



Cambridge IGCSE™

COMBINED SCIENCE

0653/13

Paper 1 Multiple Choice (Core)

October/November 2020

45 minutes

You must answer on the multiple choice answer sheet.

You will need: Multiple choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

INSTRUCTIONS

- 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 multiple choice answer sheet.
- Follow the instructions on the multiple choice answer sheet.
- Write in soft pencil.
- Write your name, centre number and candidate number on the multiple choice answer sheet in the spaces provided unless this has been done for you.
- Do **not** use correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.

INFORMATION

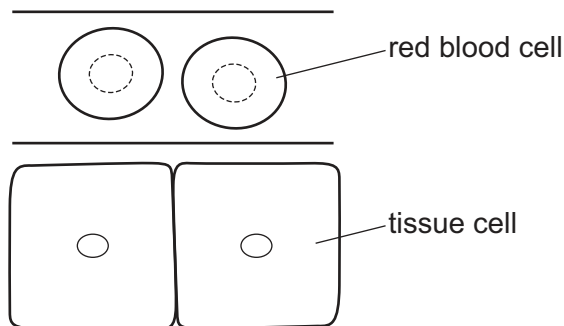
- The total mark for this paper is 40.
- Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

This document has **20** pages. Blank pages are indicated.



2

- 1 The diagram shows two red blood cells inside a capillary and two tissue cells near this capillary.

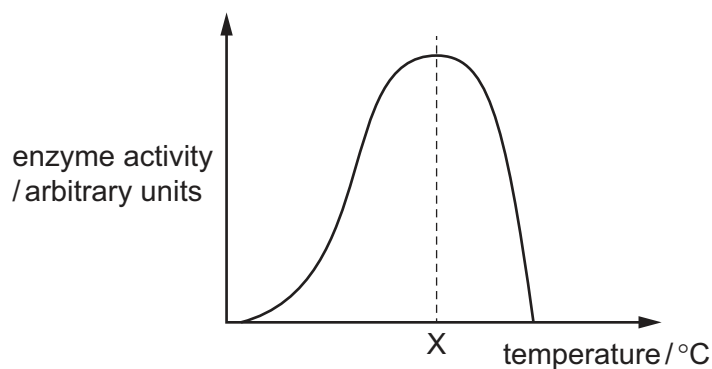


How does the oxygen in the red blood cells reach the tissue cells?

- A** by absorption
B by diffusion
C by respiration
D by transpiration
- 2 Which row is correct?

	substance	elements contained in substance			
		carbon	hydrogen	nitrogen	oxygen
A	carbohydrates	✓	✓	✓	✗
B	carbohydrates	✓	✓	✗	✗
C	proteins	✓	✓	✓	✓
D	proteins	✗	✓	✓	✓

- 3 The diagram shows how the activity of an enzyme changes with temperature.



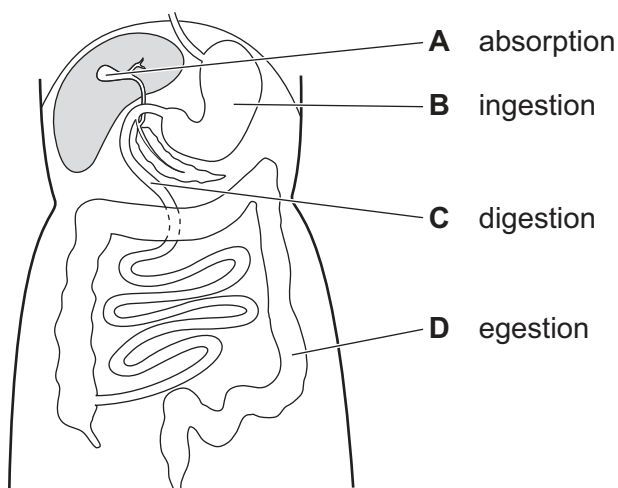
This enzyme works in the human body.

What is the most likely value of temperature X?

- A** 10 °C **B** 40 °C **C** 70 °C **D** 100 °C

3

- 4** Which label gives the correct function of that region of the alimentary canal and its associated organs?



- 5** Which breakdown processes occur inside cells, and which occur outside cells?

	large molecules to small molecules for absorption	breakdown of glucose to release energy
A	inside	inside
B	inside	outside
C	outside	inside
D	outside	outside

- 6** The table shows two plant tissues with their possible functions.

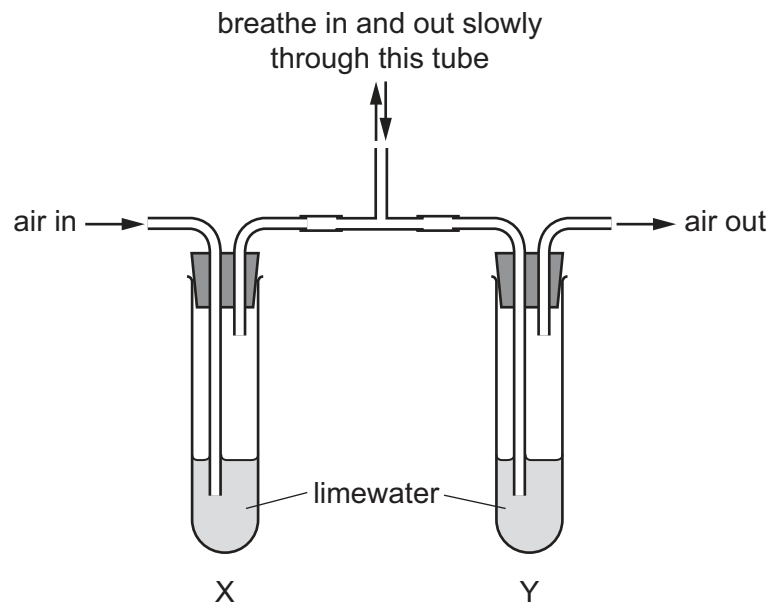
	tissue	functions	
		support	transport
1	phloem	✓	✓
2	phloem	✗	✓
3	xylem	✓	✓
4	xylem	✓	✗

Which rows show the correct functions for phloem and xylem?

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

4

- 7 A student uses the apparatus shown to investigate the composition of inspired and expired air.

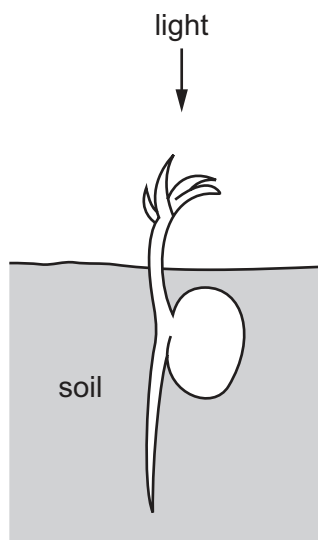


What is the appearance of the limewater after one minute of breathing in and out?

	tube X	tube Y
A	clear	clear
B	clear	cloudy
C	cloudy	clear
D	cloudy	cloudy

5

8 The diagram shows a germinating seed.



What does the germinating seed show?

	shoot	root
A	negative phototropism	negative gravitropism
B	negative phototropism	positive gravitropism
C	positive phototropism	negative gravitropism
D	positive phototropism	positive gravitropism

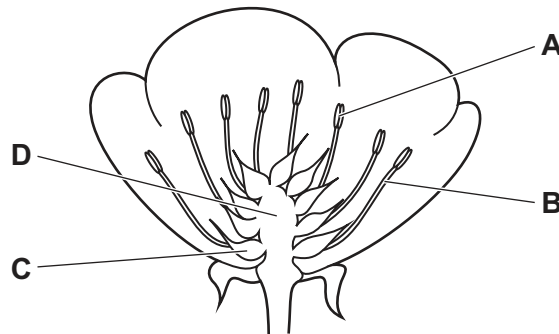
9 Which row describes asexual reproduction?

	number of parents	a zygote is produced	offspring identical to the parent
A	1	no	yes
B	1	yes	no
C	2	no	yes
D	2	yes	no

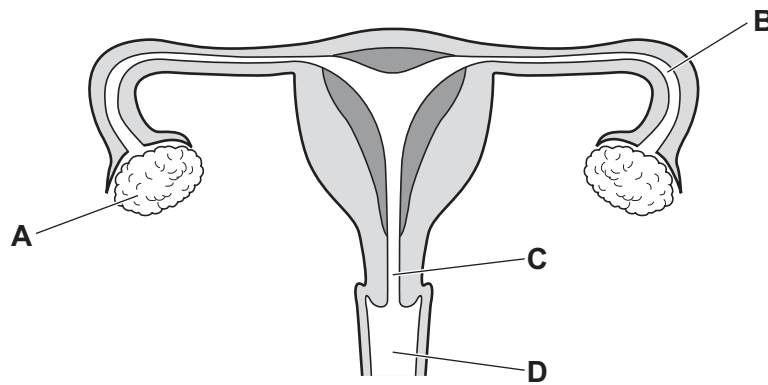
6

10 The diagram shows a section through a buttercup flower.

Which structure produces pollen grains?



11 Where does fertilisation take place?



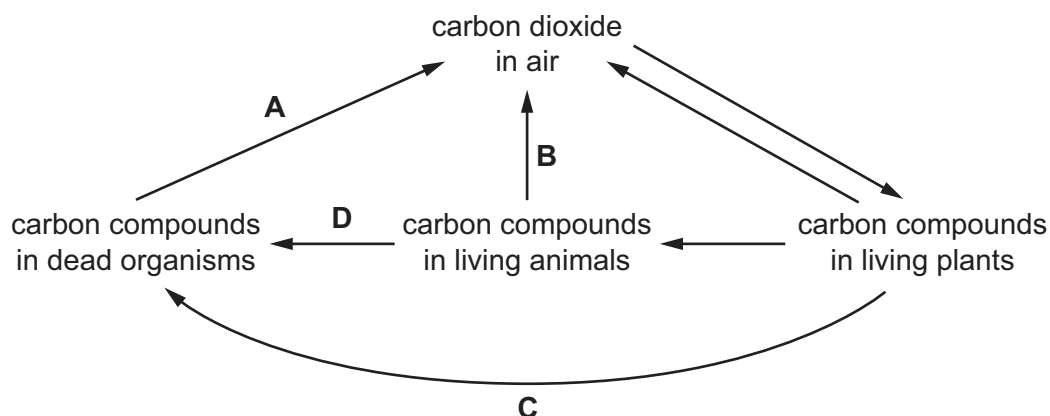
12 Which organism makes its own organic nutrients?

- A carnivore
- B decomposer
- C herbivore
- D producer

7

13 The diagram shows part of the carbon cycle.

Which arrow represents respiration by decomposers?



14 The temperature and pressure of oxygen in two different containers are shown.

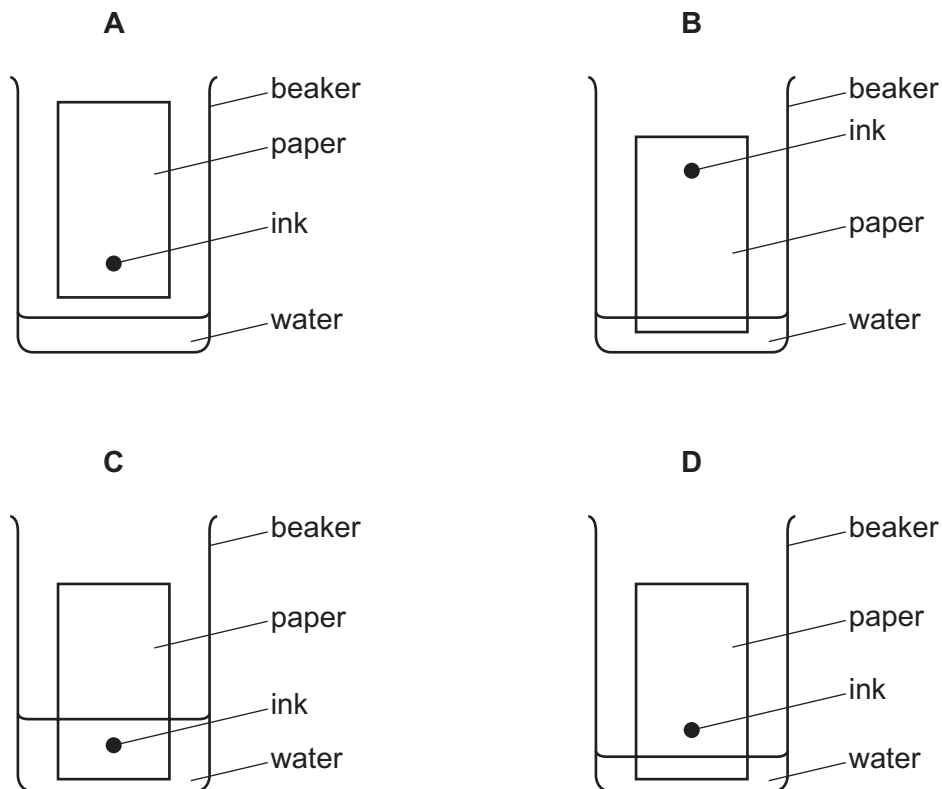
	temperature /°C	pressure kN/m ²
container 1	20	200
container 2	50	150

Which statement about the oxygen molecules in container 1 compared to container 2 is correct?

- A** In container 1 they are closer together and moving faster.
- B** In container 1 they are closer together and moving slower.
- C** In container 1 they are further apart and moving faster.
- D** In container 1 they are further apart and moving slower.

15 Chromatography separates ink into different colours.

Which diagram shows how the apparatus is set up?



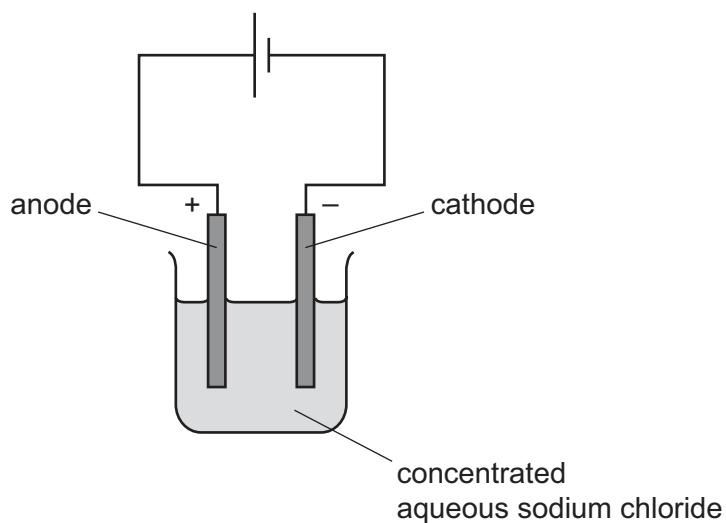
16 Which statement about non-metals is correct?

- A** They are in Group I of the Periodic Table.
- B** They are malleable and have high melting points.
- C** They react with acids to form hydrogen gas.
- D** They react with other non-metals to form covalent compounds.

17 Which row correctly identifies formulae for acids and for alkalis?

	acids	alkalis
A	HNO_3 and H_2SO_4	NaOH and KOH
B	HNO_3 and H_2SO_4	HCl and KOH
C	HCl and KOH	H_2SO_4 and HNO_3
D	NaOH and KOH	HNO_3 and H_2SO_4

- 18** The apparatus for the electrolysis of concentrated aqueous sodium chloride using inert electrodes is shown.



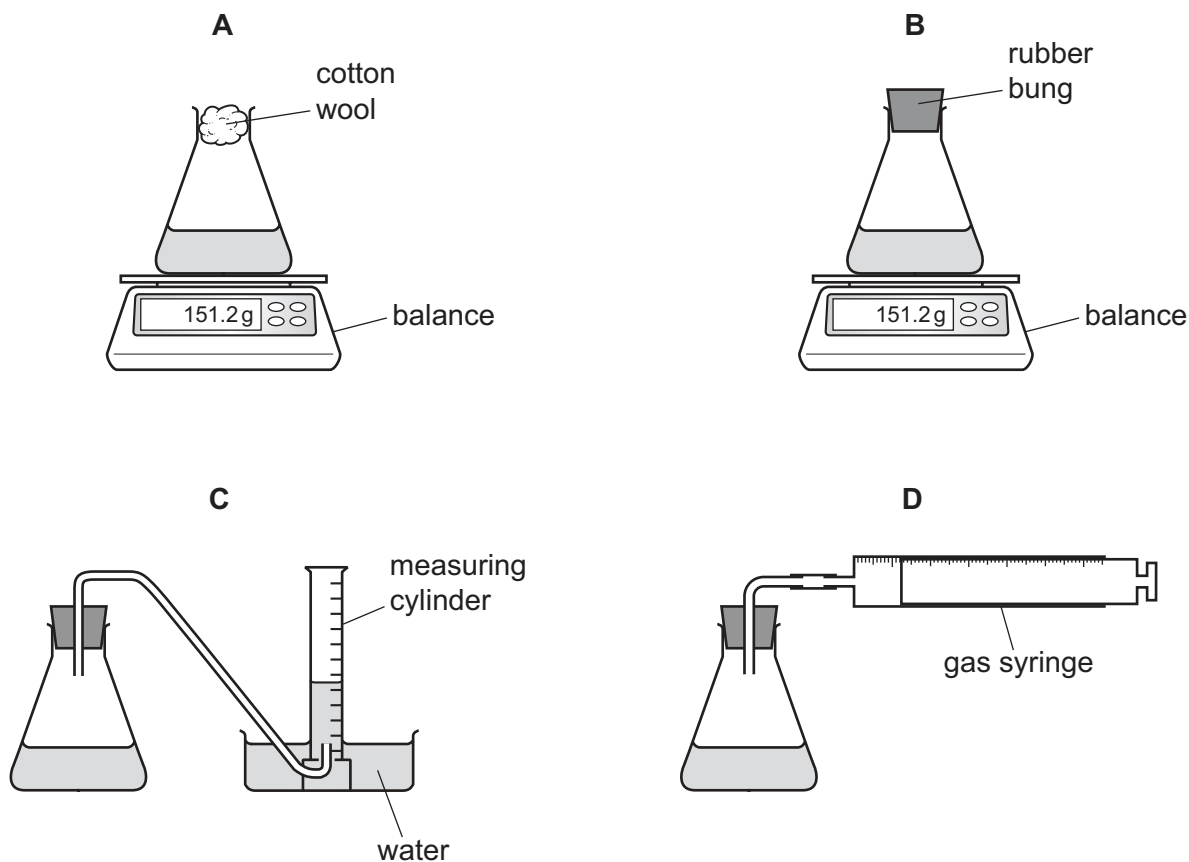
Which statement about this electrolysis is correct?

- A** A gas, which turns red litmus blue, is produced at the anode.
- B** Hydrogen is produced at the cathode.
- C** Oxygen is produced at the anode.
- D** Sodium can be used for the inert electrodes.
- 19** Which temperature changes occur during exothermic and endothermic reactions?

	exothermic	endothermic
A	decreases	increases
B	decreases	no change
C	increases	decreases
D	increases	no change

20 Dilute hydrochloric acid reacts with magnesium to form magnesium chloride and hydrogen.

Which apparatus is **not** suitable for use in investigating the rate of this reaction?



21 Which two substances both react with dilute sulfuric acid to make the salt magnesium sulfate?

- A** magnesium carbonate and magnesium chloride
- B** magnesium chloride and magnesium nitrate
- C** magnesium oxide and magnesium carbonate
- D** magnesium oxide and magnesium nitrate

22 Acid X reacts with metal Y.

A colourless gas is given off and a pale green solution is produced.

Two tests are carried out on the solution.

test	reagent(s) added	result
1	aqueous silver nitrate and nitric acid	white precipitate
2	aqueous sodium hydroxide	green precipitate

What are acid X and metal Y?

	acid	metal
A	hydrochloric	iron
B	hydrochloric	zinc
C	sulfuric	iron
D	sulfuric	zinc

23 The diagram shows Period 3 of the Periodic Table.

I	II	III	IV	V	VI	VII	VIII
V		W	X			Y	

Which two elements are metals?

- A** V and W **B** V and X **C** W and X **D** X and Y

24 Some physical properties of four elements are shown.

Which element can act as a catalyst?

	melting point / °C	conductivity as a solid	density g/cm ³
A	98	good	0.97
B	113	poor	2.07
C	1455	good	8.9
D	1683	poor	2.32

25 Which method is used to extract copper from copper(II) oxide?

- A** dissolving copper(II) oxide in hydrochloric acid and then filtering
- B** dissolving copper(II) oxide in water and then filtering
- C** heating the copper(II) oxide
- D** heating the copper(II) oxide mixed with carbon

26 Decane is a hydrocarbon.

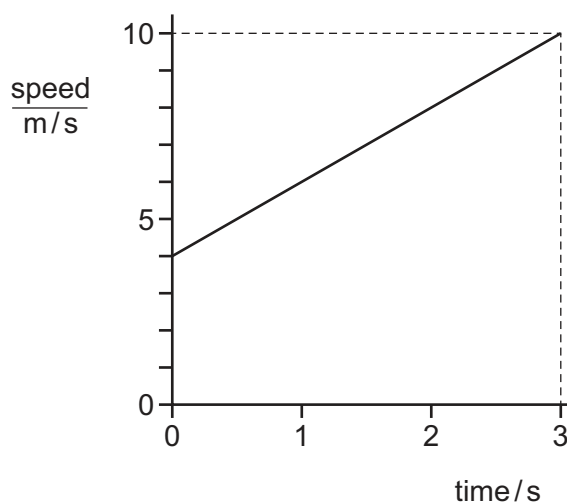
Which greenhouse gas is made during the complete combustion of decane?

- A** carbon dioxide
- B** carbon monoxide
- C** hydrogen
- D** methane

27 Which statement describes a hydrocarbon?

- A** a compound that burns to form carbon dioxide and hydrogen
- B** a compound that contains carbon and hydrogen only
- C** a compound that only contains ionic bonds
- D** a compound that reacts easily with metals

28 The diagram shows a speed–time graph for an object.



What is the average speed of the object?

- A** 2.0 m/s
- B** 4.0 m/s
- C** 7.0 m/s
- D** 10 m/s

29 The gravitational field strength is 10 N/kg .

What is the mass of an object that has a weight of 5.0 N ?

- A** 0.50 kg **B** 2.0 kg **C** 5.0 kg **D** 50 kg

30 A solid metal cube of side 5.0 cm has a mass of 250 g .

What is the density of the metal?

- A** 0.50 g/cm^3 **B** 2.0 g/cm^3 **C** 10 g/cm^3 **D** 50 g/cm^3

31 A student carrying a bag walks up some stairs at a constant speed.

Which change does **not** affect the power developed by the student?

- A** carrying a heavier bag
B walking at a higher constant speed
C walking at a lower constant speed
D walking half-way up the stairs

32 Which energy source is non-renewable?

- A** geothermal
B hydroelectric
C nuclear fission
D wind

33 Which row shows how molecules in a solid and a liquid are arranged?

	solid	liquid
A	regularly	regularly
B	regularly	not regularly
C	not regularly	regularly
D	not regularly	not regularly

14

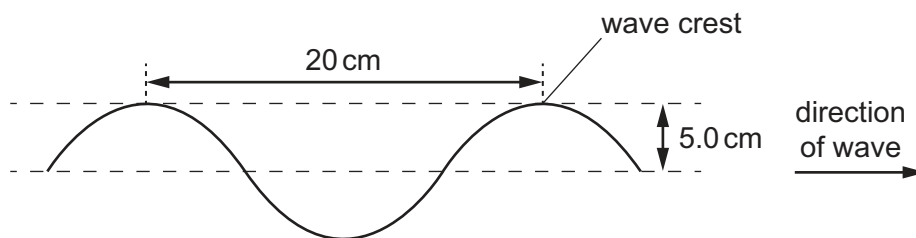
34 In which states of matter can convection occur?

	in a solid	in a liquid	in a gas
A	no	no	yes
B	no	yes	yes
C	yes	no	no
D	yes	yes	no

35 The diagram shows a section of a rope.

Four wave crests pass a point on the rope every second.

Each wave crest travels 80 cm in one second.



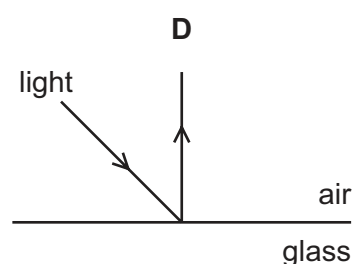
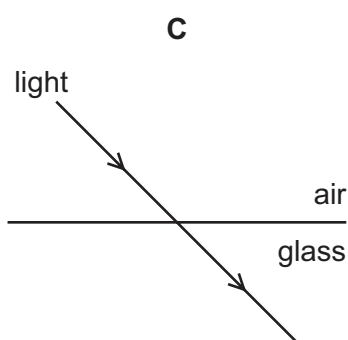
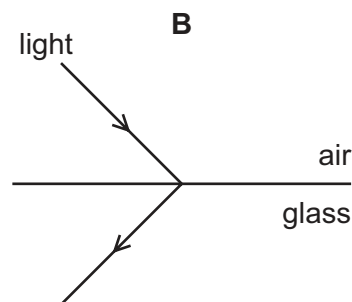
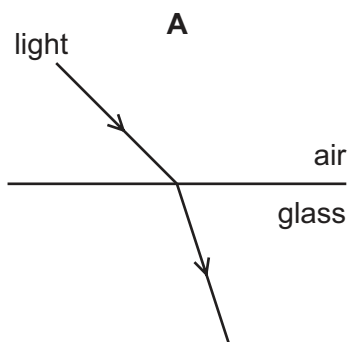
What is the speed of the wave?

- A** 4.0 cm/s **B** 5.0 cm/s **C** 20 cm/s **D** 80 cm/s

15

36 Light travelling in air strikes a glass block.

Which diagram shows what happens to the light?



37 Two sounds with the same frequency are produced by a loudspeaker.

The first sound has a large amplitude.

The second sound has a smaller amplitude.

How do the two sounds compare?

- A** The second sound is higher pitched.
- B** The second sound is lower pitched.
- C** The second sound is louder.
- D** The second sound is quieter.

38 A plastic rod can be charged by friction. This happens when some particles are added to or removed from the rod.

Which particles are added or removed?

- A** electrons
- B** ions
- C** neutrons
- D** protons

39 A power supply causes a current in a circuit.

The electromotive force (e.m.f.) of the power supply and the resistance of the circuit are both changed.

Which pair of changes **must** result in a smaller current in the circuit?

	e.m.f.	resistance
A	decreased	decreased
B	decreased	increased
C	increased	decreased
D	increased	increased

40 What is the purpose of a fuse in an electrical appliance?

- A** to maintain the correct current in the appliance
- B** to maintain the correct voltage across the appliance
- C** to prevent the insulation around the cables from becoming too thin
- D** to protect the wires from overheating when the current is too large

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The Periodic Table of Elements

Group																		
I	II											III	IV	V	VI	VII	VIII	
		Key atomic number atomic symbol name relative atomic mass										1 H hydrogen 1						
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 —	—	—	—	—

lanthanoids

actinoids

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