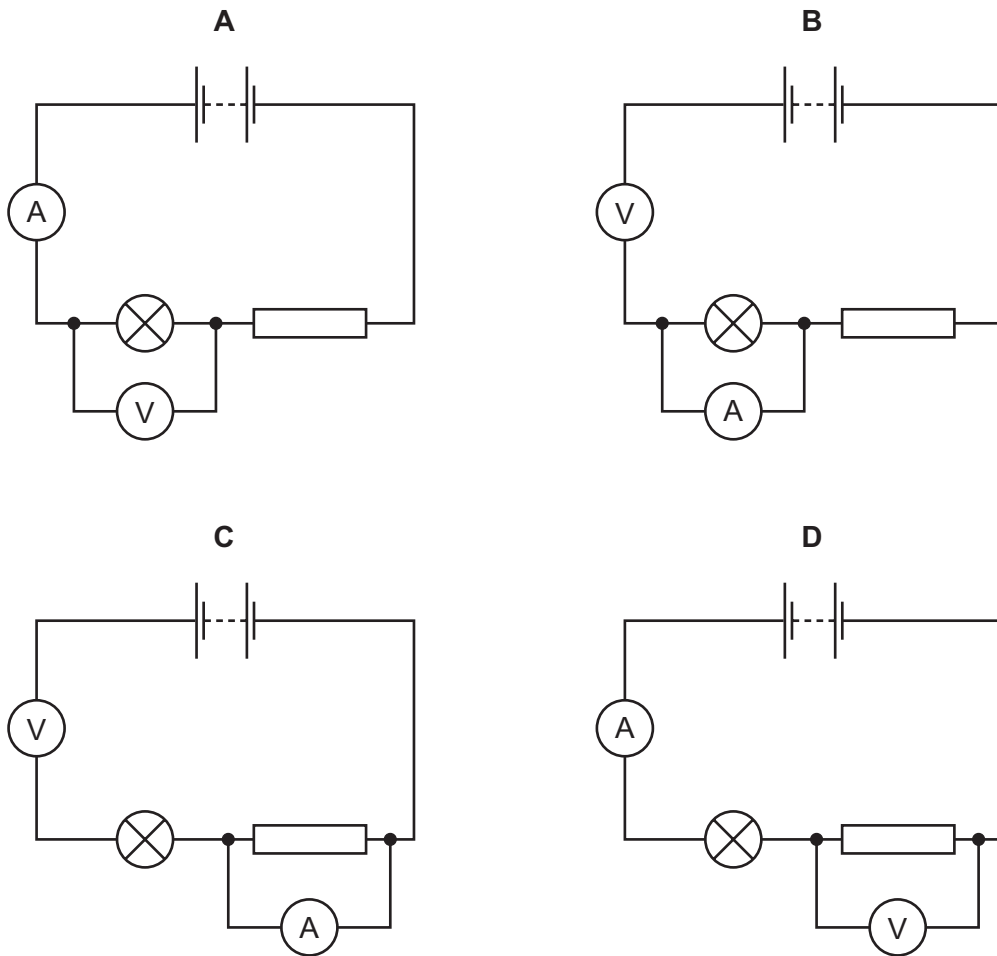
A hairdryer takes 2 A. It is connected to the circuit by a lead which can safely carry up to 5 A.

Which fuse should be used to protect the hairdryer?

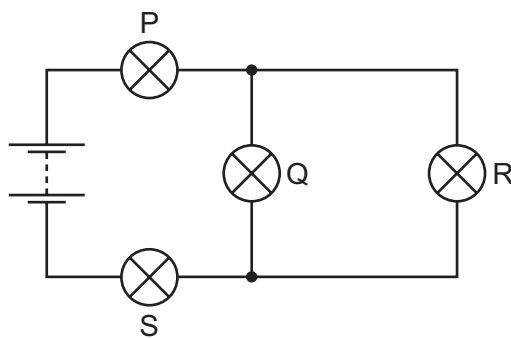
- A 1 A fuse B 3 A fuse C 10 A fuse D 50 A fuse

39 A voltmeter and an ammeter are used to determine the resistance of a lamp.

Which circuit shows the meters connected to take the necessary measurements?



40 The diagram shows a circuit with four identical bulbs P, Q, R and S.



Which statement about the brightness of the bulbs is correct?

- A** P is the same brightness as Q.
- B** P is the same brightness as S.
- C** Q is brighter than S.
- D** R is brighter than P.

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DATA SHEET

The Periodic Table of the Elements

[illegible]

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



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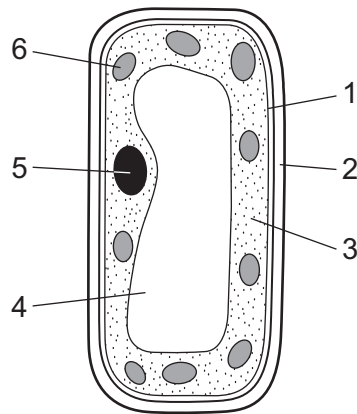
A copy of the Periodic Table is printed on page 20.

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- 1 The diagram shows a palisade cell.

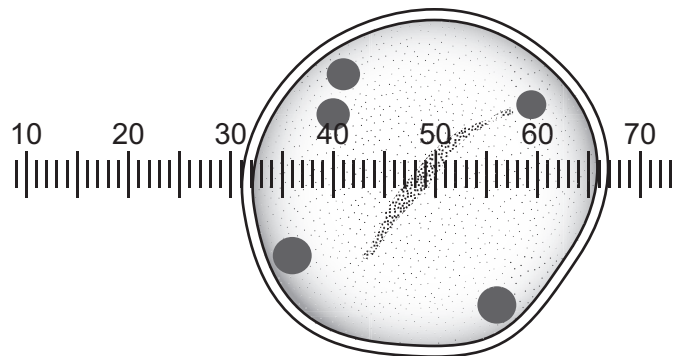


Which parts are found in plant cells and **not** in animal cells?

	1	2	3	4	5	6
A	✓	x	✓	✓	x	x
B	✓	x	✓	x	✓	x
C	x	✓	x	✓	x	✓
D	x	✓	x	x	✓	✓

- 2 The diagram shows a biological specimen as viewed through a light microscope.

The scale is in mm.



What is the diameter of the specimen?

- A** 28 mm **B** 31 mm **C** 36 mm **D** 67 mm

3 Which substances may diffuse into and out of plant cells?

	into plant cells	out of plant cells
A	chlorophyll	oxygen
B	oxygen	water
C	starch	chlorophyll
D	water	starch

4 The numbered statements are about enzymes.

- 1 All enzymes are proteins.
- 2 Enzymes are destroyed at temperatures below 5 °C.
- 3 Enzymes speed up the rate of chemical reactions.
- 4 The higher the pH the faster the enzymes work.

Which statements are correct for **all** enzymes?

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

5 The table names some places where processes involved in animal nutrition may take place.

Which row is correct?

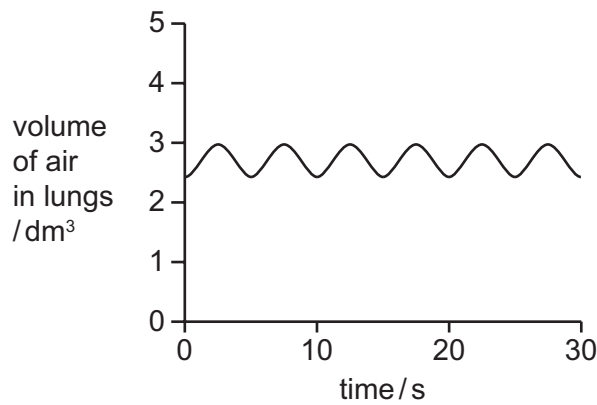
	ingestion	digestion
A	mouth	mouth cavity
B	mouth	pancreas
C	oesophagus	ileum
D	oesophagus	stomach

6 In transpiration, most of the water evaporates at the surface of which part of a leaf?

- A** epidermis
B guard cells
C mesophyll
D xylem

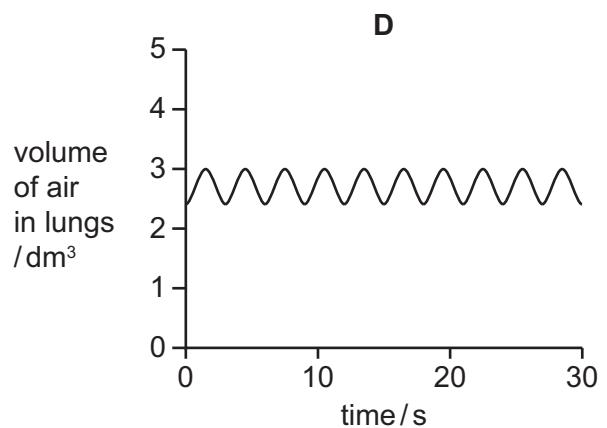
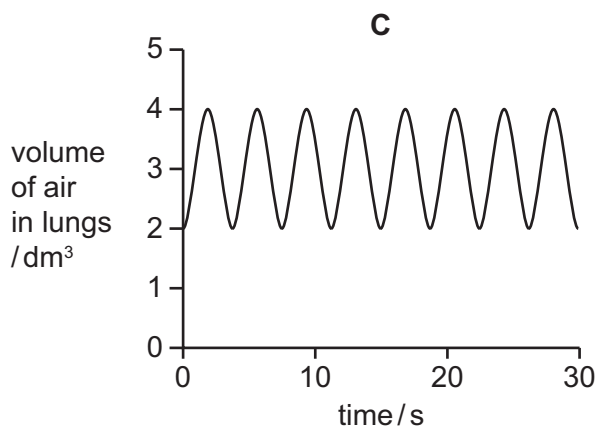
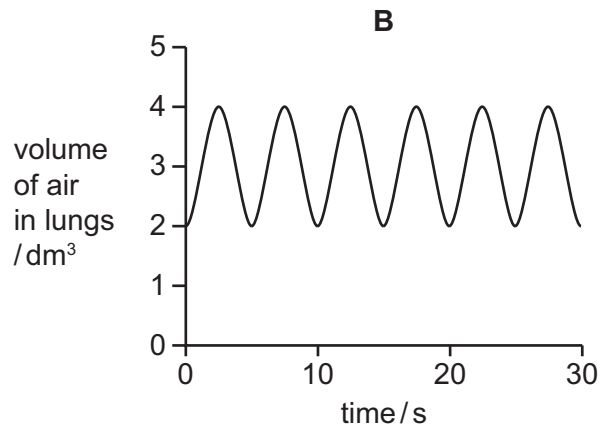
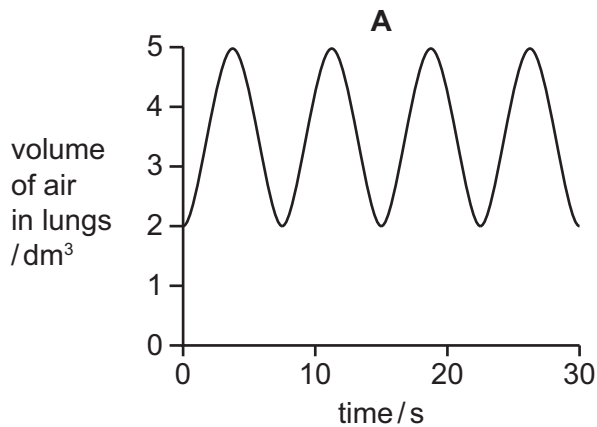
- 7 Which statement about respiration is **not** correct?
- A Respiration always releases energy.
 - B Respiration in green plants does not use oxygen.
 - C Respiration occurs only in living cells.
 - D Respiration provides energy for muscle contraction

- 8 The diagram shows the volume of air in the lungs over a period of 30 s for a person at rest.



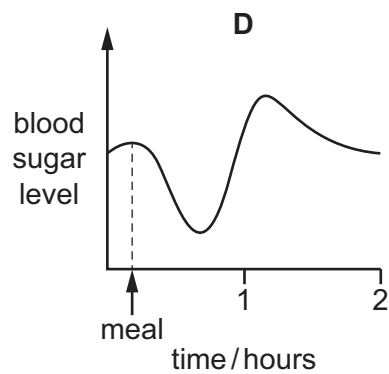
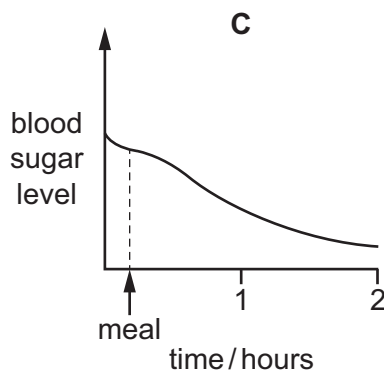
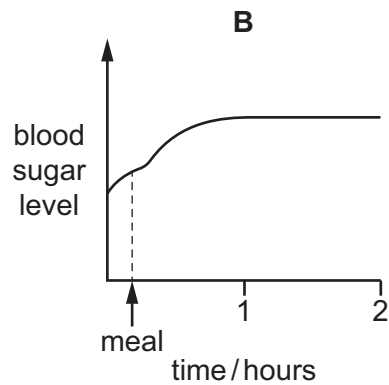
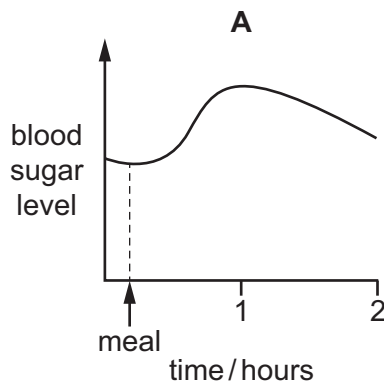
The following graphs show the volume of air in the lungs over a similar period of time when the same person is no longer at rest.

Which graph records the rate and depth of breathing during vigorous activity?



- 9 A healthy person does not eat for several hours but then has a meal rich in carbohydrate.

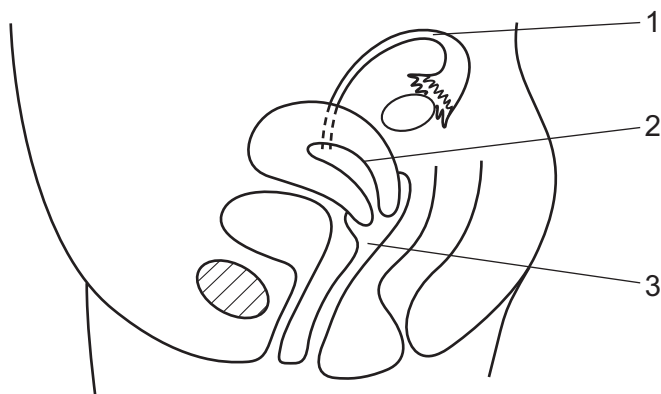
Which graph shows how the person's blood sugar level changes after the meal?



- 10 What is the stimulus for geotropism in plants?

- A** gravity
- B** light
- C** temperature
- D** water

11 The diagram shows a side view of the female reproductive system in a human.



Where do fertilisation and implantation occur?

	fertilisation	implantation
A	1	2
B	2	1
C	2	3
D	3	2

12 What are features of asexual reproduction?

	number of parents	presence of gametes	production of a zygote
A	1	✓	✓
B	1	✗	✗
C	2	✓	✗
D	2	✗	✓

13 A farmer makes his grass grow more quickly by adding cow manure to the soil. He feeds this grass to the same cows and milks the cows.

Which is the producer in this food chain?

- A** the cows
- B** the farmer
- C** the grass
- D** the manure

14 How many atoms of hydrogen are present in three molecules of ammonia, NH_3 .

- A** 3 **B** 6 **C** 9 **D** 12

15 Which processes are involved in the separation of petroleum?

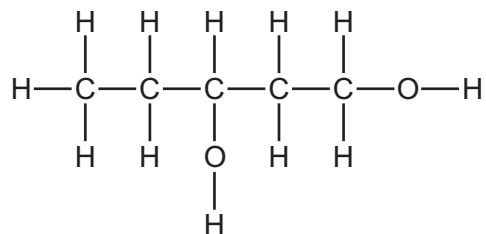
- A** condensation and crystallisation
B condensation only
C evaporation and condensation
D evaporation only

16 Fluorine and chlorine are in Group VII of the Periodic Table.

Which number increases by eight from fluorine to chlorine?

- A** the number of atoms in one molecule
B the number of electrons in one atom
C the number of electrons in one molecule
D the number of nucleons in one atom

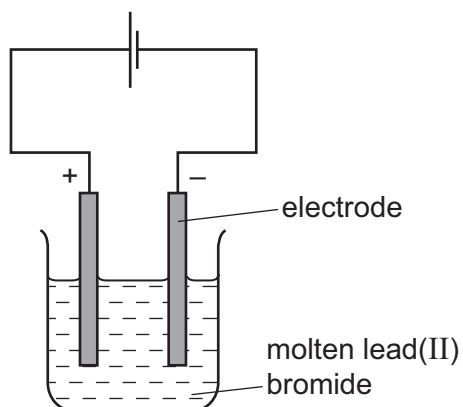
17 The structure of a compound is shown.



What is the formula of the compound?

- A** $\text{C}_5\text{H}_{11}\text{O}$ **B** $\text{C}_5\text{H}_{11}\text{O}_2$ **C** $\text{C}_5\text{H}_{12}\text{O}$ **D** $\text{C}_5\text{H}_{12}\text{O}_2$

18 The diagram shows the electrolysis of molten lead(II) bromide.



Which row is correct?

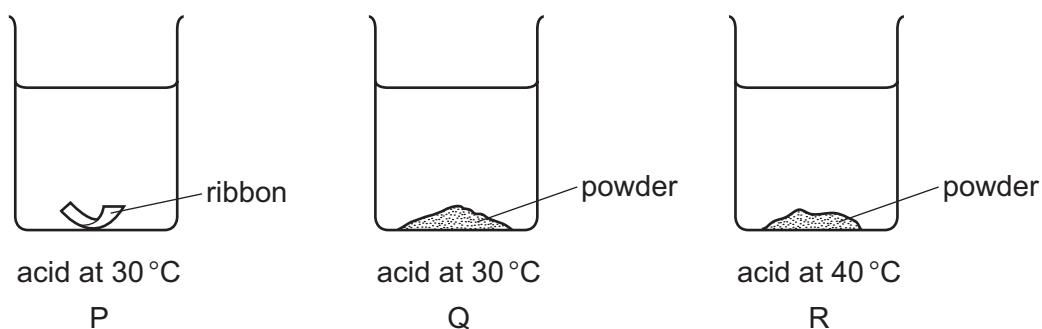
	name of positive electrode	product at the negative electrode
A	anode	bromine
B	anode	lead
C	cathode	bromine
D	cathode	lead

19 A student measures the initial and final temperatures of four different reactions.

Which reaction is endothermic?

	initial temperature / °C	final temperature / °C
A	2	20
B	20	20
C	22	42
D	30	27

- 20 The diagram shows equal masses of magnesium added to equal volumes of acid of the same concentration.



What is the order of the speed of reaction?

	fastest	→	slowest
A	P	R	Q
B	Q	R	P
C	R	P	Q
D	R	Q	P

- 21 Magnesium reacts with carbon dioxide to give magnesium oxide and carbon.

What happens to the magnesium?

- A** It is oxidised by gaining oxygen.
B It is oxidised by losing oxygen.
C It is reduced by gaining oxygen.
D It is reduced by losing oxygen.

- 22 The table shows the results of tests on an aqueous solution of X.

test	result
blue litmus paper	turns red
aqueous silver nitrate	white precipitate formed

What is X?

- A** HCl **B** HNO_3 **C** NaCl **D** NaOH

23 Lithium is a metal in Group I of the Periodic Table.

Which statement about lithium is correct?

- A** It is hard with the highest melting point in Group I.
- B** It is hard with the lowest melting point in Group I.
- C** It is soft with the highest melting point in Group I.
- D** It is soft with the lowest melting point in Group I.

24 A new alloy is resistant to corrosion.

It costs about the same as aluminium but it is slightly poisonous.

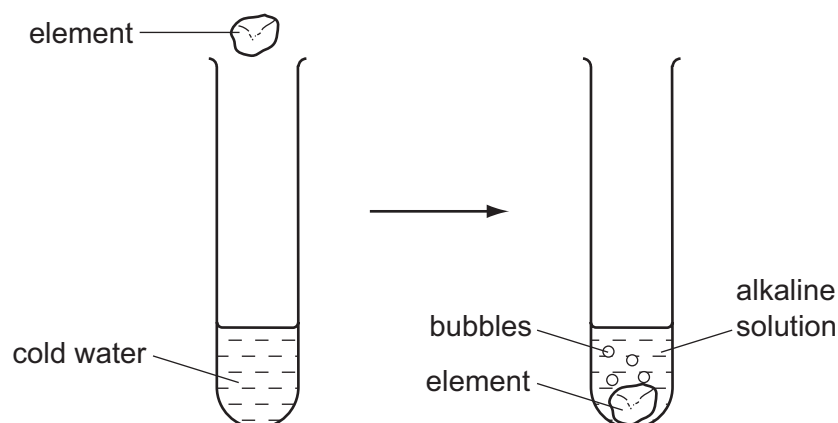
Its density, compared with stainless steel and aluminium, is shown.

	aluminium	new alloy	stainless steel
<u>density</u> g/cm ³	2.7	2.8	7.9

What is this new alloy used to make?

- A** aircraft frames
- B** cutlery
- C** electrical insulators
- D** food containers

- 25 The diagram shows an element being added to cold water to form a gas and an alkaline solution.



What is the element?

- A calcium
 - B carbon
 - C copper
 - D sulfur
- 26 Carbon is used to extract copper from copper oxide.

Which statement about the process is correct?

- A Carbon is an oxidising agent.
 - B Carbon is more reactive than copper.
 - C Copper is more reactive than carbon.
 - D Copper oxide is a reducing agent.
- 27 Iron rusts when it reacts with oxygen and water.

Which substances are used to prevent rusting?

	oil	paint	zinc
A	✓	✓	✓
B	✓	✓	x
C	✓	x	✓
D	x	✓	✓

key

✓ = yes

x = no

- 28 An ant walks a distance of 90 cm in a time of 1 minute at a steady speed.

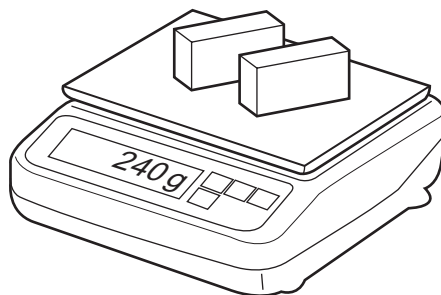
What is its speed?

- A 0.011 cm/s
- B 0.67 cm/s
- C 1.5 cm/s
- D 90 cm/s

- 29 A shop-keeper places **two** identical blocks of cheese on a balance.

The combined mass of the two blocks of cheese is 240 g.

Each block measures $2.0\text{ cm} \times 5.0\text{ cm} \times 10.0\text{ cm}$.

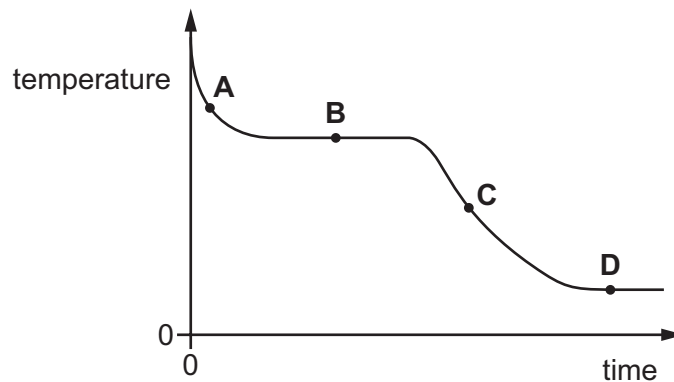


What is the density of the cheese?

- A** 0.42 g/cm^3 **B** 0.83 g/cm^3 **C** 1.2 g/cm^3 **D** 2.4 g/cm^3
- 30 A car is driven on a long journey along a horizontal road. The car stops several times on the journey and its engine becomes hot.
- Which type of energy remains constant during the journey?
- A** the chemical energy in the fuel tank
B the gravitational energy of the car
C the kinetic energy of the car
D the thermal energy of the engine
- 31 Which statement about the evaporation of a liquid is **not** correct?
- A** Evaporation happens only at one particular temperature.
B Evaporation happens only at the surface of the liquid.
C Evaporation happens when the more energetic molecules escape from the liquid.
D The energy required for evaporation can cause the liquid to cool.

- 32** Hot, liquid wax is allowed to cool to room temperature. The graph shows how the temperature of the wax changes with time.

At which labelled point on the graph are both liquid wax and solid wax present?



- 33** Which row is correct?

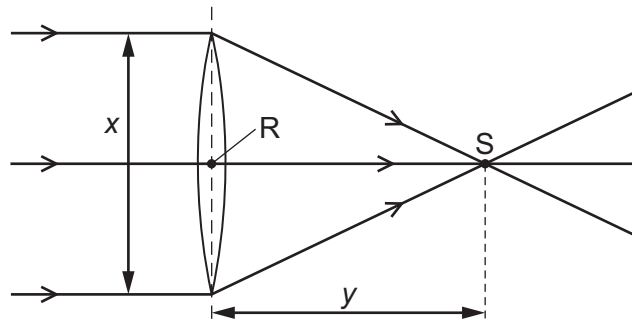
	conduction of heat	convection of heat
A	can happen in a solid	can happen in a solid
B	can happen in a solid	only happens in liquids and gases
C	only happens in liquids and gases	can happen in a solid
D	only happens in liquids and gases	only happens in liquids and gases

- 34** A boat floats on the sea. The boat moves slowly up and down as a wave passes it. The amplitude of the wave is 0.50 m.

What is the vertical distance between the highest and lowest positions of the boat as the wave passes it?

- A** 0 m **B** 0.50 m **C** 1.0 m **D** 2.0 m

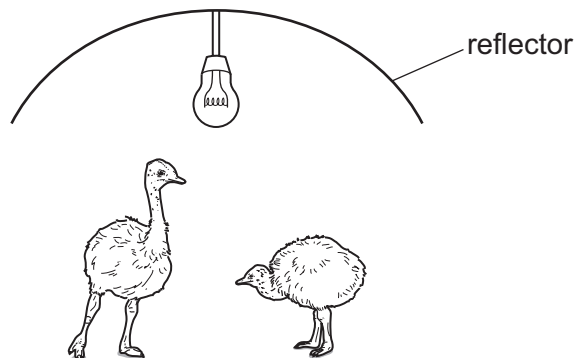
35 The diagram shows three rays of light passing through a converging lens.



Which labelled point is the principal focus of the lens, and which labelled distance is the focal length of the lens?

	principal focus	focal length
A	R	x
B	R	y
C	S	x
D	S	y

36 A filament lamp is used in a zoo to keep young animals warm.



What are the main types of wave given out by the lamp?

- A** visible light and infra-red
- B** visible light and microwaves
- C** visible light and radio waves
- D** visible light and X-rays

- 37** A loudspeaker vibrates with different amplitudes and at different frequencies.

Which amplitude and which frequency produces the louder, higher-pitched sound?

- A** large amplitude and high frequency
- B** large amplitude and low frequency
- C** small amplitude and high frequency
- D** small amplitude and low frequency

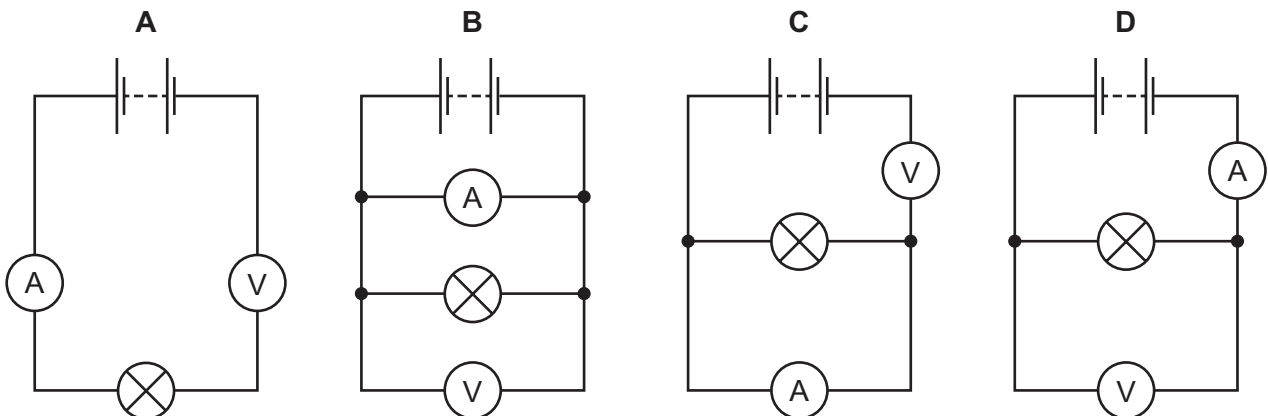
- 38** The current in a lamp is 0.25 A. The maximum safe current in the cable to the lamp is 5.0 A.

Which fuse should be used to protect the lamp circuit?

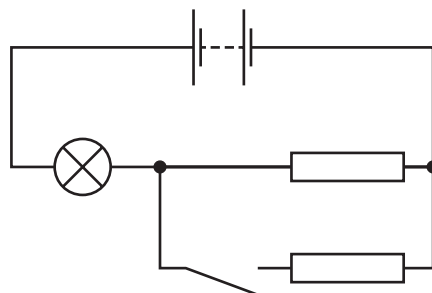
- A** 0.2 A
- B** 1.0 A
- C** 5.0 A
- D** 10.0 A

- 39** A student connects a battery to a lamp. She wishes to measure the current in the lamp and the potential difference across the lamp.

Which circuit is used to do this?



40 In the circuit shown, the switch is open.



What happens to the lamp when the switch is closed?

- A It becomes brighter.
- B It becomes dimmer.
- C It becomes dimmer at first, then brighter.
- D Its brightness does not change.

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DATA SHEET
The Periodic Table of the Elements

Group																	
I	II											III	IV	V	VI	VII	0
		1 H Hydrogen 1															
7 Li Lithium 3	9 Be Beryllium 4											11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10
23 Na Sodium 11	24 Mg Magnesium 12											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
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	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36
85 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	98 Tc Technetium 43	101 Ru Ruthenium 44	103 Rh Rhodium 45	106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54
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	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	210 Po Polonium 84	210 At Astatine 85	210 Rn Radon 86
87 Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89															
58-71 Lanthanoid series																	
90-103 Actinoid series																	

a = relative atomic mass

X = atomic symbol

b = proton (atomic) number

Key

a	X	b
---	---	---

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



Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

COMBINED SCIENCE

Paper 1 Multiple Choice

0653/13

May/June 2015

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.

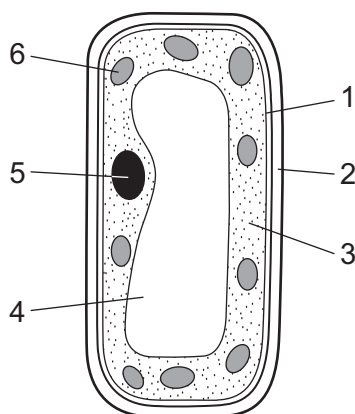
This document consists of **16** printed pages.



1 Which process produces an element that is excreted?

- A fertilisation
- B photosynthesis
- C respiration
- D transpiration

2 The diagram shows a palisade cell.



Which parts are found in plant cells and **not** in animal cells?

	1	2	3	4	5	6
A	✓	x	✓	✓	x	x
B	✓	x	✓	x	✓	x
C	x	✓	x	✓	x	✓
D	x	✓	x	x	✓	✓

3 Which substances may diffuse into and out of plant cells?

	into plant cells	out of plant cells
A	chlorophyll	oxygen
B	oxygen	water
C	starch	chlorophyll
D	water	starch

- 4 When an apple is cut, the cut surface quickly turns brown. This is due to enzyme action.

Which action destroys the enzyme?

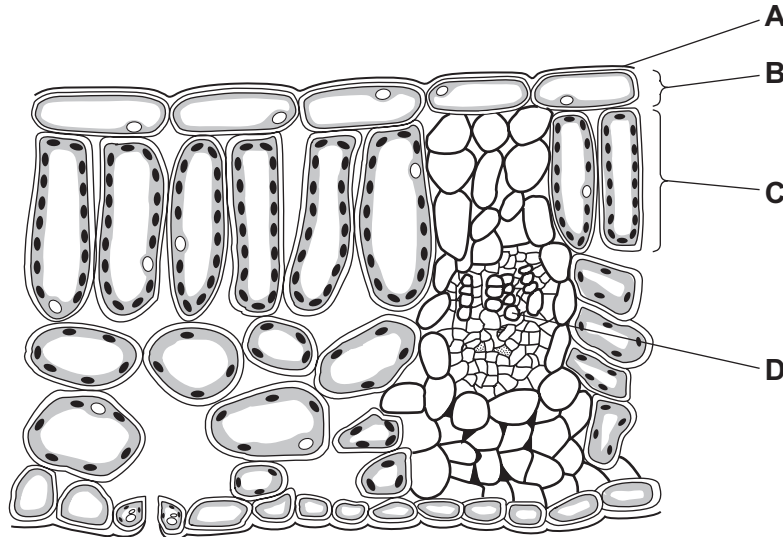
- A brushing the cut surface with a strong sugar solution
- B cutting the apple into smaller pieces
- C dipping the cut apple in boiling water
- D dipping the cut apple in cold water

- 5 Which nutrients are needed in the diet to produce strong bones?

	calcium	iron	vitamin C	vitamin D
A	✓	✓	✗	✗
B	✓	✗	✗	✓
C	✗	✓	✗	✓
D	✗	✗	✓	✓

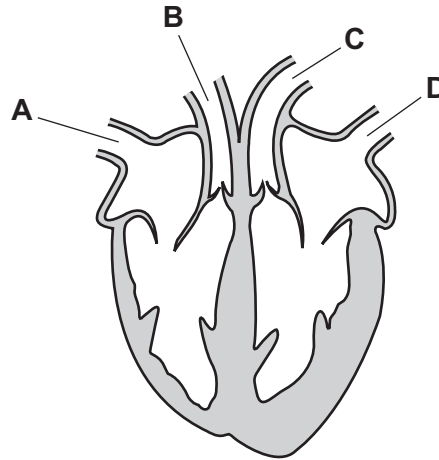
- 6 The diagram shows a section through a leaf.

Where are there cells that contain the light-absorbing structures?

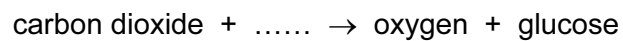


- 7 The diagram represents the human heart and associated blood vessels.

Which blood vessel carries deoxygenated blood away from the heart?



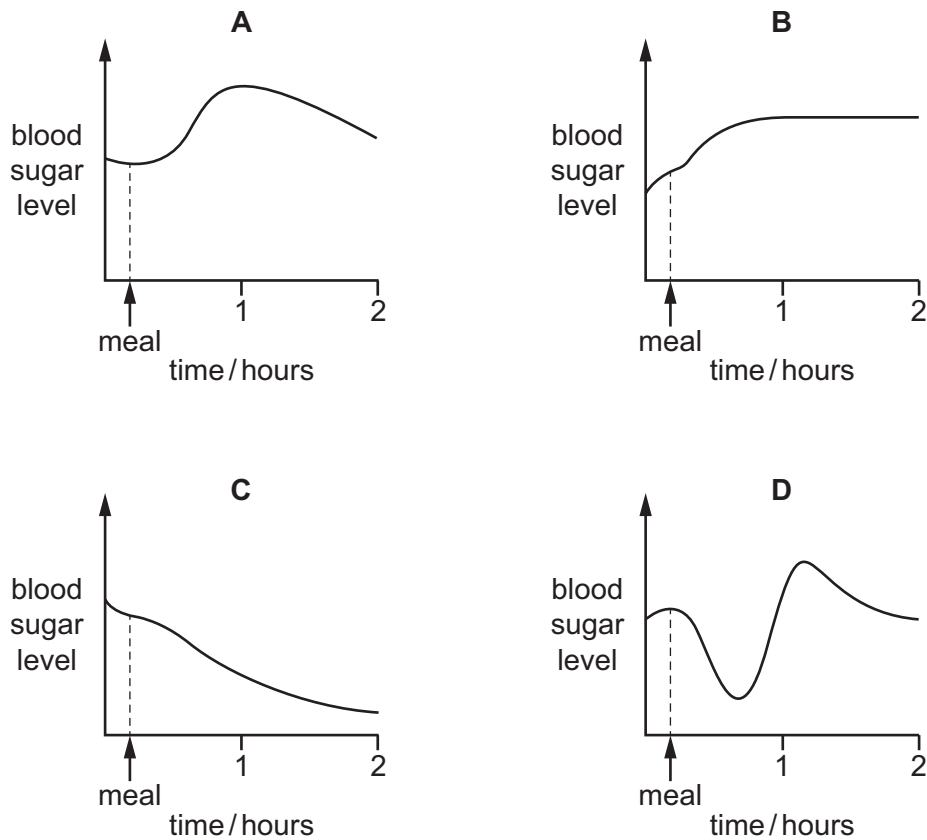
- 8 Which word is missing from the equation for a chemical reaction which takes place in living cells?



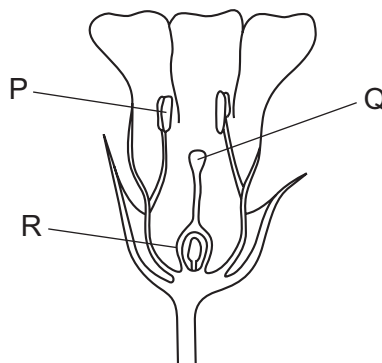
- A enzyme
B fat
C starch
D water
- 9 Where in the body are hormones destroyed?
- A gall bladder
B kidney
C liver
D pancreas

10 A healthy person does not eat for several hours but then has a meal rich in carbohydrate.

Which graph shows how the person's blood sugar level changes after the meal?



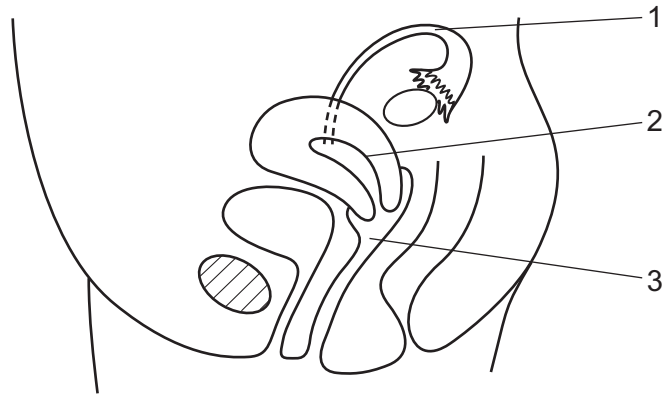
11 The diagram shows a section through a flower.



Which row correctly identifies the labelled parts of the flower?

	P	Q	R
A	anther	ovary	stigma
B	anther	stigma	ovary
C	stamen	carpel	sepal
D	stamen	sepal	carpel

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



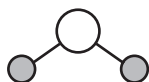
Where do fertilisation and implantation occur?

	fertilisation	implantation
A	1	2
B	2	1
C	2	3
D	3	2

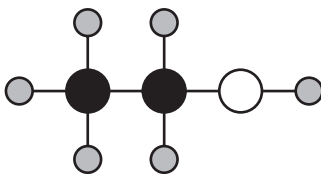
13 When fossil fuels are burnt, what is released?

	energy	carbon dioxide	oxygen
A	✓	✓	✓
B	✓	✓	x
C	✓	x	✓
D	x	✓	✓

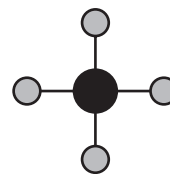
14 The structures of three molecules are shown.



water



ethanol



methane

How many atoms are in each of these molecules?

	water	ethanol	methane
A	2	3	2
B	2	4	5
C	3	3	2
D	3	9	5

15 Which method is used to determine the number of dyes present in ink?

- A** chromatography
- B** crystallisation
- C** distillation
- D** filtration

16 Fluorine and chlorine are in Group VII of the Periodic Table.

Which number increases by eight from fluorine to chlorine?

- A** the number of atoms in one molecule
- B** the number of electrons in one atom
- C** the number of electrons in one molecule
- D** the number of nucleons in one atom

17 Sodium nitrate contains one atom of sodium, one atom of nitrogen and three atoms of oxygen.

What is the formula of sodium nitrate?

- A** NaN_3O
- B** NaNO_3
- C** SN_3O
- D** SNO_3

- 18 During the electrolysis of aqueous copper chloride, inert electrodes are placed in the solution.

The copper chloride solution is the 1..... .

Copper is deposited on the 2..... when electricity is passed through the solution.

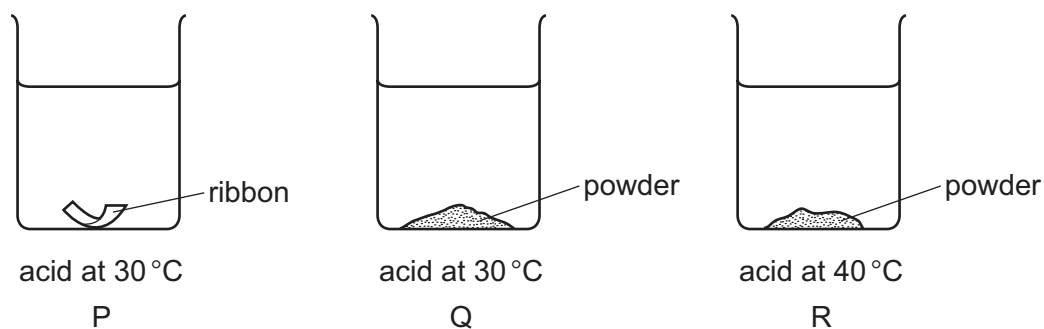
Which words correctly complete the gaps?

	gap 1	gap 2
A	electrode	anode
B	electrode	cathode
C	electrolyte	anode
D	electrolyte	cathode

- 19 Which change **must** take place in an endothermic reaction?

- A** Bubbles of gas are released.
- B** The mass decreases.
- C** The temperature decreases.
- D** The temperature increases.

- 20 The diagram shows equal masses of magnesium added to equal volumes of acid of the same concentration.



What is the order of the speed of reaction?

	fastest	→	slowest
A	P	R	Q
B	Q	R	P
C	R	P	Q
D	R	Q	P

21 The following reactions occur in the blast furnace.

reaction 1: iron oxide + carbon monoxide $\rightarrow$ iron + carbon dioxide

reaction 2: iron oxide + carbon $\rightarrow$ iron + carbon monoxide

Which two substances are oxidised in these reactions?

- A carbon and carbon monoxide
- B carbon monoxide and carbon dioxide
- C iron and carbon dioxide
- D iron and iron oxide

22 The table shows the results of tests on an aqueous solution of X.

test	result
blue litmus paper	turns red
aqueous silver nitrate	white precipitate formed

What is X?

- A HCl
- B HNO_3
- C NaCl
- D NaOH

23 Chromium is a transition metal.

Which properties are shown by chromium?

	high melting point	low density	acts as a catalyst
A	✓	✓	✓
B	✓	✓	x
C	✓	x	✓
D	x	✓	✓

key

✓ = yes

x = no

- 24 A new alloy is resistant to corrosion.

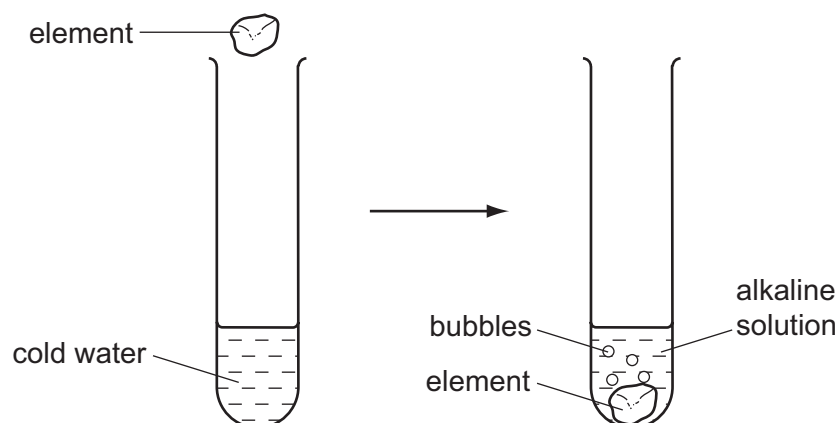
It costs about the same as aluminium but it is slightly poisonous.

Its density, compared with stainless steel and aluminium, is shown.

	aluminium	new alloy	stainless steel
<u>density</u> g/cm ³	2.7	2.8	7.9

What is this new alloy used to make?

- A aircraft frames
 - B cutlery
 - C electrical insulators
 - D food containers
- 25 The diagram shows an element being added to cold water to form a gas and an alkaline solution.



What is the element?

- A calcium
 - B carbon
 - C copper
 - D sulfur
- 26 Which process does **not** produce carbon dioxide?
- A combustion of coal
 - B reaction of calcium carbonate with hydrochloric acid
 - C respiration
 - D rusting of iron

27 Which gas is the main constituent of natural gas?

- A carbon dioxide
- B methane
- C nitrogen
- D oxygen

28 A student travels a distance of 6.0 km at a steady speed. She completes her journey in a time of 5.0 minutes.

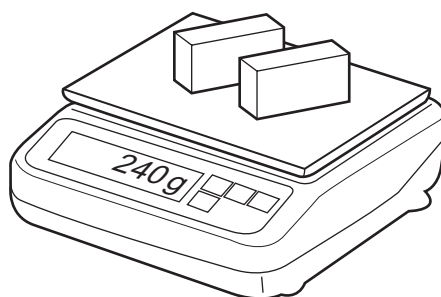
What is her speed?

- A 1.2 m/s B 20 m/s C 30 m/s D 50 m/s

29 A shop-keeper places **two** identical blocks of cheese on a balance.

The combined mass of the two blocks of cheese is 240 g.

Each block measures 2.0 cm × 5.0 cm × 10.0 cm.



What is the density of the cheese?

- A 0.42 g/cm³ B 0.83 g/cm³ C 1.2 g/cm³ D 2.4 g/cm³

30 Energy is stored in petrol and in a box of matches.

In which form is the energy stored in each?

	petrol	a box of matches
A	chemical	chemical
B	chemical	thermal
C	kinetic	chemical
D	kinetic	thermal

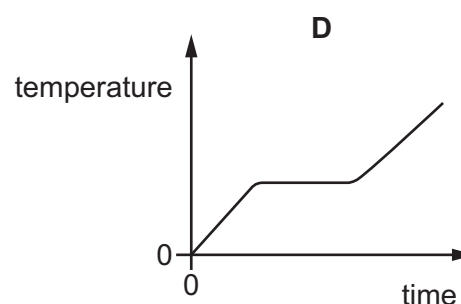
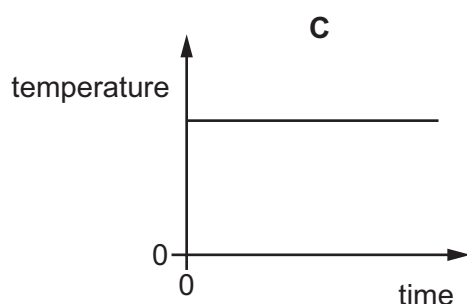
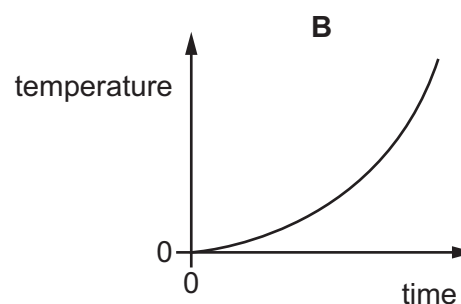
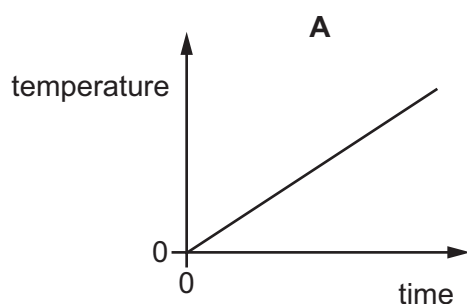
- 31** A container of milk is wrapped in a wet cloth. Air blows over the cloth. The temperature of the milk changes as the water in the cloth evaporates.

Which statement is correct?

- A** The temperature of the milk falls because the less energetic water molecules escape from the cloth.
- B** The temperature of the milk falls because the more energetic water molecules escape from the cloth.
- C** The temperature of the milk rises because the less energetic water molecules escape from the cloth.
- D** The temperature of the milk rises because the more energetic water molecules escape from the cloth.

- 32** A pure solid is heated until it all becomes a liquid, and is then heated further.

Which graph shows how its temperature changes with time?



- 33** Which row is correct?

	conduction of heat	convection of heat
A	can happen in a solid	can happen in a solid
B	can happen in a solid	only happens in liquids and gases
C	only happens in liquids and gases	can happen in a solid
D	only happens in liquids and gases	only happens in liquids and gases

- 34 Waves cause a small boat to move regularly up and down.

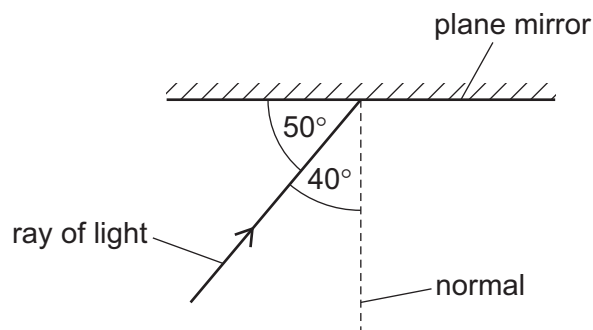
A student calculates the number of times that the boat moves up and down in one second.

Which wave property has he calculated?

- A amplitude
- B frequency
- C speed
- D wavelength

- 35 The diagram shows a ray of light striking a plane mirror.

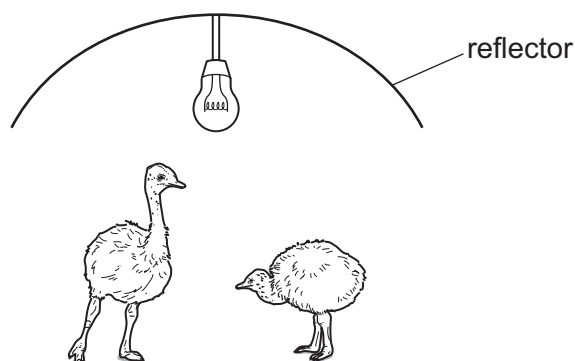
The angle between the ray and the mirror is 50° .



What is the angle of reflection of the ray when it is reflected from the mirror?

- A 40°
- B 50°
- C 80°
- D 100°

- 36 A filament lamp is used in a zoo to keep young animals warm.



What are the main types of wave given out by the lamp?

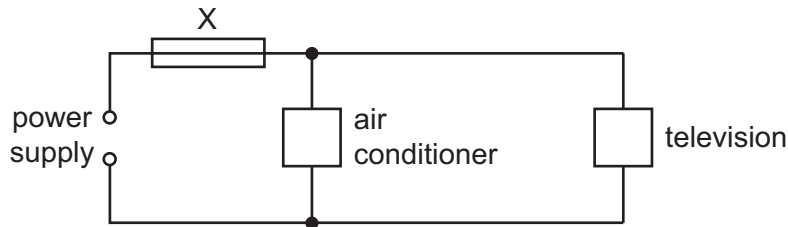
- A visible light and infra-red
- B visible light and microwaves
- C visible light and radio waves
- D visible light and X-rays

- 37** A whistle produces a sound that dogs can hear. It cannot be heard by humans.

What is a possible frequency for the sound of the whistle?

- A** 0.025 kHz **B** 0.25 kHz **C** 2.5 kHz **D** 25 kHz

- 38** An air conditioner and a television are both connected to the same electrical circuit.



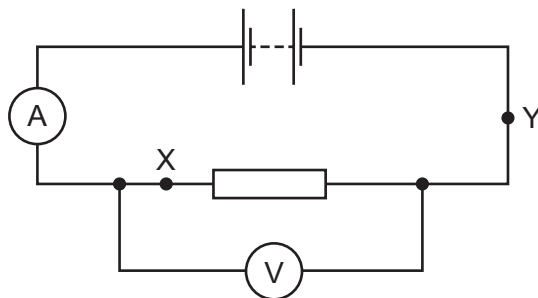
The current in the air conditioner is 9.0 A and the current in the television is 2.0 A.

Several different fuses are available.

Which fuse should be connected at X?

- A** 1 A **B** 3 A **C** 7 A **D** 13 A

- 39** A student wishes to determine the resistance of a resistor. He sets up the circuit shown.

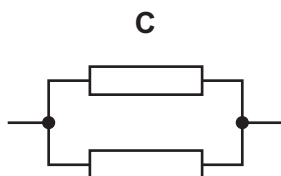
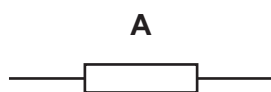


Which statement about the circuit is true?

- A** The ammeter and the voltmeter should change places.
B The circuit is correct.
C The voltmeter should be in position X.
D The voltmeter should be in position Y.

40 The diagrams show different arrangements of identical resistors.

Which arrangement has the least resistance?



DATA SHEET
The Periodic Table of the Elements

Group														
I	II								III	IV	V	VI	VII	0