



**Cambridge International Examinations**  
Cambridge International General Certificate of Secondary Education

**COMBINED SCIENCE**

**0653/11**

Paper 1 Multiple Choice

**October/November 2015**

**45 minutes**

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

\* 5 3 8 9 4 7 8 0 0 0 \*

**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.**

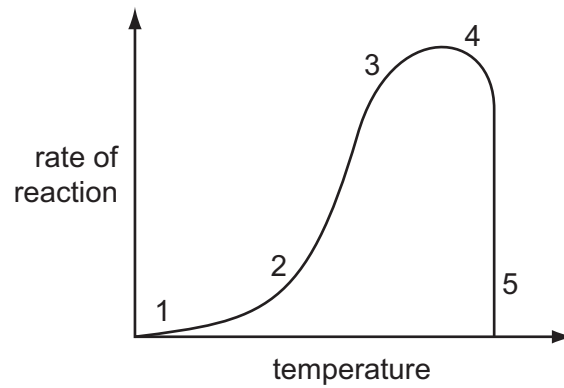
There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A, B, C** and **D**.  
Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

**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 The graph shows the effect of temperature on the rate of an enzyme-controlled reaction.



Where on the graph has all the enzyme been denatured?

- A** 1                      **B** 2 and 3                      **C** 3 and 4                      **D** 5
- 2 Which statement describes nutrition and respiration in plants?
- A** Plants respire only when they are not undergoing nutrition.  
**B** Plants respire using a process called photosynthesis.  
**C** Plants undergo nutrition and respiration at the same time.  
**D** Plants undergo nutrition only when they are not respiring.
- 3 A careless student has two microscope slides, one of animal cells and one of plant cells. He has lost the labels saying which slide is which.

Which feature in the cells that he can see through the microscope tells him that he is looking at the plant cells?

- A** cells all surrounded by membranes  
**B** cytoplasm with granules in it  
**C** green dots visible inside the cells  
**D** many cells with a noticeable dark dot inside them

- 4 A sample of food is tested with Benedict's solution, biuret solution and iodine solution. The results are shown in the table.

test	final colour after test
Benedict's solution	blue
biuret solution	purple/lilac
iodine solution	blue/black

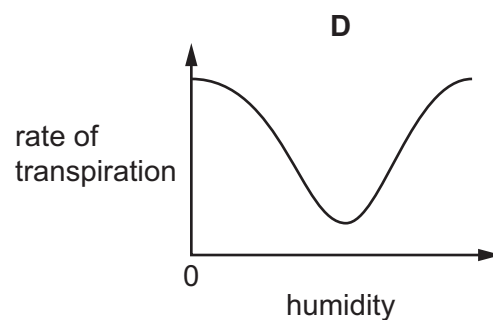
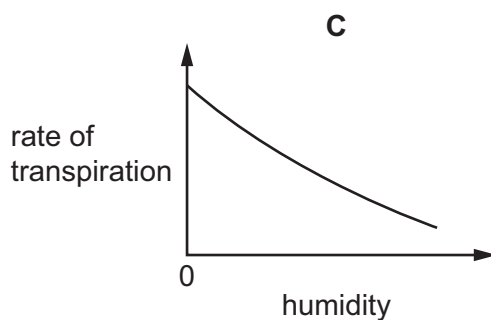
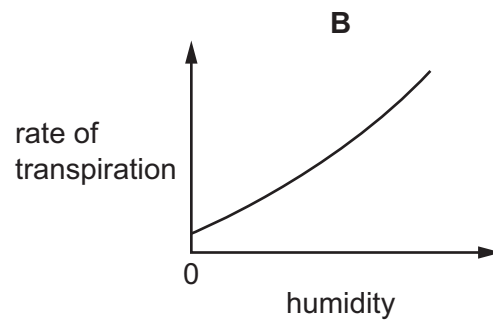
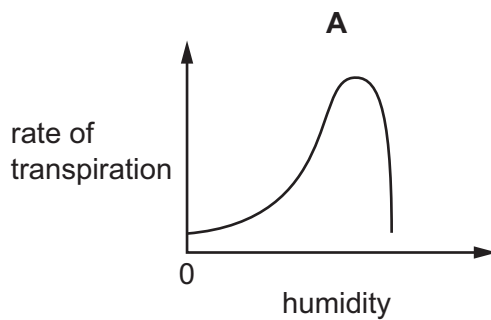
Which substances are present in the food sample tested?

	protein	reducing sugar	starch
<b>A</b>	✓	✓	✓
<b>B</b>	✓	✓	x
<b>C</b>	✓	x	✓
<b>D</b>	x	✓	✓

- 5 Which chemical is produced from digestion of a fat?

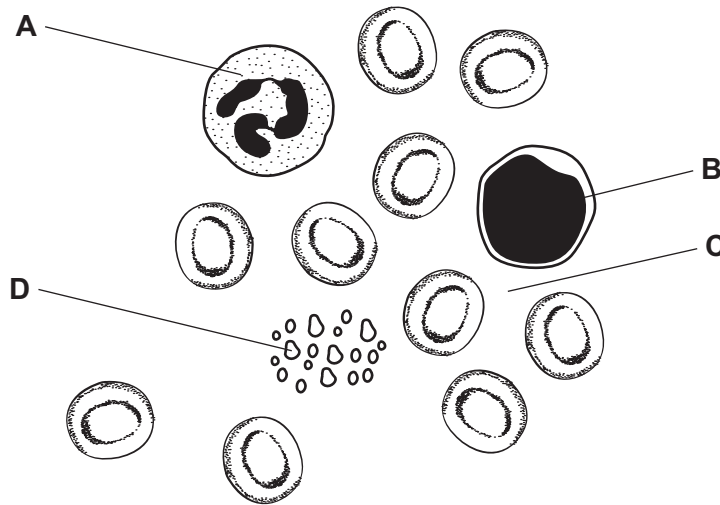
- A amino acid
- B glycerol
- C glycogen
- D sugar

- 6 Which graph shows how atmospheric humidity affects the rate of transpiration of a green plant?



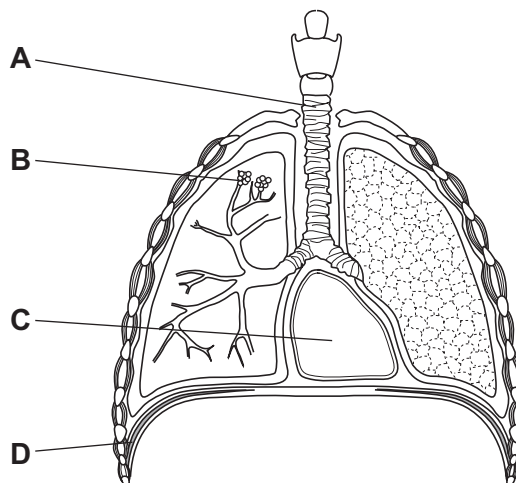
7 The drawing shows some blood, as it appears under the microscope.

Which part carries glucose to muscles?



8 The diagram shows some structures in the human thorax (chest).

Into which part does carbon dioxide pass immediately after leaving the blood?



9 Which row describes the stimulus and response in a plant process?

	name of process	stimulus	plant response
<b>A</b>	geotropism	gravity	root grows down
<b>B</b>	geotropism	light	shoot grows up
<b>C</b>	phototropism	gravity	shoot grows down
<b>D</b>	phototropism	light	root grows up

10 Which row is correct for the hormone adrenaline?

	effect on blood glucose concentration	effect on the pulse rate	organ where adrenaline is destroyed
<b>A</b>	lowered	decreased	kidney
<b>B</b>	lowered	decreased	liver
<b>C</b>	raised	increased	kidney
<b>D</b>	raised	increased	liver

11 Which structure in a flower produces pollen?

- A** sepal
- B** stamen
- C** stigma
- D** style

12 Where in the female human reproductive system is the hormone oestrogen produced?

- A** cervix
- B** ovary
- C** uterus
- D** vagina

13 Fresh sewage runs into a river. Why does this reduce the fish population in the river?

- A** It brings organisms that feed on fish.
- B** It carries bacteria that reduce oxygen concentration.
- C** It decreases the growth of algae.
- D** It makes the water too cloudy for fish to see.

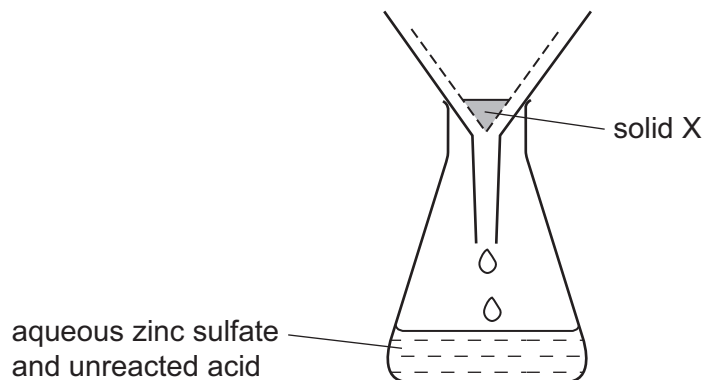
14 Which statement about atoms and molecules is correct?

- A** Atoms gain or lose electrons to become molecules.
- B** Atoms of the same element contain the same number of molecules.
- C** Molecules are the simplest unit of an atom.
- D** Molecules contain atoms which are covalently bonded.

- 15** In an experiment, a mixture of 0.5g of copper and 3g of zinc is added to an excess of dilute sulfuric acid.

The copper acts as a catalyst.

After all the zinc has dissolved, the resulting mixture is filtered.



What is solid X and what is its mass?

	solid X	mass of pure X
<b>A</b>	copper	less than 0.5g
<b>B</b>	copper	0.5g
<b>C</b>	copper(II) oxide	0.5g
<b>D</b>	copper(II) oxide	greater than 0.5g

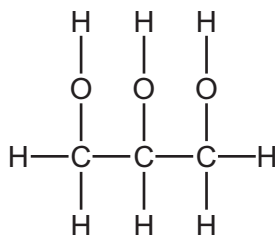
- 16** Element Y has a proton number of 18 and a nucleon number of 40.

Which statements about element Y are correct?

- 1 It has 40 neutrons in its nucleus.
- 2 It has 22 electrons.
- 3 It is unreactive.
- 4 It is in Group 0 of the Periodic Table.

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

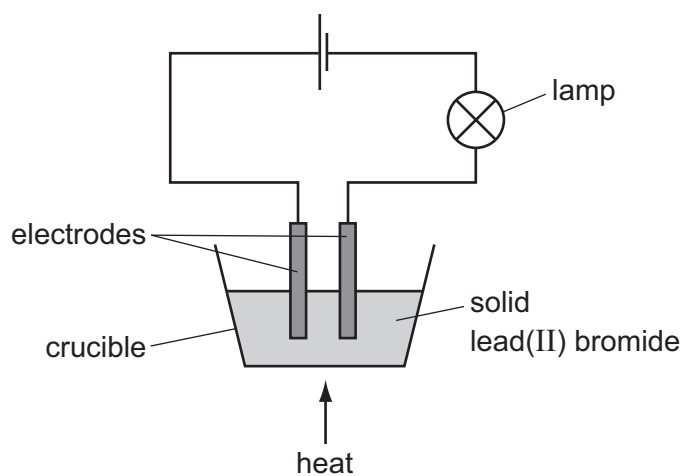
17 The structure of a compound is shown.



What is the formula of this compound?

- A**  $\text{C}_3\text{H}_5\text{O}_3$       **B**  $\text{C}_3\text{H}_6\text{O}_3$       **C**  $\text{C}_3\text{H}_8\text{O}$       **D**  $\text{C}_3\text{H}_8\text{O}_3$

18 The apparatus shown is set up.

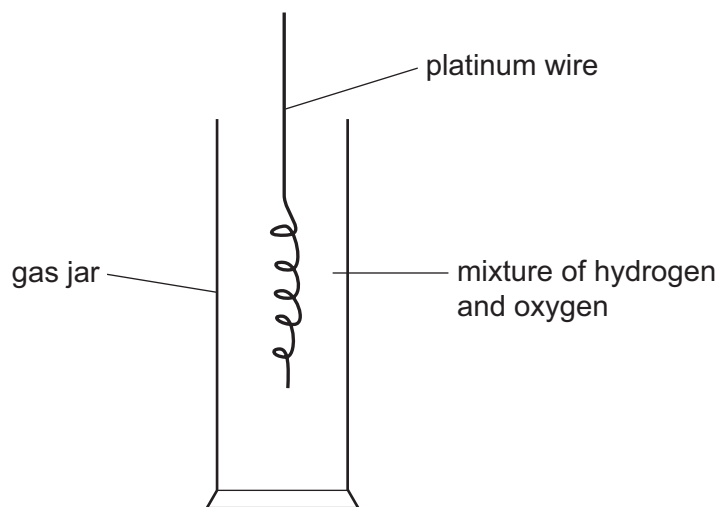


The crucible needs to be heated for the lamp to give out light.

Why is heat needed?

- A** An exothermic reaction takes place in the crucible.  
**B** Electrodes only conduct electricity when hot.  
**C** Heat causes the lead(II) bromide to react with air.  
**D** The lead(II) bromide must be molten.

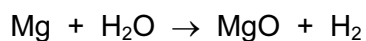
- 19 The diagram shows a platinum wire being used to catalyse the reaction between hydrogen and oxygen.



An explosive squeak is heard.

Which statement is correct?

- A An acidic gas is formed.
  - B Energy is released.
  - C Hydrogen is reduced.
  - D Platinum is oxidised.
- 20 Magnesium reacts with steam to form magnesium oxide and hydrogen gas.



Which statement is correct?

- A Hydrogen gas is reduced.
- B Magnesium is oxidised.
- C Magnesium is reduced.
- D Water is oxidised.



21 Compound X reacts with dilute nitric acid to give a colourless gas which turns limewater milky.

A solution of compound X reacts with sodium hydroxide solution to form a pale blue precipitate.

What is X?

- A copper(II) carbonate
- B copper(II) chloride
- C iron(II) carbonate
- D iron(II) chloride

22 A substance reacts with dilute acid, producing a gas.

The gas ignites with a pop when tested with a lighted splint.

What is the substance?

- A copper
- B copper(II) oxide
- C magnesium
- D magnesium carbonate

23 The positions of four elements are shown in the outline of the Periodic Table.

Which element has a high melting point and forms coloured compounds?

The diagram shows an outline of the periodic table with four elements marked as follows:

C	D									A															B

Element A is located in the d-block (transition metals). Element B is in Group 17 (halogens). Elements C and D are in Groups 1 and 2 (alkali and alkaline earth metals).

24 Chlorine, bromine and iodine are elements in Group VII of the Periodic Table.

Which trend is observed going down Group VII?

- A Each element has the same physical state.
- B The colour of the element becomes lighter.
- C The reactivity of the element decreases.
- D The state of the element changes from solid to liquid to gas.

25 Which element is less reactive than hydrogen?

- A copper
- B iron
- C magnesium
- D zinc

26 What are the approximate percentages by volume of nitrogen and oxygen in clean air?

	nitrogen	oxygen
<b>A</b>	1	99
<b>B</b>	20	80
<b>C</b>	80	20
<b>D</b>	99	1

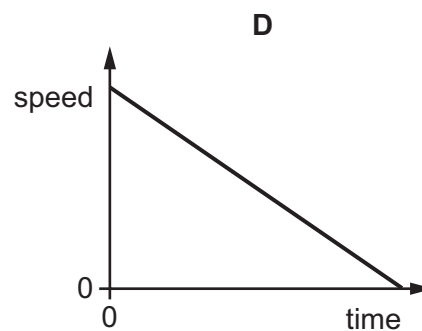
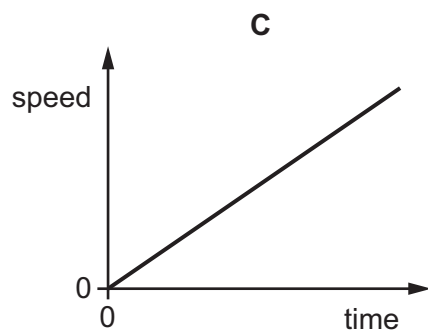
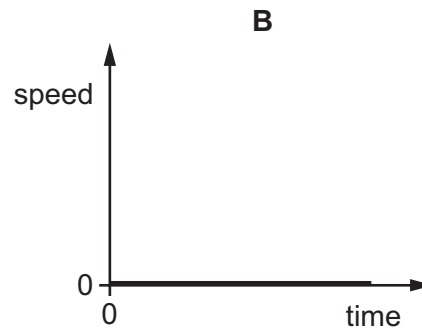
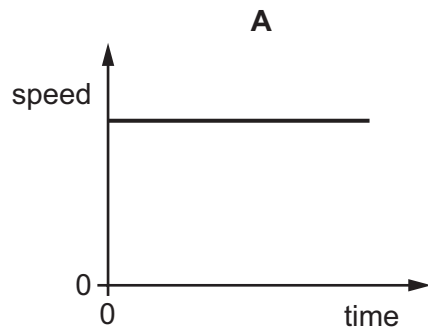
27 Petroleum is a mixture of hydrocarbons.

Which method is used to separate these hydrocarbons?

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

28 A car is moving downhill along a road at a constant speed.

Which graph is the speed/time graph for the car?



29 Which statement about mass and weight is correct?

- A Mass and weight are both forces.
- B Mass is a force and weight is not.
- C Neither mass nor weight is a force.
- D Weight is a force and mass is not.

30 An object has a mass of 75 g and a volume of 15 cm<sup>3</sup>.

What is its density?

- A 0.20 g/cm<sup>3</sup>
- B 5.0 g/cm<sup>3</sup>
- C 60 g/cm<sup>3</sup>
- D 90 g/cm<sup>3</sup>

31 What is the unit for work and what is the unit for power?

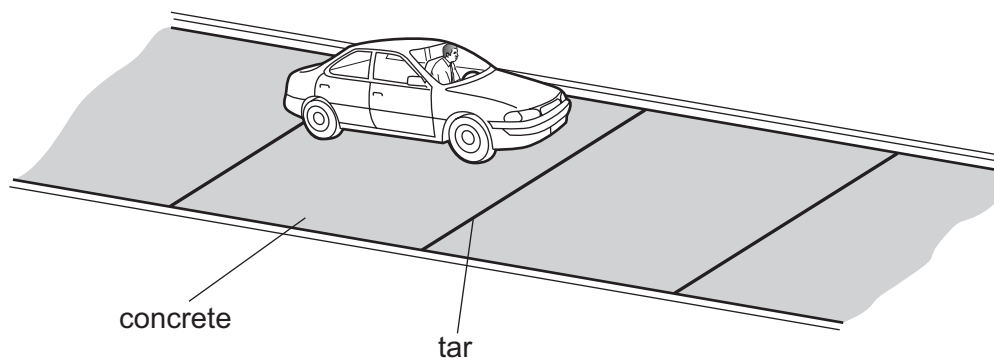
	work	power
<b>A</b>	J	N
<b>B</b>	J	W
<b>C</b>	N	W
<b>D</b>	W	J

- 32 Which energy change takes place when a block of wood slows down as it slides across a rough horizontal table?
- A chemical energy to kinetic energy  
 B gravitational energy to kinetic energy  
 C gravitational energy to thermal energy  
 D kinetic energy to thermal energy
- 33 A beaker of water is at room temperature. Some of the water changes from a liquid into a gas. As a result, the temperature of the remaining water changes.

What is the name for this change of state and how does the temperature change?

	change of state	how temperature changes
<b>A</b>	condensation	decreases
<b>B</b>	condensation	increases
<b>C</b>	evaporation	decreases
<b>D</b>	evaporation	increases

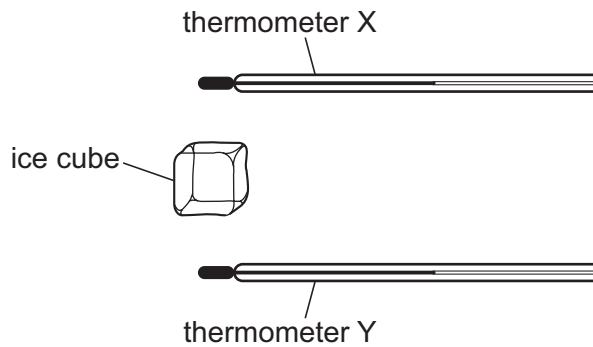
- 34 Concrete roads are laid in sections and the gaps between sections are filled with soft tar.



Why is this done?

- A to allow for expansion and contraction of the concrete  
 B to allow the tar to radiate heat from the road  
 C to increase the density of the concrete used  
 D to reduce the mass of concrete used

- 35 Thermometer X is held above an ice cube and thermometer Y is held an equal distance below the ice cube. After several minutes, the reading on one thermometer changes. The ice cube has not melted.

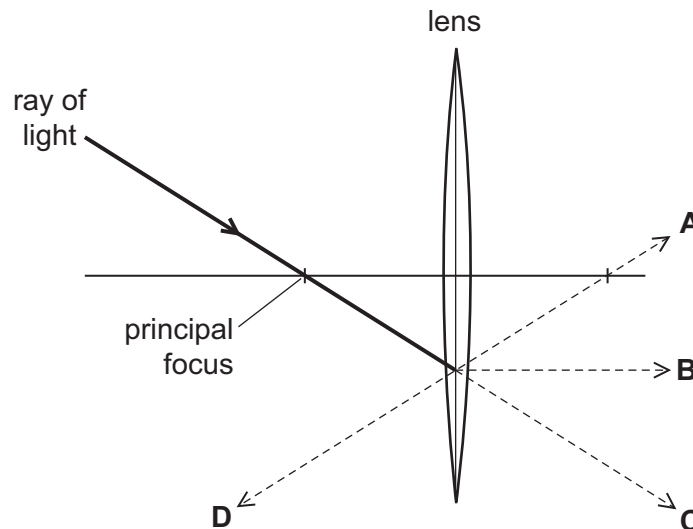


The reading of which thermometer changes, and why?

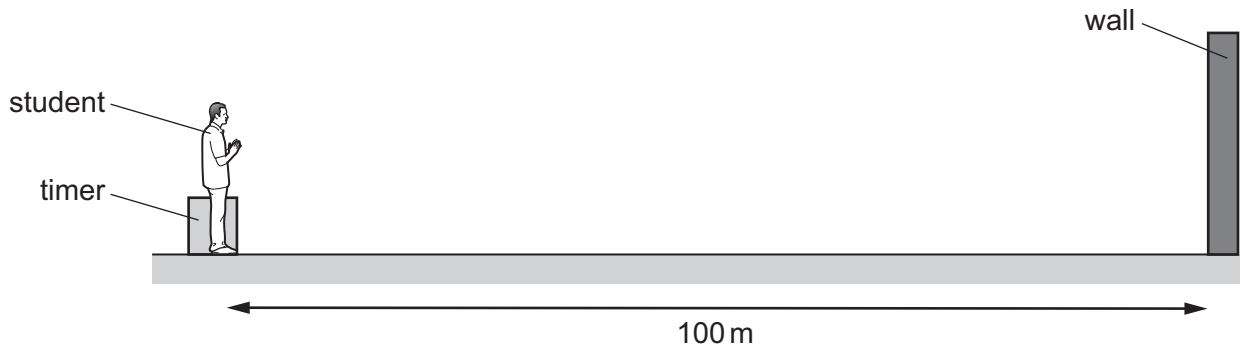
	thermometer	reason
<b>A</b>	X	cool air rises from the ice cube
<b>B</b>	X	warm air rises from the ice cube
<b>C</b>	Y	cool air falls from the ice cube
<b>D</b>	Y	warm air falls from the ice cube

- 36 The diagram shows the path of a ray of light passing through a principal focus of a lens.

Which labelled line shows the direction of the ray after it leaves the lens?



- 37 A student measures the speed of sound. He claps his hands and the sound reflects from a wall which is 100 m away from him.

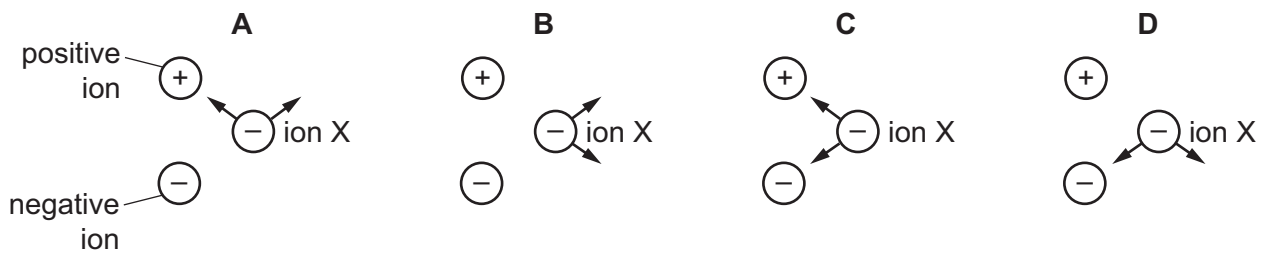


An electronic timer detects the echo of the sound 0.60 s after it is made.

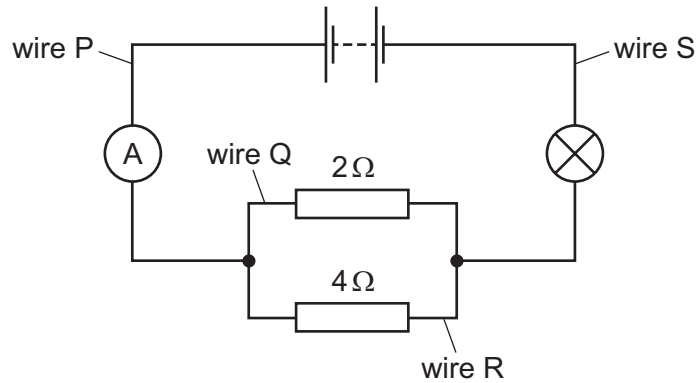
Which calculation should the student use to determine the speed of sound?

- A  $\frac{100}{0.60}$  m/s      B  $\frac{100}{1.2}$  m/s      C  $\frac{200}{0.30}$  m/s      D  $\frac{200}{0.60}$  m/s
- 38 A negative ion X is close to a positive ion and another negative ion. Electrical forces act on ion X because of the charges in the other two ions.

Which diagram shows the directions of the two forces acting on ion X?

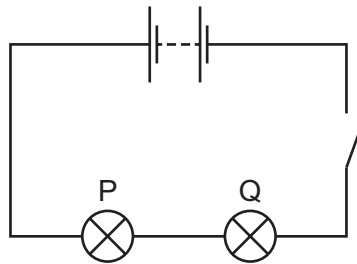


- 39 The circuit diagram includes two resistors connected in parallel.



Which statement is correct?

- A The current in wire P is equal to the current in wire Q.
  - B The current in wire P is greater than the current in wire R.
  - C The current in wire Q is greater than the current in wire S.
  - D The current in wire R is equal to the current in wire S.
- 40 Two identical lamps P and Q are connected in a circuit as shown in the diagram.



The circuit is now switched on.

Which statement is correct?

- A Each lamp can be switched off independently.
- B If lamp Q breaks, lamp P stays alight.
- C Lamp P is brighter than lamp Q.
- D The current is the same in both lamps.

**DATA SHEET**  
**The Periodic Table of the Elements**

		Group														
I	II	III	IV	V	VI	VII	VIII					0				
7 <b>Li</b> Lithium 3	9 <b>Be</b> Beryllium 4	1 <b>H</b> Hydrogen 1	11 <b>B</b> Boron 5	12 <b>C</b> Carbon 6	13 <b>Al</b> Aluminium 13	14 <b>N</b> Nitrogen 7	15 <b>P</b> Phosphorus 15	16 <b>S</b> Sulfur 16	17 <b>Cl</b> Chlorine 17	18 <b>Ar</b> Argon 18	19 <b>F</b> Fluorine 9	20 <b>Ne</b> Neon 10	2 <b>He</b> Helium 2			
23 <b>Na</b> Sodium 11	24 <b>Mg</b> Magnesium 12	25 <b>Mn</b> Manganese 25	26 <b>Fe</b> Iron 26	27 <b>Co</b> Cobalt 27	28 <b>Ni</b> Nickel 28	29 <b>Cu</b> Copper 29	30 <b>Zn</b> Zinc 30	31 <b>Ga</b> Gallium 31	32 <b>Ge</b> Germanium 32	33 <b>As</b> Arsenic 33	34 <b>Se</b> Selenium 34	35 <b>Br</b> Bromine 35	36 <b>Kr</b> Krypton 36			
39 <b>K</b> Potassium 19	40 <b>Ca</b> Calcium 20	41 <b>Nb</b> Niobium 41	42 <b>Mo</b> Molybdenum 42	43 <b>Tc</b> Technetium 43	44 <b>Ru</b> Ruthenium 44	45 <b>Rh</b> Rhodium 45	46 <b>Pd</b> Palladium 46	47 <b>Ag</b> Silver 47	48 <b>Cd</b> Cadmium 48	49 <b>In</b> Indium 49	50 <b>Sn</b> Tin 50	51 <b>Sb</b> Antimony 51	52 <b>Te</b> Tellurium 52	53 <b>I</b> Iodine 53	54 <b>Xe</b> Xenon 54	
85 <b>Rb</b> Rubidium 37	88 <b>Sr</b> Strontium 38	89 <b>Y</b> Yttrium 39	90 <b>Zr</b> Zirconium 40	91 <b>Nb</b> Niobium 41	92 <b>Mo</b> Molybdenum 42	93 <b>Tc</b> Technetium 43	94 <b>Ru</b> Ruthenium 44	95 <b>Rh</b> Rhodium 45	96 <b>Pd</b> Palladium 46	97 <b>Ag</b> Silver 47	98 <b>Cd</b> Cadmium 48	99 <b>In</b> Indium 49	100 <b>Sn</b> Tin 50	101 <b>Sb</b> Antimony 51	102 <b>Te</b> Tellurium 52	103 <b>Xe</b> Xenon 54
133 <b>Cs</b> Caesium 55	137 <b>Ba</b> Barium 56	138 <b>La</b> Lanthanum 57	139 <b>Ce</b> Cerium 58	140 <b>Pr</b> Praseodymium 59	141 <b>Nd</b> Neodymium 60	142 <b>Pm</b> Promethium 61	143 <b>Sm</b> Samarium 62	144 <b>Eu</b> Europium 63	145 <b>Gd</b> Gadolinium 64	146 <b>Tb</b> Terbium 65	147 <b>Dy</b> Dysprosium 66	148 <b>Ho</b> Holmium 67	149 <b>Er</b> Erbium 68	150 <b>Tm</b> Thulium 69	151 <b>Yb</b> Ytterbium 70	152 <b>Lu</b> Lutetium 71
223 <b>Fr</b> Francium 87	226 <b>Ra</b> Radium 88	227 <b>Ac</b> Actinium 89	228 <b>Th</b> Thorium 90	231 <b>Pa</b> Protactinium 91	232 <b>U</b> Uranium 92	233 <b>Np</b> Neptunium 93	234 <b>Pu</b> Plutonium 94	235 <b>Am</b> Americium 95	236 <b>Cm</b> Curium 96	237 <b>Bk</b> Berkelium 97	238 <b>Cf</b> Californium 98	239 <b>Es</b> Einsteinium 99	240 <b>Fm</b> Fermium 100	241 <b>Md</b> Mendelevium 101	242 <b>No</b> Nobelium 102	243 <b>Lr</b> Lawrencium 103

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

Key  

a	<b>X</b>	a = relative atomic mass
b	<b>X</b>	X = atomic symbol
		b = proton (atomic) number

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