Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CO-ORDINATED SCIENCES **0654/13**

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)

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.

IB15 11_0654_13/5RP

1 Which chemical is found in a plant cell but **not** in an animal cell?

A glucose

B glycogen

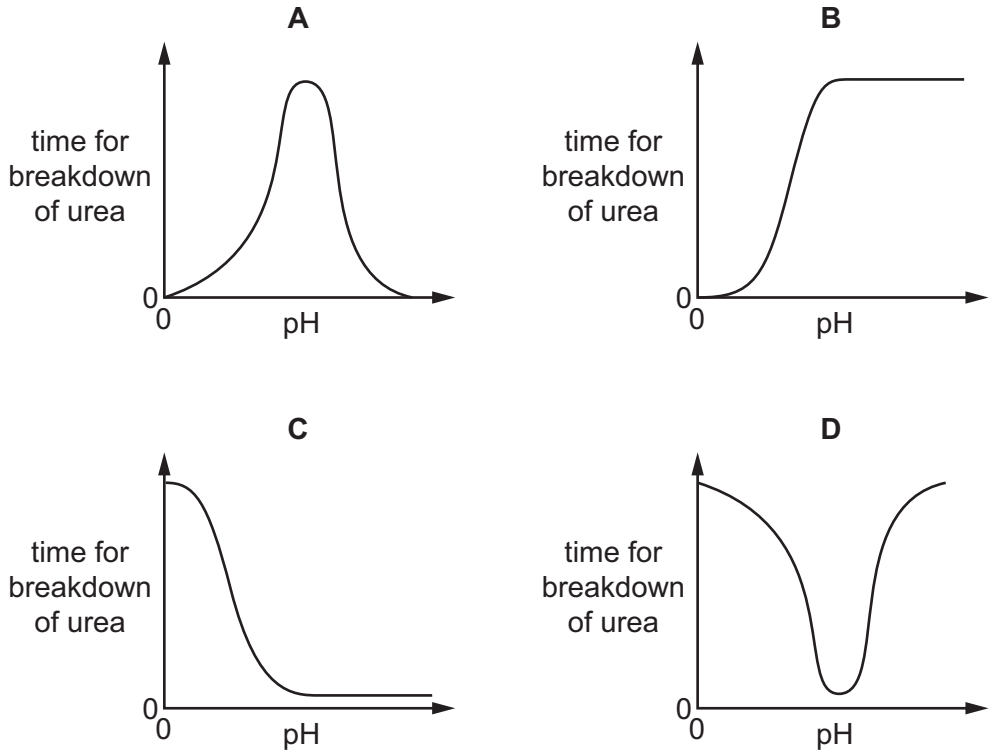
C protein

D starch

2 What must be present for diffusion to occur?

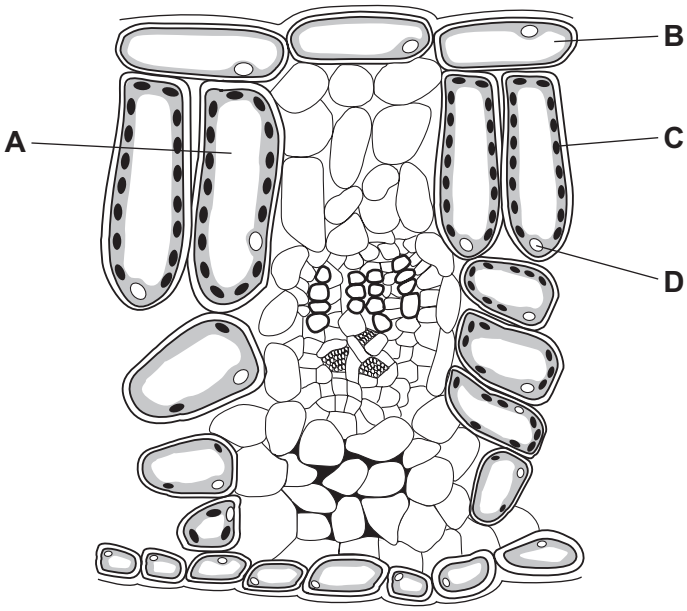
	concentration gradient	random movement of molecules	solvent
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

3 Which graph shows the effect of pH on the time taken for the breakdown of urea by enzymes?

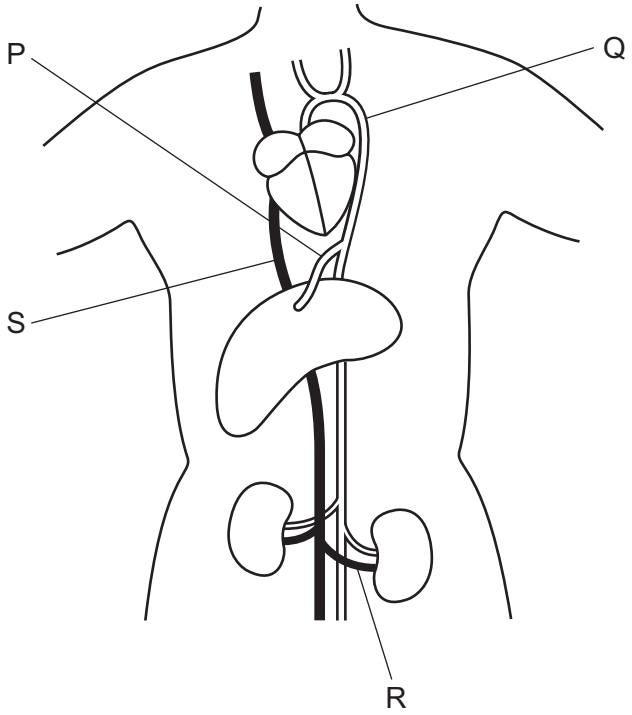


4 The diagram shows a section through a leaf.

Where are carbohydrates made?



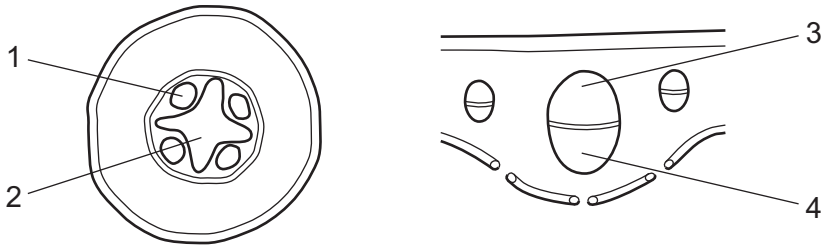
5 The diagram shows the heart, liver and kidneys with connecting blood vessels.



What are the labelled blood vessels?

	aorta	hepatic artery	vena cava	renal vein
A	Q	P	S	R
B	Q	R	S	P
C	S	P	Q	R
D	S	R	Q	P

6 The diagram shows sections through a plant root and a leaf.



root leaf

Which tissues are phloem?

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

7 Which part of the alimentary canal is in the form of a coiled tube?

A oesophagus

B pancreas

C rectum

D small intestine

8 What is the definition of homeostasis?

A controlling body temperature

B controlling responses to stimuli

C maintaining a constant external environment

D maintaining a constant internal environment

9 What happens when the body temperature falls below normal?

A Arterioles (small arteries) supplying the skin constrict (become narrower).

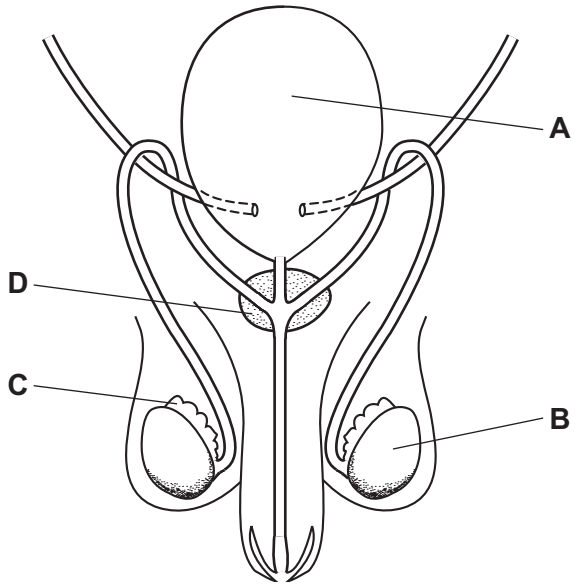
B Arterioles (small arteries) supplying the skin dilate (become wider).

C Capillaries move towards the skin surface.

D Capillaries move away from the skin surface.

10 The diagram shows the male reproductive system.

Which structure produces the hormones that control adolescence?



11 Which statement about flowers is correct?

A The anther and stigma are parts of the carpel.

B The anther and stigma are parts of the stamen.

C The ovary and stigma are parts of the carpel.

D The ovary and stigma are parts of the stamen.

12 The diagram shows a food chain.

beech tree → insect → shrew → owl

Which statement is correct?

A The beech tree is a consumer.

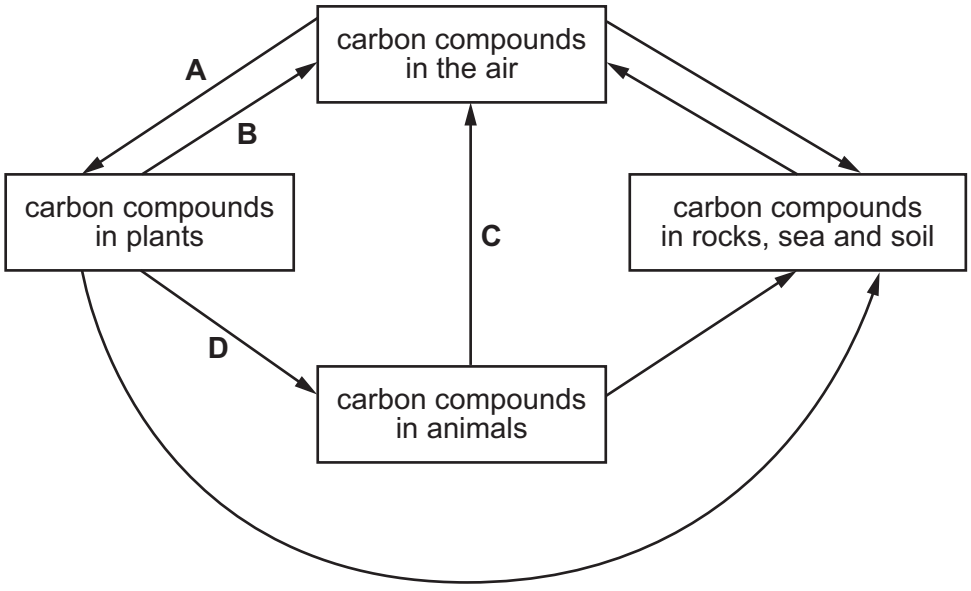
B The insect is a producer.

C The owl is a carnivore.

D The shrew is a herbivore.

13 The diagram shows part of the carbon cycle.

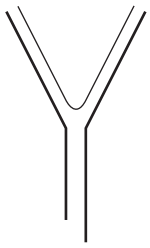
Which arrow shows respiration by plants?



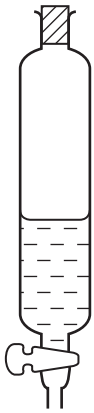
14 Hexane and octane are liquid hydrocarbons that mix together.

Which method is used to separate a mixture of these two liquids?

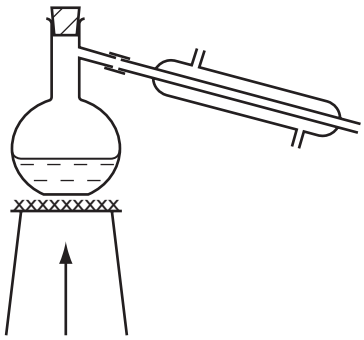
A



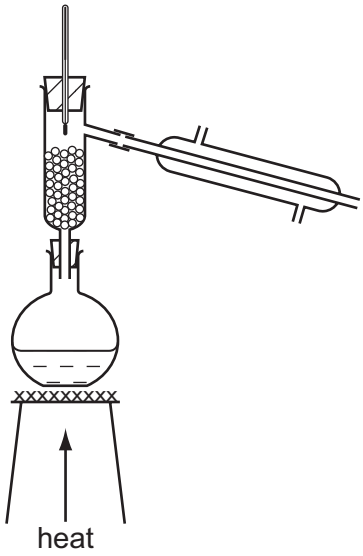
B



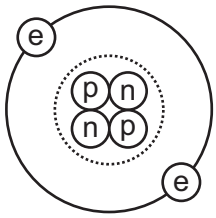
C



D



15 The diagram shows a helium atom.



Which particles in the helium atom have approximately the same mass?

A electron and proton only

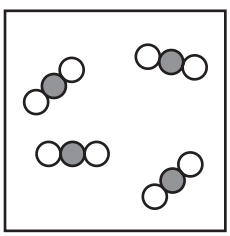
B electron and neutron only

C proton and neutron only

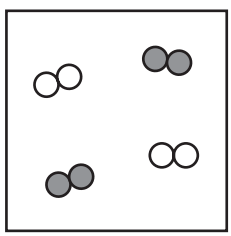
D electron, proton and neutron

16 Which diagram represents a single element?

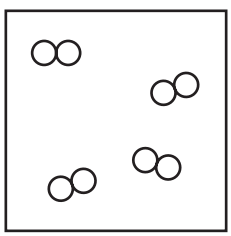
A



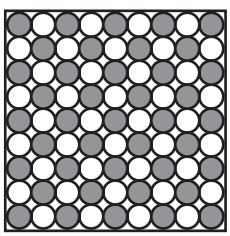
B



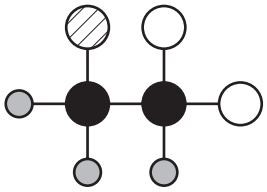
C

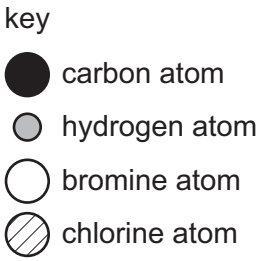


D



17 The diagram shows an organic molecule.

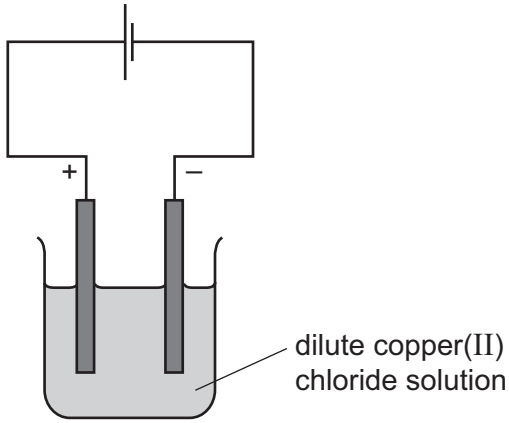




What is the formula of the molecule?

A $C_2H_3BrCl_2$ **B** $C_2H_3Br_2Cl$ **C** $C_3H_2BrCl_2$ **D** $C_3H_2Br_2Cl$

18 The diagram shows the electrolysis of a dilute solution of copper(II) chloride using inert electrodes.



Which row shows the products formed at each electrode and describes the bonding in copper(II) chloride?

	anode	cathode	type of bonding
A	chlorine	copper	ionic
B	chlorine	hydrogen	covalent
C	oxygen	copper	ionic
D	oxygen	hydrogen	covalent

19 Lime is manufactured by heating limestone.

Lime is used to control the acidity of soil.

Which types of chemical change occur in these two reactions?

	heating limestone	controlling acidity
A	endothermic	oxidation
B	endothermic	neutralisation
C	exothermic	oxidation
D	exothermic	neutralisation

20 Nitrogen from the air is used to manufacture ammonia.

$$\text{nitrogen + hydrogen} \rightarrow \text{ammonia}$$

Why is a catalyst used in this reaction?

A Nitrogen from the air is not pure.

B Nitrogen is a gas at room temperature.

C Nitrogen is a non-metallic element.

D Nitrogen is not very reactive.

21 When petrol burns in a car engine carbon monoxide, CO, and nitrogen monoxide, NO, are produced.

The gases produced are passed through a catalytic converter.

In the catalytic converter, the carbon monoxide reacts with nitrogen monoxide.

The equation for the reaction is

$$\text{carbon monoxide + nitrogen monoxide} \rightarrow \text{nitrogen gas + carbon dioxide}$$

Which statement is **not** correct?

A Carbon monoxide is oxidised in the catalytic converter.

B Carbon monoxide is produced by the complete combustion of petrol.

C Nitrogen from the air is oxidised in the car engine.

D Nitrogen monoxide is reduced in the catalytic converter.

22 An unknown aqueous solution is mixed with nitric acid and silver nitrate solution.

A white precipitate is formed.

Which ion is present in the unknown aqueous solution?

A carbonate

B chloride

C nitrate

D sulfate

23 An element is a solid at room temperature and does **not** conduct electricity.

What is the proton number of this element?

A 11 **B** 19 **C** 35 **D** 53

24 Which process does **not** produce carbon dioxide?

A acid reacting with a metal

B acid reacting with sodium carbonate

C complete combustion of methane

D respiration

25 Which anion is present in limestone?

A carbonate CO_3^{2-}

B nitrate NO_3^-

C oxide O^{2-}

D sulfate SO_4^{2-}

26 Which method is used to separate petroleum?

A chromatography

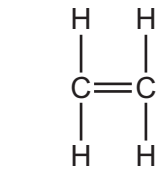
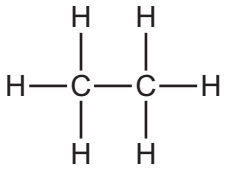
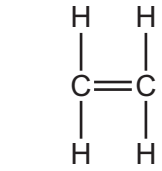
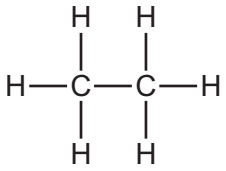
B distillation

C filtration

D fractional distillation

27 Ethanol is formed when steam reacts with compound Y.

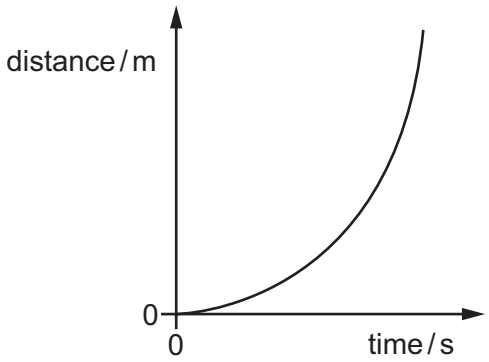
What is the name and what is the structure of compound Y?

	name	structure
A	ethane	
B	ethane	
C	ethene	
D	ethene	

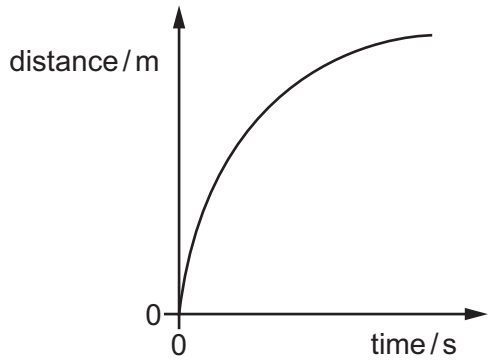
28 The following are distance / time graphs.

Which graph shows an object moving at constant speed?

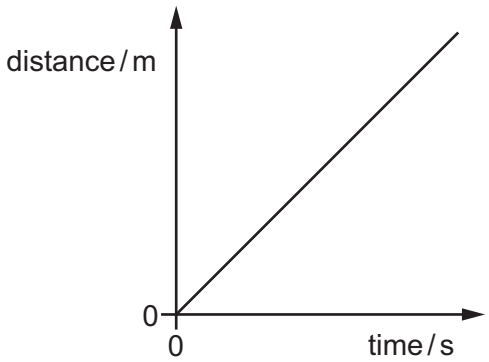
A



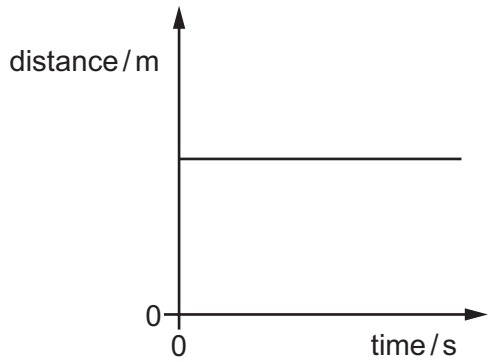
B



C



D



29 Which statement about weight is correct?

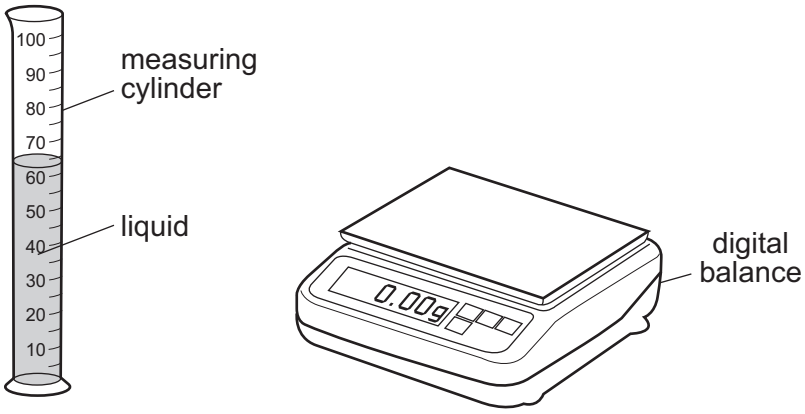
A Weight and mass are both measured in the same unit.

B Weight is the amount of matter in a body and is measured in kilograms.

C Weight is a force and is measured in kilograms.

D Weight is a force and is measured in newtons.

30 A student pours liquid into a measuring cylinder.



The student records the volume of the liquid from the scale on the measuring cylinder. He then puts the measuring cylinder containing the liquid on a balance and records the mass.

What else needs to be measured before the density of the liquid can be calculated?

A the depth of the liquid in the measuring cylinder

B the mass of the empty measuring cylinder

C the temperature of the liquid in the measuring cylinder

D the volume of the empty measuring cylinder

31 An electric motor is used to lift a container off a ship.

The output power of the motor is changed by changing the time taken to lift the container and by changing the work done in lifting the container.

Which row shows changes that both increase the output power?

	time taken	work done
A	decrease	decrease
B	decrease	increase
C	increase	decrease
D	increase	increase

32 On a warm day, a swimmer climbs out of a swimming pool into the open air and water evaporates from his skin.

As the water evaporates, which molecules escape into the air first and what happens to the average speed of the remaining water molecules?

	first molecules to escape	average speed of the remaining molecules
A	least energetic	decreases
B	least energetic	increases
C	most energetic	decreases
D	most energetic	increases

33 A sample of a solid is heated for 12 minutes and its temperature noted every minute.

The results are shown in the table.

time / min	0	1	2	3	4	5	6	7	8	9	10	11	12
temperature / °C	11.5	16.1	22.1	31.0	31.1	31.1	31.1	31.3	45.0	65.2	66.2	66.3	66.3

How should the sample be described at the end of the 12 minutes?

A all solid

B in the process of melting

C all liquid

D in the process of boiling

34 Food is kept in a loosely-packed cool-box which uses two ice packs to keep it cool.

Where should the ice packs be placed to keep all the food as cool as possible?

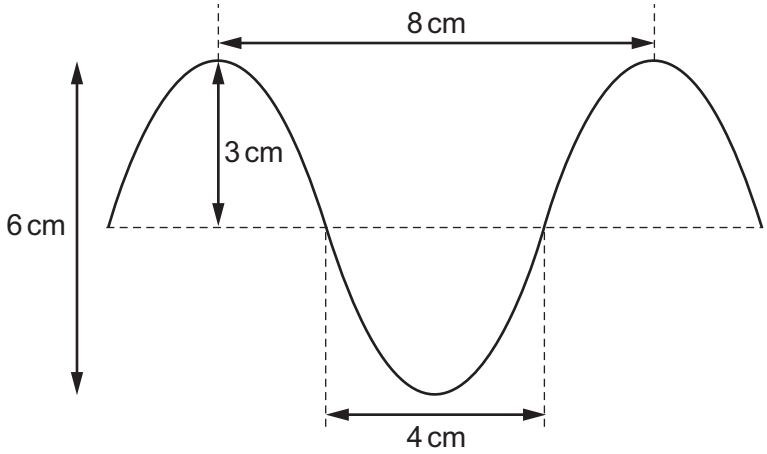
A both at the bottom of the box

B both at the top of the box

C one at the front and one at the back of the box

D one on the left and one on the right of the box

35 The diagram shows a wave.



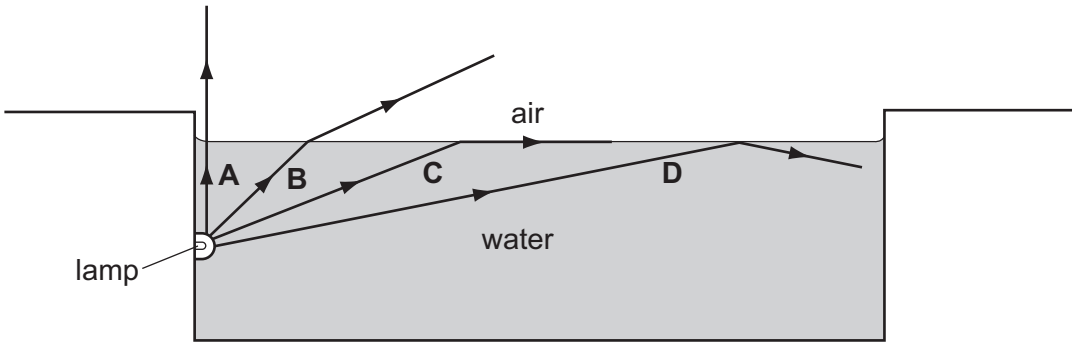
What are the amplitude and the wavelength of this wave?

	amplitude / cm	wavelength / cm
A	3	4
B	3	8
C	6	4
D	6	8

36 An underwater lamp is used to light a swimming pool.

Rays of light from the lamp hit the water surface at different angles, as shown in the diagram.

Which ray hits the surface at the critical angle?



37 In a test, a car horn is found to be too loud and the pitch of the note is too high.

What information does this give about the amplitude and the frequency of the sound wave produced?

	amplitude	frequency
A	too large	too large
B	too large	too small
C	too small	too large
D	too small	too small

38 A certain electrical appliance is powered from a mains supply.

The appliance normally uses a current of 3 A, but the current briefly rises to 4 A at the instant the appliance is switched on. The cable to the appliance is designed for currents up to 6 A.

A fuse is used to protect the circuit.

What should be the rating of the fuse?

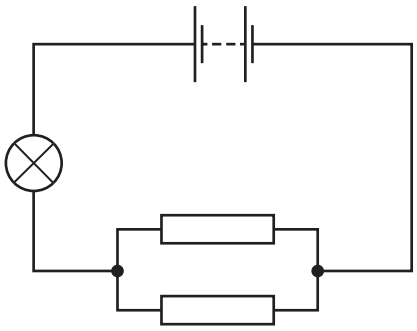
A 1 A **B** 3 A **C** 5 A **D** 13 A

39 A lamp is connected in four circuits in turn.

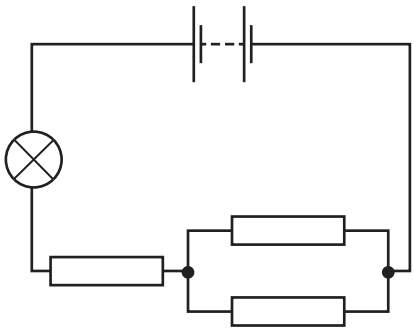
The batteries are identical and the resistors are identical.

In which circuit is the lamp brightest?

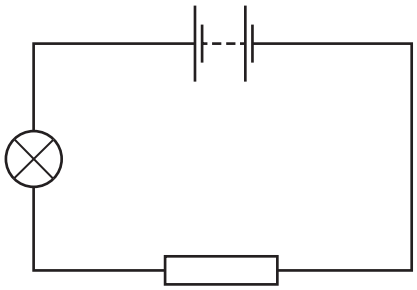
A



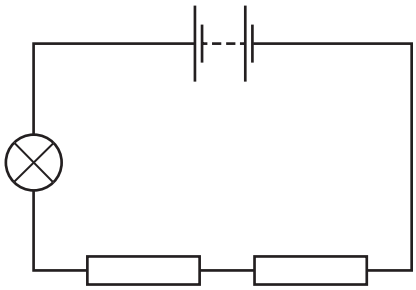
B



C



D



40 The table compares an atom of carbon-13 and an atom of nitrogen-14.

	carbon-13	nitrogen-14
nucleon number *A*	6	7
proton number *Z*	13	14

A neutral atom of carbon-13 and a neutral atom of nitrogen-14 have the same number of

A electrons.

B ions.

C neutrons.

D protons.

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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									4 He Helium 2
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	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	209 Po Polonium 84	210 At Astatine 85	222 Rn Radon 86
223 Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89 †															

140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	147 Pm Promethium 61	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	159 Tb Terbium 65	162 Dy Dysprosium 66	165 Ho Holmium 67	167 Er Erbium 68	169 Tm Thulium 69	173 Yb Ytterbium 70	175 Lu Lutetium 71
232 Th Thorium 90	231 Pa Protactinium 91	238 U Uranium 92	237 Np Neptunium 93	244 Pu Plutonium 94	243 Am Americium 95	247 Cm Curium 96	247 Bk Berkelium 97	251 Cf Californium 98	252 Es Einsteinium 99	257 Fm Fermium 100	258 Md Mendelevium 101	259 No Nobelium 102	260 Lr Lawrencium 103

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

Key: a X b — a = relative atomic mass; X = atomic symbol; b = proton (atomic) number

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