



**COMBINED SCIENCE**

**0653/01**

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.

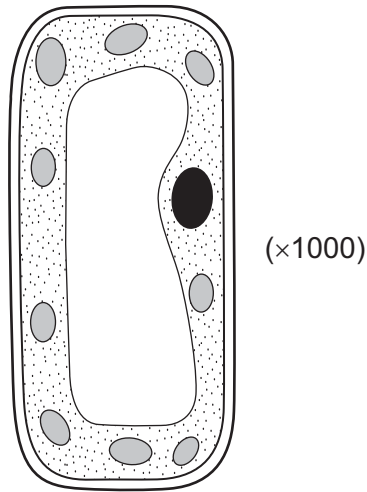
Any rough working should be done in this booklet.

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

Electronic calculators may be used.

This document consists of **19** printed pages and **1** blank page.

- 1 The width of the plant cell in the diagram is 30 mm when it is magnified by a microscope (magnification shown in brackets).



What is the actual width of the cell?

- A 0.003 mm
  - B 0.03 mm
  - C 0.3 mm
  - D 30 mm
- 2 A healthy plant has been in the light. A leaf is taken from the plant, decolourised and then tested with iodine solution.

What colour does the iodine solution change to?

- A black
- B brick red
- C pale blue
- D yellow

- 3 The numbered statements are about enzymes.
- 1 Enzymes are destroyed at temperatures below 5 °C.
  - 2 Enzymes are proteins.
  - 3 Enzymes increase 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
- 4 The table shows the regions of the alimentary canal where ingestion and egestion may take place.

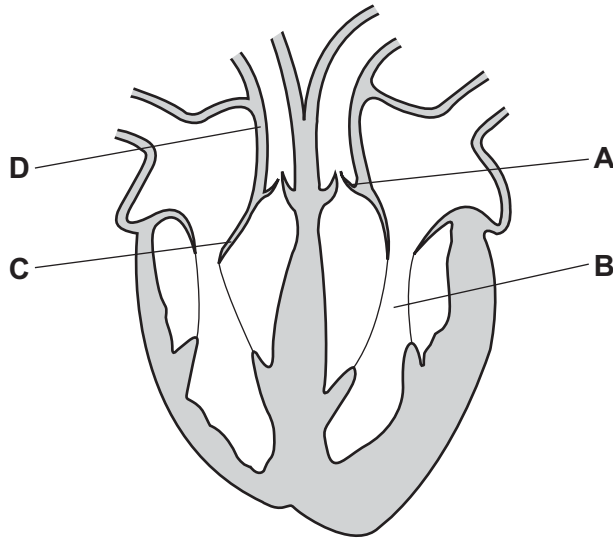
Which row is correct?

	ingestion	egestion
<b>A</b>	mouth	anus
<b>B</b>	mouth	large intestine
<b>C</b>	oesophagus	anus
<b>D</b>	oesophagus	large intestine

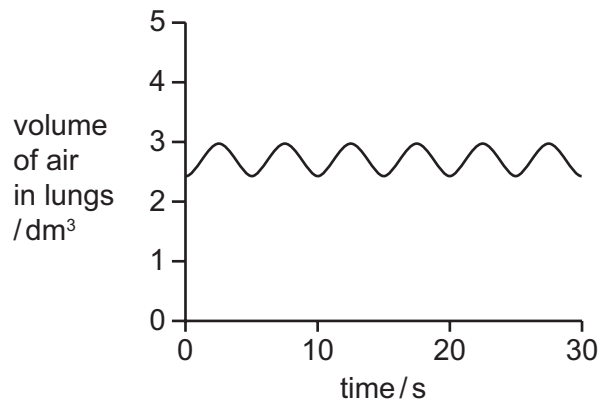
- 5 In transpiration, most of the water evaporates at the surface of which cell in a leaf?
- A epidermal  
 B guard  
 C mesophyll  
 D xylem

6 The diagram shows a section through the human heart.

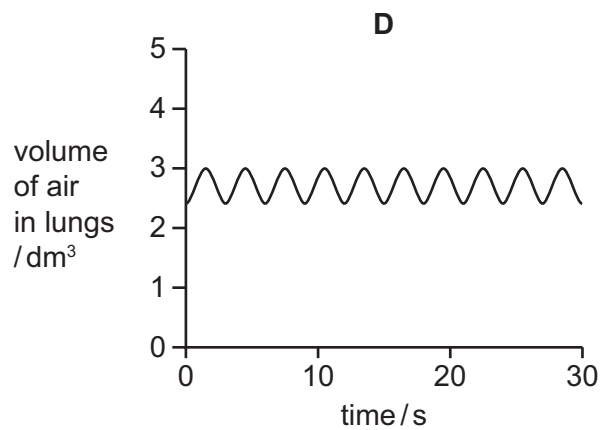
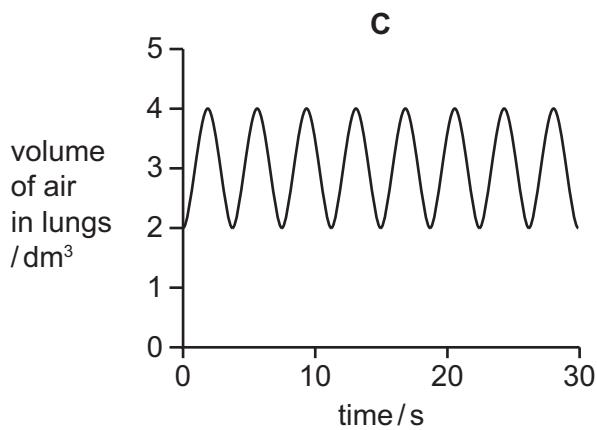
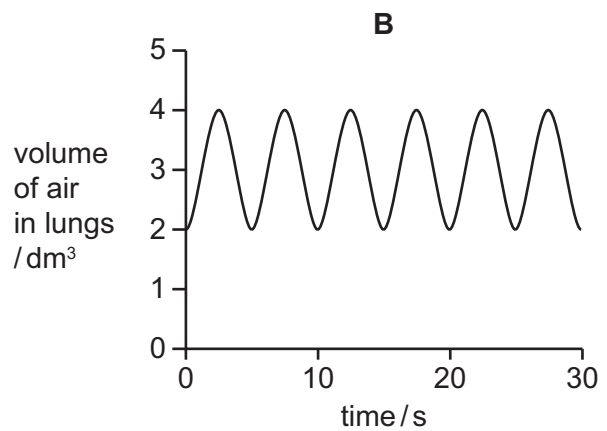
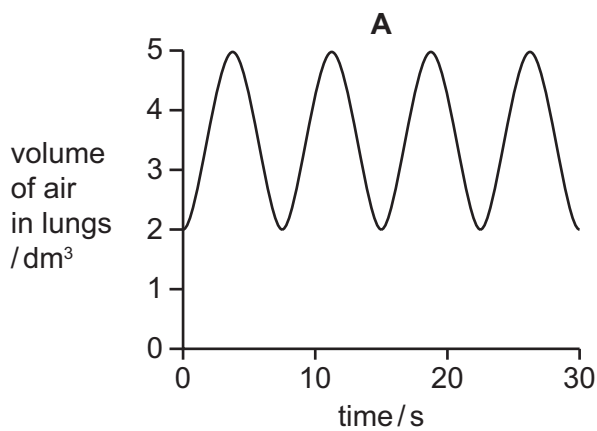
Which structure is the ventricle?



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



Which graph shows the same person doing vigorous exercise over another period of 30 s?



8 What is the stimulus for phototropism in plants?

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

9 Which row shows the features of asexual reproduction?

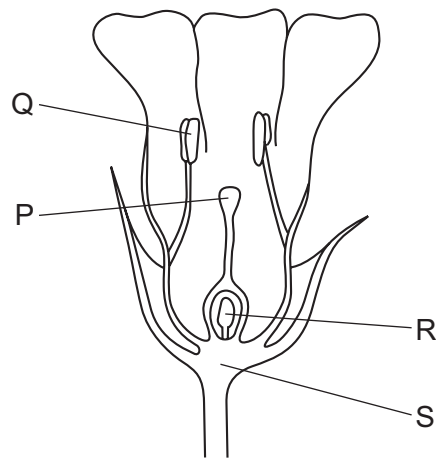
	number of parents	presence of gametes	production of a zygote
<b>A</b>	1	✓	✓
<b>B</b>	1	x	x
<b>C</b>	2	✓	x
<b>D</b>	2	x	✓

key

✓ = yes

x = no

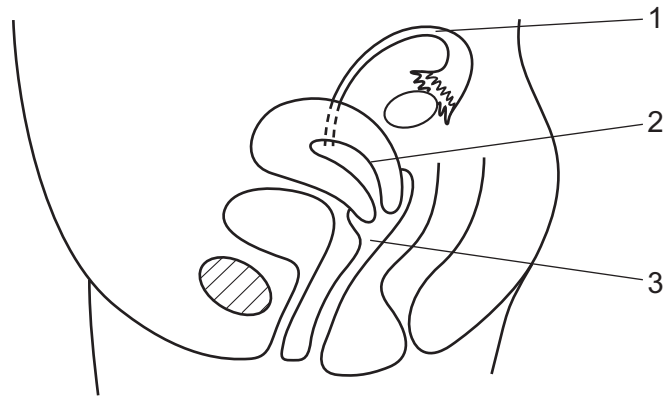
10 The diagram shows a section through a flower.



In which parts of the flower are pollen grains produced and received?

	pollen grains produced	pollen grains received
<b>A</b>	Q	P
<b>B</b>	Q	S
<b>C</b>	S	P
<b>D</b>	S	Q

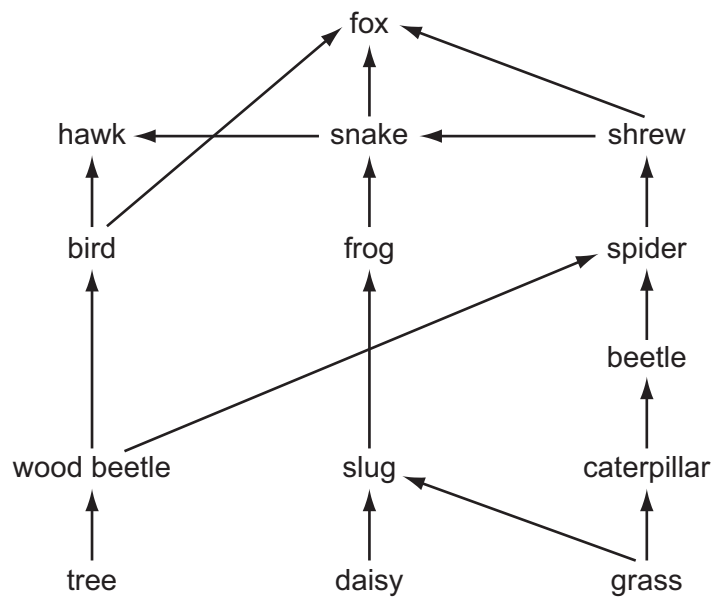
11 The diagram shows a side view of the female reproductive system in a human.



Where do fertilisation and implantation occur?

	fertilisation	implantation
<b>A</b>	1	2
<b>B</b>	1	3
<b>C</b>	2	3
<b>D</b>	3	2

12 The diagram shows a food web.



How many producers and how many consumers are shown in this food web?

	number of producers	number of consumers
<b>A</b>	3	3
<b>B</b>	3	11
<b>C</b>	11	3
<b>D</b>	13	1

13 Which process removes carbon dioxide from the atmosphere?

- A combustion
- B decay
- C photosynthesis
- D respiration

14 Which method of separation can be used to obtain pure water from aqueous potassium chloride?

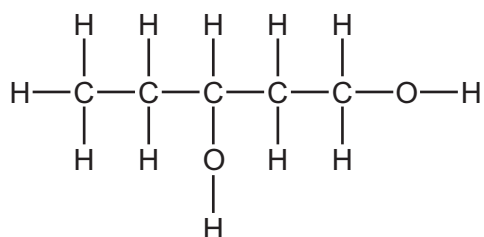
- A chromatography
- B crystallisation
- C distillation
- D filtration



15 Which row in the table correctly describes the three substances?

	air	brass	iron
<b>A</b>	compound	compound	element
<b>B</b>	element	mixture	compound
<b>C</b>	mixture	element	compound
<b>D</b>	mixture	mixture	element

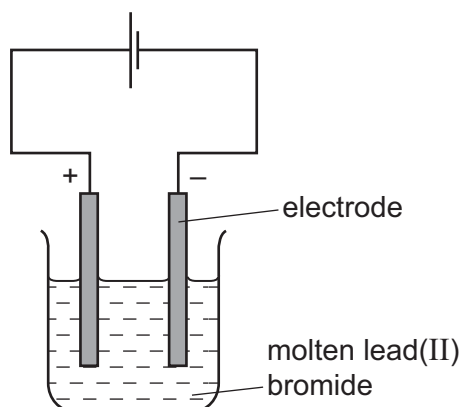
16 The structure of a compound is shown.



What is the formula of this 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**  $\text{C}_5\text{H}_{12}\text{O}_2$

17 The diagram shows the electrolysis of molten lead(II) bromide using inert electrodes.



Which row shows the name of the positive electrode and the product at the negative electrode?

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

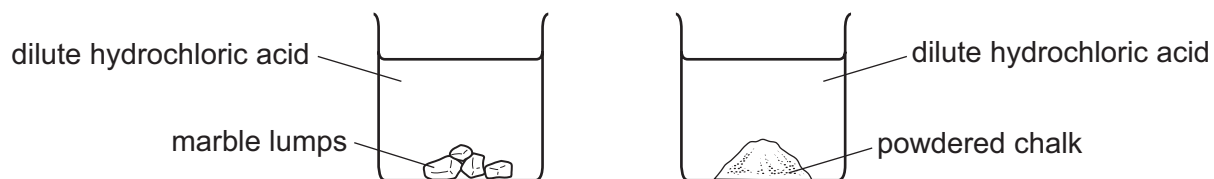
18 A student measures the initial and final temperatures of four different reactions.

Which reaction is endothermic?

	initial temperature / °C	final temperature / °C
<b>A</b>	20	20
<b>B</b>	20	22
<b>C</b>	22	20
<b>D</b>	22	42

19 Marble and chalk are two forms of calcium carbonate.

Equal masses of marble lumps and powdered chalk are added to dilute hydrochloric acid.



The marble takes longer than the chalk to fully react.

Why is this?

- A Marble is more reactive than chalk.
- B Marble is more soluble than chalk.
- C The marble has a smaller surface area than chalk.
- D The marble is more basic than chalk.

20 Magnesium reacts with carbon dioxide to produce magnesium oxide and carbon.

What happens to the magnesium in this reaction?

- 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 Which row in the table describes an alkali?

	solubility in water	reaction with an acid
A	insoluble	does not react
B	insoluble	reacts
C	soluble	does not react
D	soluble	reacts

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

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

What is X?

- A  $\text{HCl}$
- B  $\text{HNO}_3$
- C  $\text{NaCl}$
- D  $\text{NaOH}$

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

Which row describes lithium?

	hardness	melting point
<b>A</b>	hard	highest in Group I
<b>B</b>	hard	lowest in Group I
<b>C</b>	soft	highest in Group I
<b>D</b>	soft	lowest in Group I

24 Which row in the table describes the physical states of the two Group VII elements chlorine and iodine, at room temperature?

	chlorine	iodine
<b>A</b>	gas	liquid
<b>B</b>	gas	solid
<b>C</b>	liquid	gas
<b>D</b>	liquid	solid

25 Metal X reacts rapidly with cold water.

Metal Y does not react with dilute hydrochloric acid.

Which row describes the reactivities of X and Y?

	reactivity of metal	reactivity compared to hydrogen
<b>A</b>	X is more reactive than Y	X is less reactive than hydrogen
<b>B</b>	X is more reactive than Y	X is more reactive than hydrogen
<b>C</b>	Y is more reactive than X	Y is less reactive than hydrogen
<b>D</b>	Y is more reactive than X	Y is more reactive than hydrogen

26 Carbon is used to extract copper from copper oxide.

Which statement about the process is correct?

- A** Carbon is more reactive than copper.
- B** Carbon oxidises copper oxide.
- C** Copper is more reactive than carbon.
- D** Copper oxide reduces carbon.

27 Iron rusts when it reacts with oxygen and water.

Which substances are used to prevent rusting?

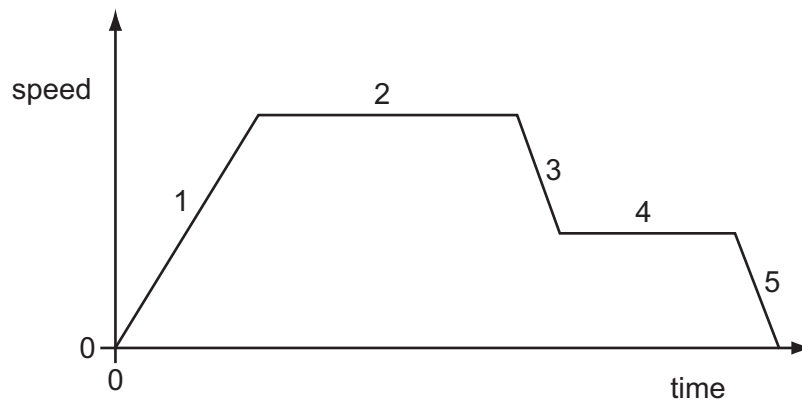
	oil	paint	zinc
<b>A</b>	✓	✓	✓
<b>B</b>	✓	✓	✗
<b>C</b>	✓	✗	✓
<b>D</b>	✗	✓	✓

key

✓ = yes

✗ = no

28 The speed-time graph for a car journey is shown.



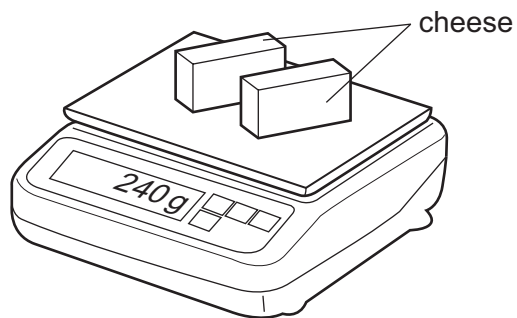
During which two parts of the journey is the car moving at constant speed?

- A 1 and 3
- B 1 and 5
- C 2 and 4
- D 3 and 5

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.

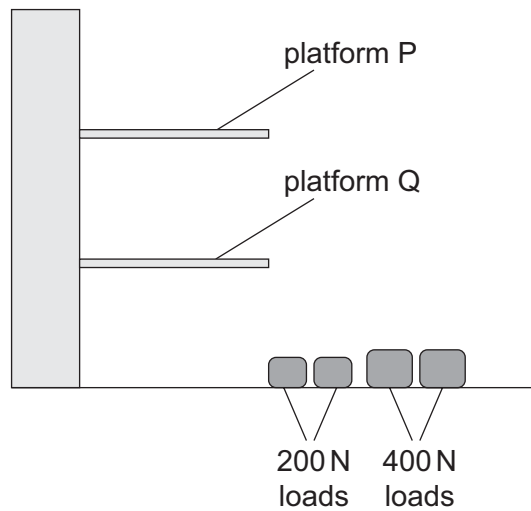
Each block measures 2.0 cm × 5.0 cm × 10.0 cm.



What is the density of the cheese?

- A 0.42 g/cm<sup>3</sup>
- B 0.83 g/cm<sup>3</sup>
- C 1.2 g/cm<sup>3</sup>
- D 2.4 g/cm<sup>3</sup>

- 30 The diagram shows two 200 N loads and two 400 N loads on the ground. Each load is lifted either to platform P or to platform Q.



The time taken for each load to be lifted is shown in the table.

Which row represents the greatest power used in lifting the load?

	load / N	platform lifted to	time taken / s
<b>A</b>	200	P	5.0
<b>B</b>	200	Q	10
<b>C</b>	400	P	5.0
<b>D</b>	400	Q	10

- 31 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.

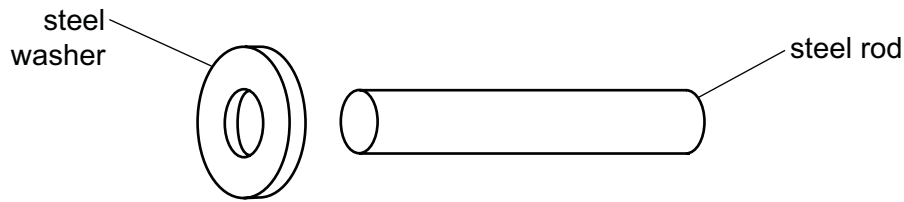
Which type of energy remains constant during the journey?

- A** the chemical energy in the fuel tank
  - B** the gravitational potential energy of the car
  - C** the kinetic energy of the car
  - D** the thermal energy of the engine
- 32 A gas is trapped in a sealed container of constant volume. The gas is heated.

What effect does this have on the gas molecules?

- A** The average distance between the molecules increases.
- B** The average mass of the molecules increases.
- C** The molecules expand.
- D** The molecules move more quickly.

- 33 An engineer wants to fit a steel washer on to a steel rod. The rod is slightly too big to fit into the hole of the washer.



How can the engineer fit the washer on to the rod?

- A Cool the washer and then place it over the rod.
  - B Cool the washer and rod to the same temperature and then push them together.
  - C Heat the rod and then place it in the hole in the washer.
  - D Heat the washer and then place it over the rod.
- 34 Heat can be transferred through solids, liquids and gases. 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

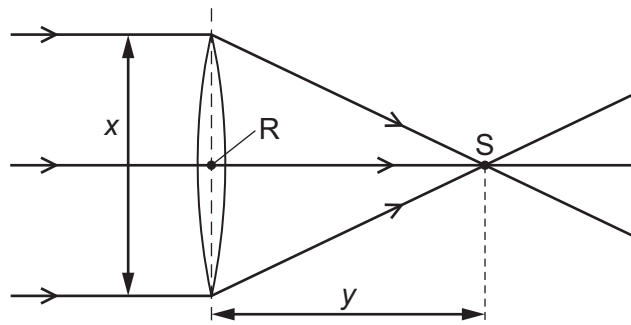
- 35 A boat floats on the sea. The boat moves slowly up and down as a wave passes it. The amplitude of the wave is 0.50 m.

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

- A 0.25 m
- B 0.50 m
- C 1.0 m
- D 2.0 m



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



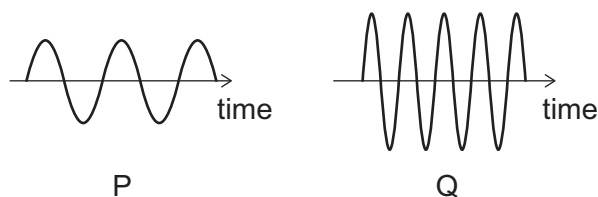
Which labelled point is the principal focus of the lens, and which labelled distance is the focal length of the lens?

	principal focus	focal length
<b>A</b>	R	$x$
<b>B</b>	R	$y$
<b>C</b>	S	$x$
<b>D</b>	S	$y$

- 37 Which electromagnetic waves are found immediately either side of the visible region of the electromagnetic spectrum?

- A** infra-red and ultraviolet
- B** microwaves and infra-red
- C** microwaves and X-rays
- D** ultraviolet and X-rays

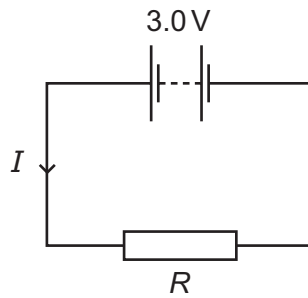
- 38 The diagrams represent two sound waves. The diagrams are drawn to the same scale.



Which statement correctly compares the pitch and the loudness of the two sounds?

- A** P has a higher pitch and is louder than Q.
- B** P has a higher pitch and is quieter than Q.
- C** P has a lower pitch and is louder than Q.
- D** P has a lower pitch and is quieter than Q.

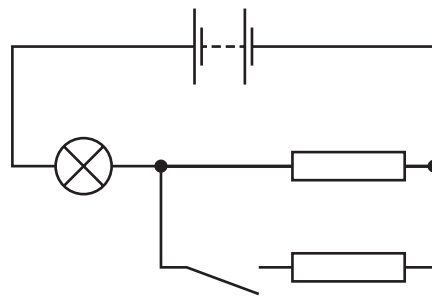
- 39 The circuit shows a 3.0 V battery connected to a resistor of resistance  $R$ . There is a current  $I$  in the resistor.



Which row shows a possible pair of values of  $I$  and  $R$ ?

	$I/A$	$R/\Omega$
<b>A</b>	1.5	1.5
<b>B</b>	1.5	2.0
<b>C</b>	4.0	12
<b>D</b>	6.0	2.0

- 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.



## 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><b>Key</b></p> <p>atomic number</p> <p>atomic symbol</p> <p>name</p> <p>relative atomic mass</p> </div>										1 <b>H</b> hydrogen 1								2 <b>He</b> helium 4					
3 <b>Li</b> lithium 7	4 <b>Be</b> beryllium 9											5 <b>B</b> boron 11	6 <b>C</b> carbon 12	7 <b>N</b> nitrogen 14	8 <b>O</b> oxygen 16	9 <b>F</b> fluorine 19	10 <b>Ne</b> neon 20	11 <b>Na</b> sodium 23	12 <b>Mg</b> magnesium 24	13 <b>Al</b> aluminium 27	14 <b>Si</b> silicon 28	15 <b>P</b> phosphorus 31	16 <b>S</b> sulfur 32	17 <b>Cl</b> chlorine 35.5	18 <b>Ar</b> argon 40
19 <b>K</b> potassium 39	20 <b>Ca</b> calcium 40											21 <b>Sc</b> scandium 45	22 <b>Ti</b> titanium 48	23 <b>V</b> vanadium 51	24 <b>Cr</b> chromium 52	25 <b>Mn</b> manganese 55	26 <b>Fe</b> iron 56	27 <b>Co</b> cobalt 59	28 <b>Ni</b> nickel 59	29 <b>Cu</b> copper 64	30 <b>Zn</b> zinc 65	31 <b>Ga</b> gallium 70	32 <b>Ge</b> germanium 73	33 <b>As</b> arsenic 75	34 <b>Se</b> selenium 79
37 <b>Rb</b> rubidium 85	38 <b>Sr</b> strontium 88	39 <b>Y</b> yttrium 89	40 <b>Zr</b> zirconium 91	41 <b>Nb</b> niobium 93	42 <b>Mo</b> molybdenum 96	43 <b>Tc</b> technetium –	44 <b>Ru</b> ruthenium 101	45 <b>Rh</b> rhodium 103	46 <b>Pd</b> palladium 106	47 <b>Ag</b> silver 108	48 <b>Cd</b> cadmium 112	49 <b>In</b> indium 115	50 <b>Sn</b> tin 119	51 <b>Sb</b> antimony 122	52 <b>Te</b> tellurium 128	53 <b>I</b> iodine 127	54 <b>Xe</b> xenon 131								
55 <b>Cs</b> caesium 133	56 <b>Ba</b> barium 137	57–71 lanthanoids	72 <b>Hf</b> hafnium 178	73 <b>Ta</b> tantalum 181	74 <b>W</b> tungsten 184	75 <b>Re</b> rhenium 186	76 <b>Os</b> osmium 190	77 <b>Ir</b> iridium 192	78 <b>Pt</b> platinum 195	79 <b>Au</b> gold 197	80 <b>Hg</b> mercury 201	81 <b>Tl</b> thallium 204	82 <b>Pb</b> lead 207	83 <b>Bi</b> bismuth 209	84 <b>Po</b> polonium –	85 <b>At</b> astatine –	86 <b>Rn</b> radon –								
87 <b>Fr</b> francium –	88 <b>Ra</b> radium –	89–103 actinoids	104 <b>Rf</b> rutherfordium –	105 <b>Db</b> dubnium –	106 <b>Sg</b> seaborgium –	107 <b>Bh</b> bohrium –	108 <b>Hs</b> hassium –	109 <b>Mt</b> meitnerium –	110 <b>Ds</b> darmstadtium –	111 <b>Rg</b> roentgenium –	112 <b>Cn</b> copernicium –	114 <b>Fl</b> flerovium –	116 <b>Lv</b> livermorium –												

lanthanoids	57 <b>La</b> lanthanum 139	58 <b>Ce</b> cerium 140	59 <b>Pr</b> praseodymium 141	60 <b>Nd</b> neodymium 144	61 <b>Pm</b> promethium –	62 <b>Sm</b> samarium 150	63 <b>Eu</b> europium 152	64 <b>Gd</b> gadolinium 157	65 <b>Tb</b> terbium 159	66 <b>Dy</b> dysprosium 163	67 <b>Ho</b> holmium 165	68 <b>Er</b> erbium 167	69 <b>Tm</b> thulium 169	70 <b>Yb</b> ytterbium 173	71 <b>Lu</b> lutetium 175
actinoids	89 <b>Ac</b> actinium –	90 <b>Th</b> thorium 232	91 <b>Pa</b> protactinium 231	92 <b>U</b> uranium 238	93 <b>Np</b> neptunium –	94 <b>Pu</b> plutonium –	95 <b>Am</b> americium –	96 <b>Cm</b> curium –	97 <b>Bk</b> berkelium –	98 <b>Cf</b> californium –	99 <b>Es</b> einsteinium –	100 <b>Fm</b> fermium –	101 <b>Md</b> mendelevium –	102 <b>No</b> nobelium –	103 <b>Lr</b> lawrencium –

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

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