Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CO-ORDINATED SCIENCES **0654/11**

Paper 1 Multiple Choice **May/June 2016**

45 minutes

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

0109038325

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 An organism has the ability to break down nutrient molecules to release energy.

What is this process?

A excretion

B growth

C nutrition

D respiration

2 Which is an enzyme involved in the digestion of proteins in the stomach?

A amylase

B bile

C lipase

D protease

3 Which statement about the alimentary canal is correct?

A The large intestine includes the colon and rectum.

B The large intestine includes the duodenum and rectum.

C The small intestine includes the colon and ileum.

D The small intestine includes the ileum and rectum.

4 Which chemical element is found in proteins, but **not** in carbohydrates or fats?

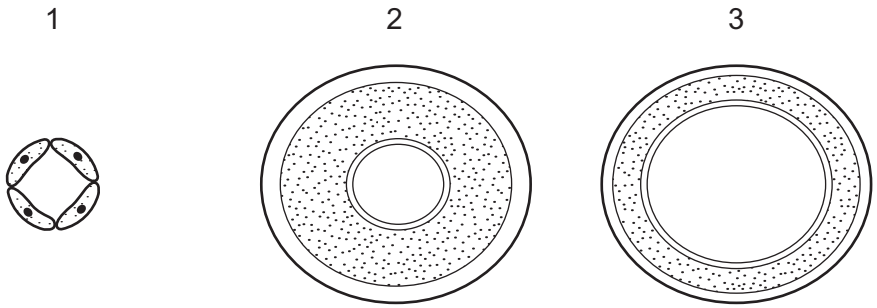
A carbon

B hydrogen

C oxygen

D nitrogen

5 The diagrams show the cross-section of three blood vessels, not drawn to the same scale.



What are these vessels?

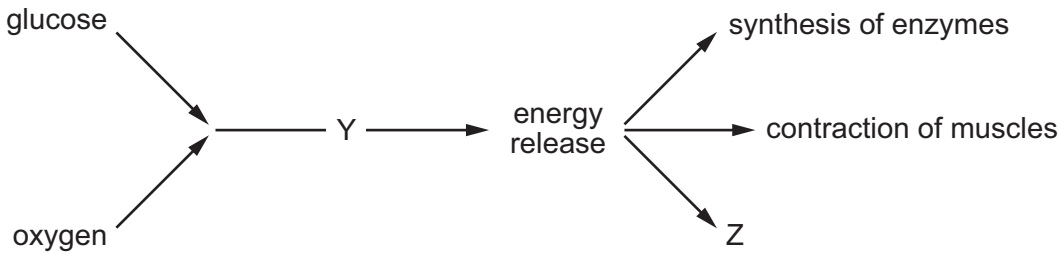
	1	2	3
A	artery	capillary	vein
B	artery	vein	capillary
C	capillary	artery	vein
D	capillary	vein	artery

6 Under which conditions will transpiration from a plant be fastest?

	temperature	humidity
A	high	high
B	high	low
C	low	high
D	low	low

[Turn over

7 The diagram shows what happens to glucose in the body.



What are processes Y and Z?

	Y	Z
A	photosynthesis	growth
B	photosynthesis	respiration
C	respiration	growth
D	respiration	photosynthesis

8 When a person was walking or running, the following measurements were taken.

speed / km per hour	number of breaths per minute	volume of each breath / dm^3
4	16	1
6	18	2
8	20	3

How many dm^3 of air did the person breathe per minute when running at 6 km per hour?

A 18 **B** 36 **C** 60 **D** 108

9 What is an example of homeostasis?

A adding acid to food in the stomach

B breathing out water vapour from the lungs

C keeping the body temperature constant

D producing adrenaline in the adrenal glands

10 What is a characteristic of human hormones?

A destroyed by endocrine glands

B made by target organs

C produced in the liver

D transported in blood plasma

11 A student placed four sets of seeds in different conditions.

Which set of conditions must be kept constant to show the effect of temperature on germination?

A temperature and water only

B temperature only

C temperature, water and oxygen

D water and oxygen only

12 Which statement about asexual reproduction is correct?

A It involves the formation of diploid zygotes.

B It involves the formation of haploid zygotes.

C It produces offspring which are genetically dissimilar.

D It produces offspring which are genetically identical.

13 In some countries, deforestation has taken place in large areas.

What effect would this be likely to have on the environment?

A decreased carbon dioxide in the atmosphere

B decreased risk of flooding

C extinction of local species

D increased use of fossil fuels

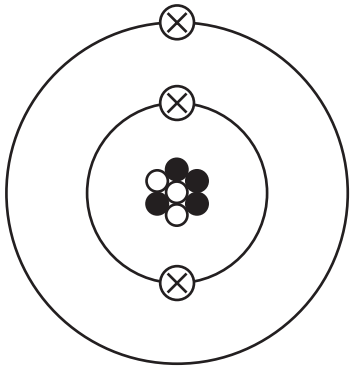
14 The diagram shows the readings on a thermometer before and after a reaction.

before the reaction after the reaction

Which row shows the readings on the thermometer?

	before the reaction	after the reaction
A	13.5	34.1
B	13.5	35.9
C	14.5	34.1
D	14.5	35.9

15 The diagram represents the structure of a lithium atom.



Which particle is represented by ⊗?

A electron

B neutron

C nucleus

D proton

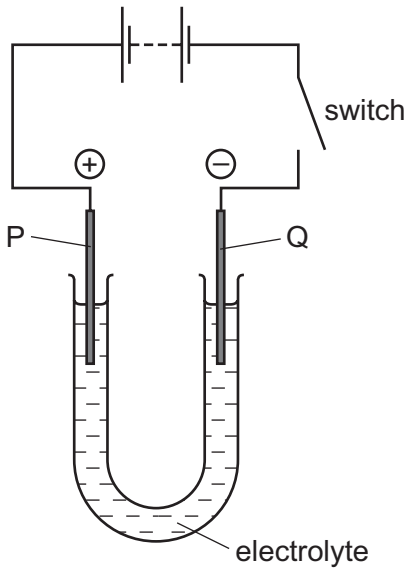
16 Three minerals containing iron are listed.

mineral	chemical formula
goethite	FeO(OH)
magnetite	Fe_3O_4
siderite	$FeCO_3$

What is the total number of different elements contained in all three minerals?

A 3 **B** 4 **C** 5 **D** 16

17 The diagram shows the electrolysis of a compound.



When the switch is closed, the solution around electrode P turns orange because a halogen is formed.

The positive electrode P is called the ……1……, and the halogen is ……2…… .

Which words complete gaps 1 and 2?

	1	2
A	anode	bromine
B	anode	chlorine
C	cathode	bromine
D	cathode	chlorine

18 Which statement about chemical reactions is correct?

A Endothermic reactions result in a temperature decrease.

B Endothermic reactions result in a temperature increase.

C Exothermic reactions always produce a large temperature rise.

D Exothermic reactions always produce a small temperature rise.

19 In a manned spacecraft, carbon dioxide is removed from the air by reacting with potassium hydroxide.

Which type of reaction occurs?

A decomposition

B neutralisation

C precipitation

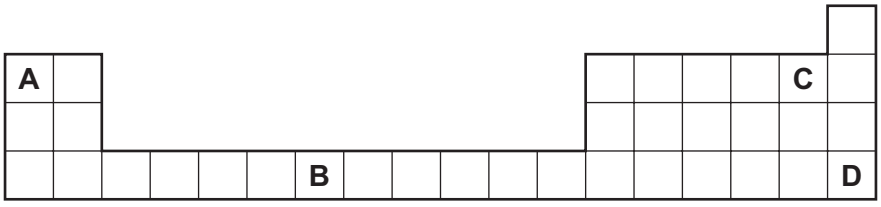
D redox

20 Which test and result show that a fertiliser contains nitrate ions?

	test	result
A	warm with aqueous sodium hydroxide	gas turns litmus blue
B	warm with aqueous sodium hydroxide	gas turns litmus red
C	warm with aqueous sodium hydroxide, then add aluminium metal	gas turns litmus blue
D	warm with aqueous sodium hydroxide, then add aluminium metal	gas turns litmus red

21 The diagram shows part of the Periodic Table.

Which letter shows the position of a metal with a low melting point?



22 A green halogen gas is bubbled through a potassium halide solution.

The potassium halide solution turns brown–black.

What is the halogen and what is the potassium halide solution?

	halogen	potassium halide solution
A	bromine	potassium chloride
B	bromine	potassium iodide
C	chlorine	potassium bromide
D	chlorine	potassium iodide

23 Which row describes the general properties of non-metals?

	melting point	density	electrical conductivity
A	high	low	no
B	low	high	no
C	low	low	no
D	low	low	yes

24 Copper is extracted in process X by heating copper oxide with substance Y.

What is process X and what is substance Y?

	process X	substance Y
A	oxidation	carbon
B	oxidation	limestone
C	reduction	carbon
D	reduction	limestone

25 Which gas emitted from a car exhaust contributes to acid rain?

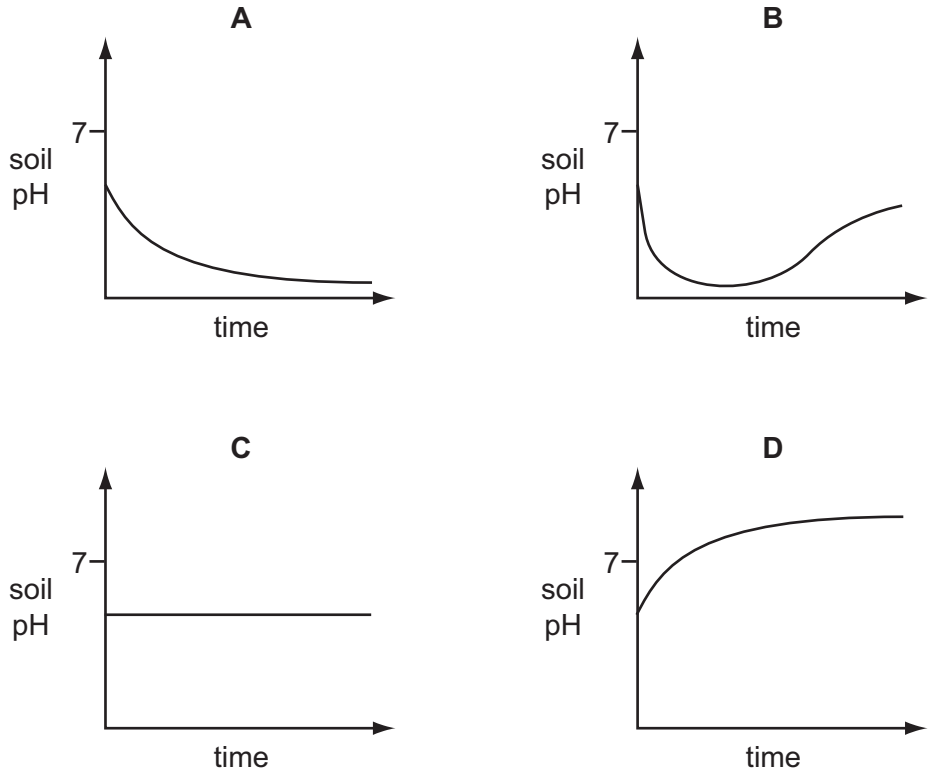
A carbon monoxide, CO

B nitrogen, N_2

C nitrogen monoxide, NO

D water vapour, H_2O

26 Which graph shows how the pH of soil changes when lime is added?



27 Organic molecule X has the following properties.

- Complete combustion produces carbon dioxide and water.
- It decolourises aqueous bromine water.
- It is produced by cracking.

What is X?

A ethane

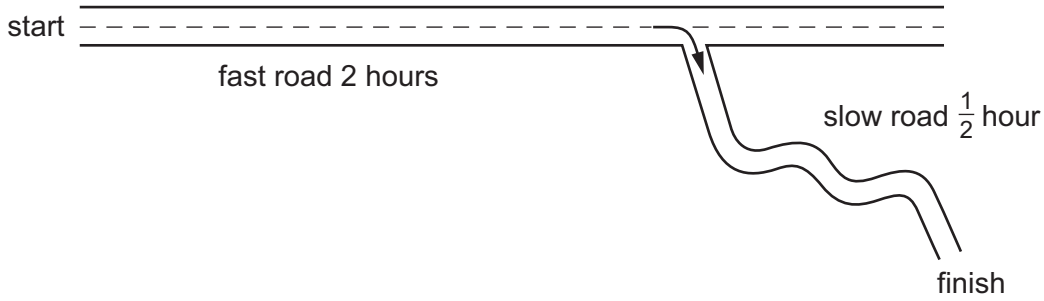
B ethene

C ethanol

D poly(ethene)

28 A motorist travels 200 km.

After travelling along a fast road for 2 hours, the motorist uses a slow road for the remaining $\frac{1}{2}$ hour of the journey.



What is the average speed of the car for the whole journey?

A 80 km / h **B** 100 km / h **C** 400 km / h **D** 500 km / h

29 Diagram 1 shows a spring with its length indicated. Diagram 2 shows the same spring with a 20 N load hung from it, and the new length of the spring.

The extension of the spring is directly proportional to the load hung on it.

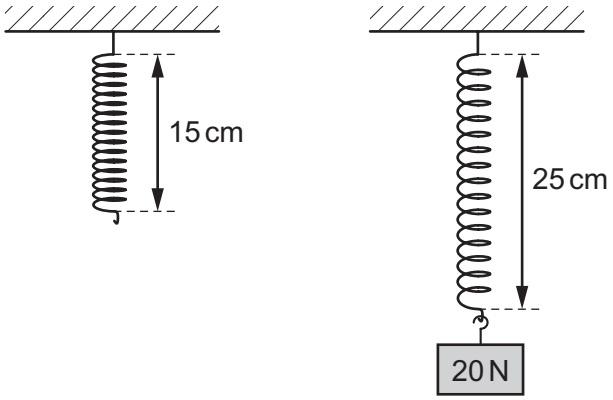
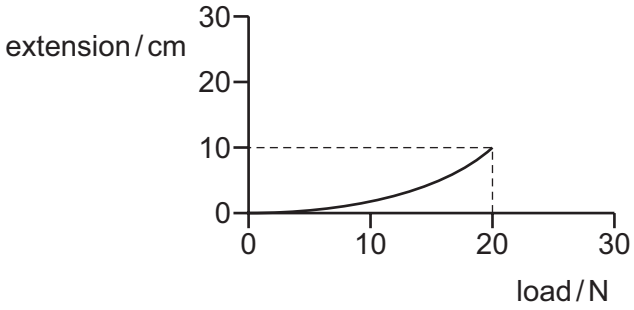


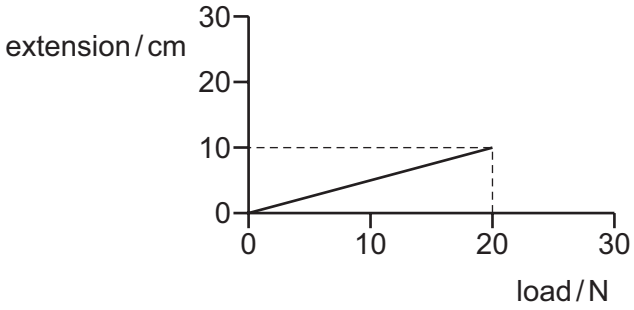
diagram 1 diagram 2

Which graph is the extension / load graph for the spring?

A



B



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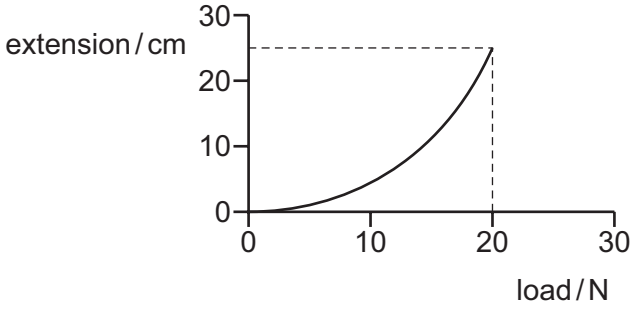
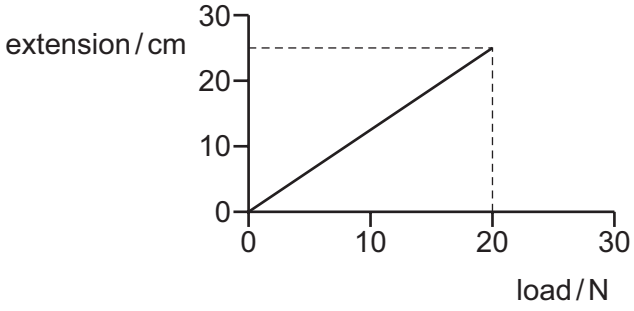
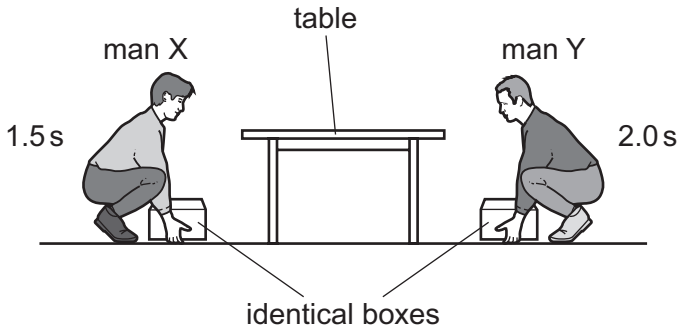


D



30 Two men each lift identical boxes vertically upwards onto the same table. Man X takes 1.5 s to lift his box, and man Y takes 2.0 s to lift his box.



Which man produces the greatest power in lifting the box and what is the unit of power?

	man producing greatest power	unit of power
A	man X	joule
B	man X	watt
C	man Y	joule
D	man Y	watt

31 Which statement describes the properties of a liquid?

A It has a definite shape and has a definite volume.

B It has a definite shape but no definite volume.

C It has no definite shape and no definite volume.

D It has no definite shape but has a definite volume.

32 A substance is a gas when its temperature is 65 °C.

How do the boiling point and the melting point of this substance compare with 65 °C?

	boiling point	melting point
A	above 65 °C	above 65 °C
B	above 65 °C	below 65 °C
C	below 65 °C	above 65 °C
D	below 65 °C	below 65 °C

[Turn over

33 Which method of thermal energy transfer can occur in a vacuum and which region of the electromagnetic spectrum is often involved in this type of thermal energy transfer?

	method of thermal energy transfer	region of the electromagnetic spectrum
A	convection	infra-red
B	convection	radio waves
C	radiation	infra-red
D	radiation	radio waves

34 Diagram 1 represents a wave.

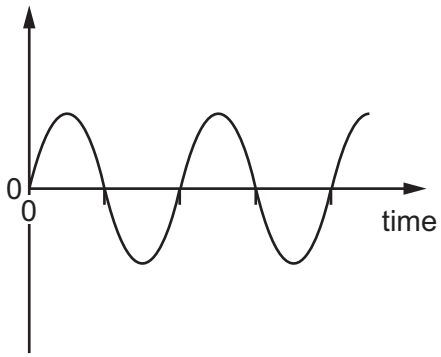
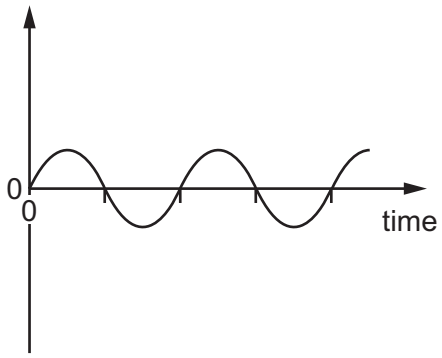


diagram 1

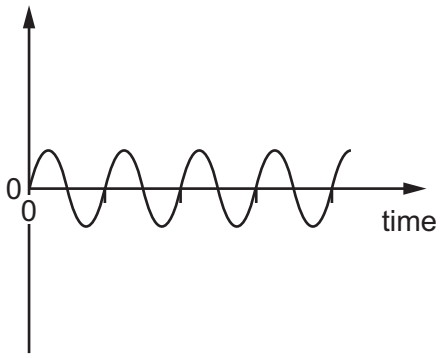
Which diagram below represents a wave with double the frequency and half the amplitude of the wave in diagram 1?

The scales are the same in all the diagrams.

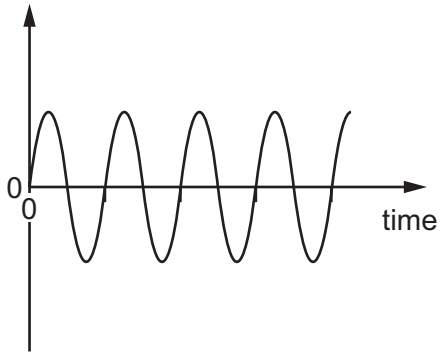
A



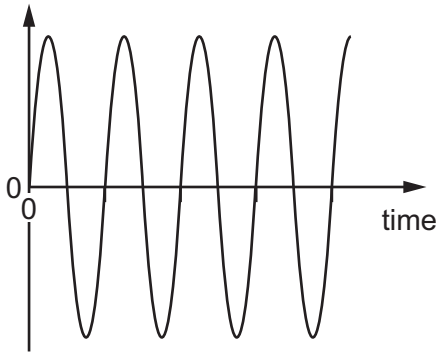
B



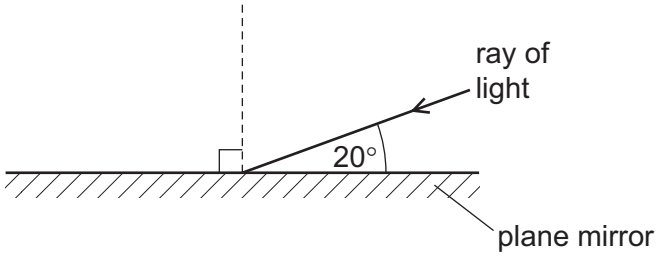
C



D



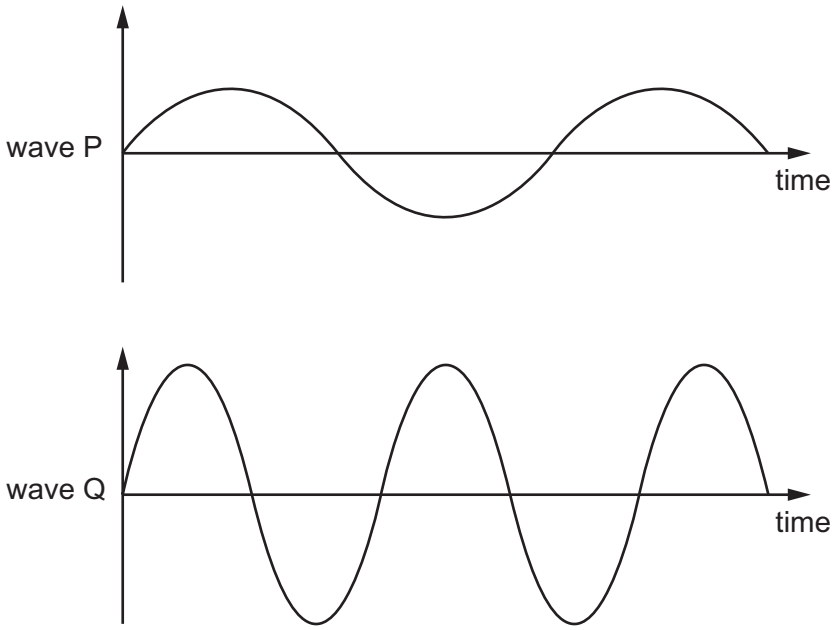
35 The diagram shows a ray of light striking a plane mirror.



What is the angle of reflection?

A 20° **B** 40° **C** 70° **D** 140°

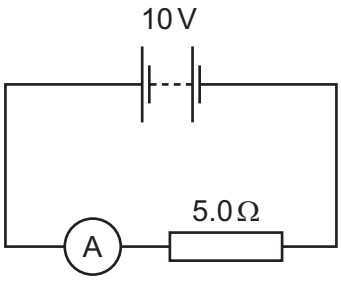
36 The diagrams represent two different sound waves, P and Q, drawn to the same scale.



How do the loudness and the pitch of the sounds compare with each other?

	louder sound	higher pitched sound
A	P	P
B	P	Q
C	Q	P
D	Q	Q

37 A 10 V battery is connected in series with an ammeter and a 5.0 Ω resistor.



What is the reading on the ammeter?

A 0.20 A **B** 0.50 A **C** 2.0 A **D** 5.0 A

38 A fuse is a safety device for use in an electrical appliance.

How does a fuse affect a circuit when the current in it becomes higher than the rated value for the fuse?

A It completely stops the current.

B It reduces the current to the rated value for the fuse.

C It reduces the thermal insulation around the wires.

D It sends the current to the outer case of the appliance.

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

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

40 Which row describes the properties of β-particles (beta-particles)?

	they are electromagnetic waves	they are ionising
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key
✓ = yes
✗ = no

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The Periodic Table of Elements

Group																	
I	II											III	IV	V	VI	VII	VIII
							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 –		

Key

atomic number
atomic symbol
name
relative atomic mass

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 dm^3 at room temperature and pressure (r.t.p.)