Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CO-ORDINATED SCIENCES **0654/12**

Paper 1 Multiple Choice **May/June 2014**

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.

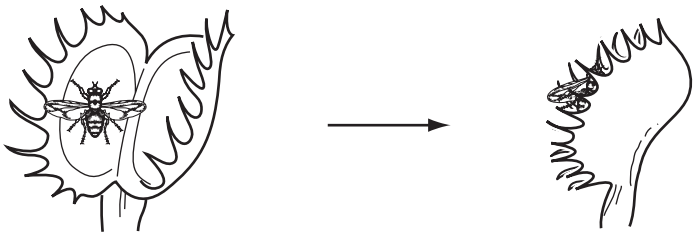
There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A**, **B**, **C** and **D**.
Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

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 **17** printed pages and **3** blank pages.

1 The Venus fly trap is a plant that catches insects.



Which characteristic is shown in the diagram?

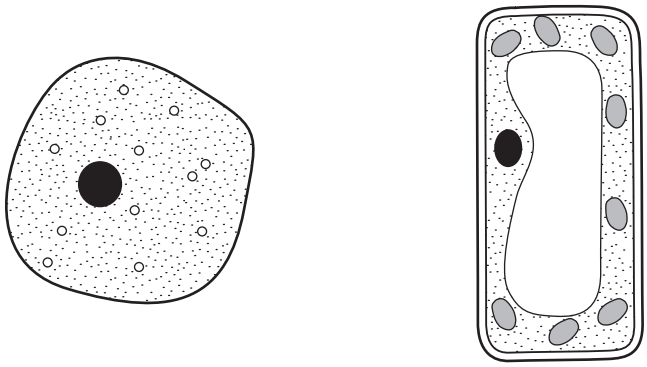
A excretion

B growth

C reproduction

D sensitivity

2 The diagram shows two different cells.



Which feature do they both have?

A cell membrane

B cell wall

C central vacuole

D chloroplasts

3 How does oxygen pass from the alveoli to the blood capillaries in the lungs?

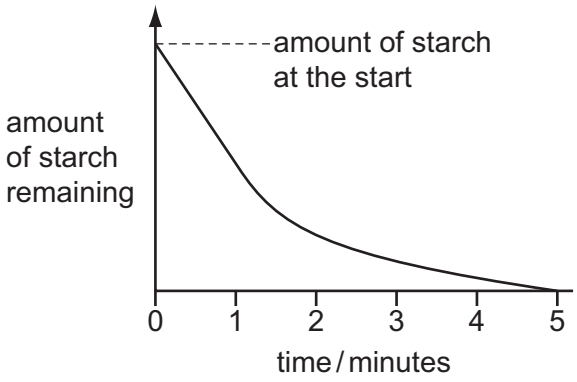
A diffusion

B evaporation

C secretion

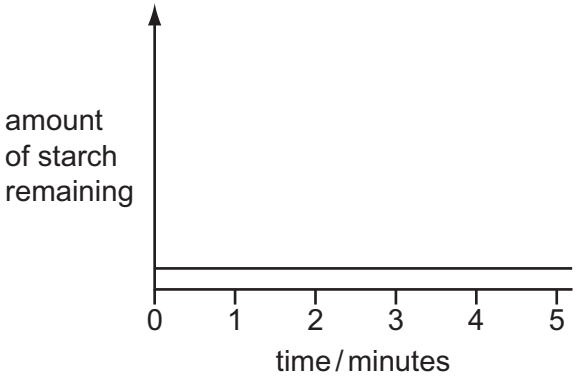
D transpiration

4 A test-tube containing a starch-amylase mixture is incubated at 35 °C. The graph shows how the amount of starch in the test-tube changes over the next five minutes.

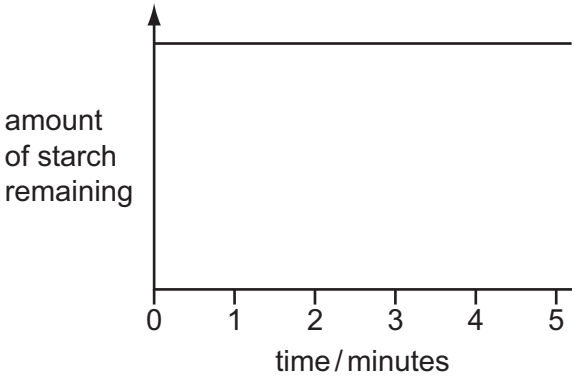


Which graph shows what happens if a similar starch-amylase mixture is incubated at 100 °C?

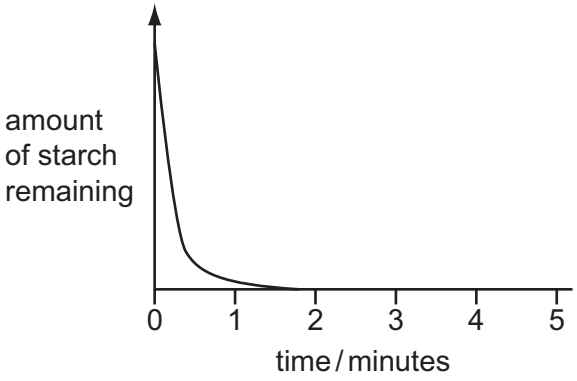
A



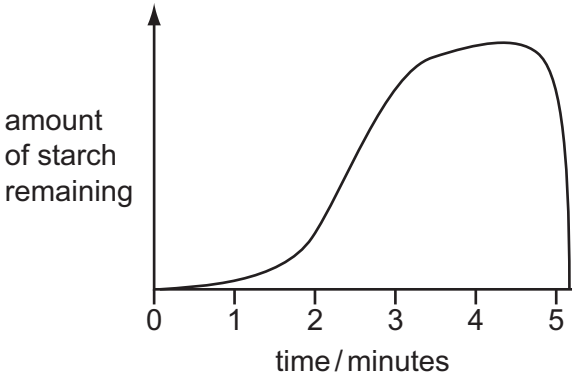
B



C



D



5 Which row states the basic units from which the large molecules are made?

	large molecules	basic units
A	oil	amino acids
B	oil	simple sugars
C	protein	amino acids
D	protein	simple sugars

6 During photosynthesis, where does most of the carbon dioxide and water enter a leaf?

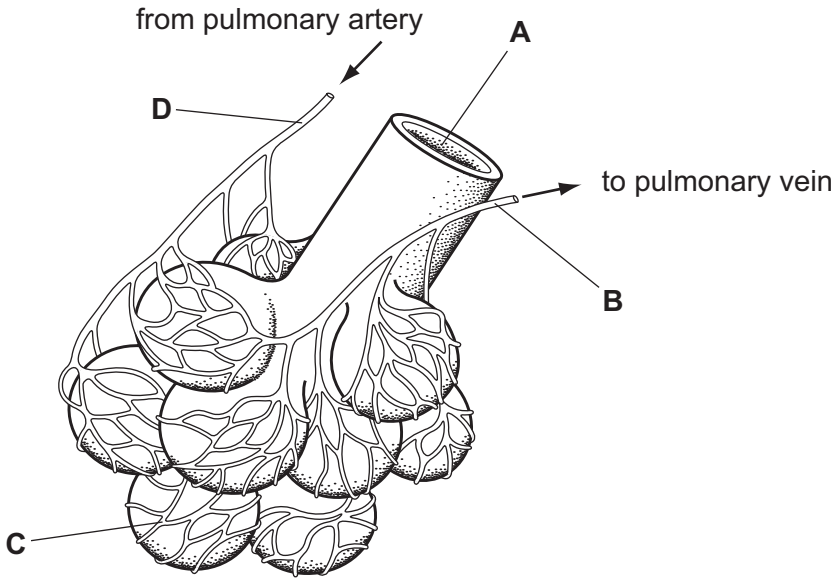
	carbon dioxide	water
A	through cuticle	in phloem
B	through cuticle	in xylem
C	through stomata	in phloem
D	through stomata	in xylem

7 Which processes require energy released from respiration?

	cell division	diffusion into a cell	protein synthesis
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

8 The diagram shows some of the structures in a human lung.

Where is the oxygen concentration lowest?



9 You suddenly pull your finger away if you accidentally touch something hot.

Which process controls this sudden response?

A a muscular movement by the spinal cord

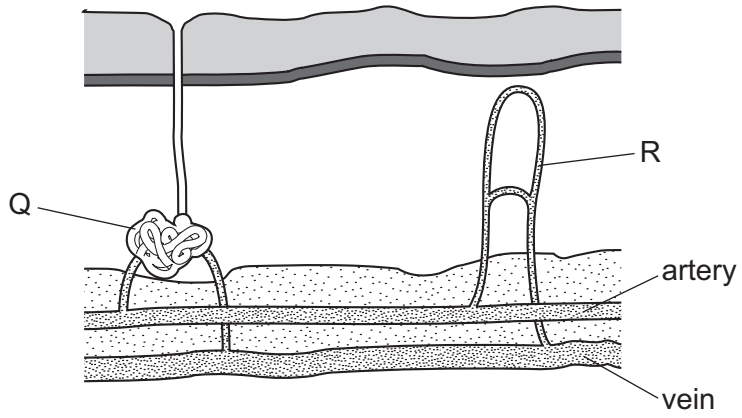
B a nervous reflex, not directed by the brain

C reflex muscle action independent of any nervous or brain control

D your brain, without you thinking about it

[Turn over

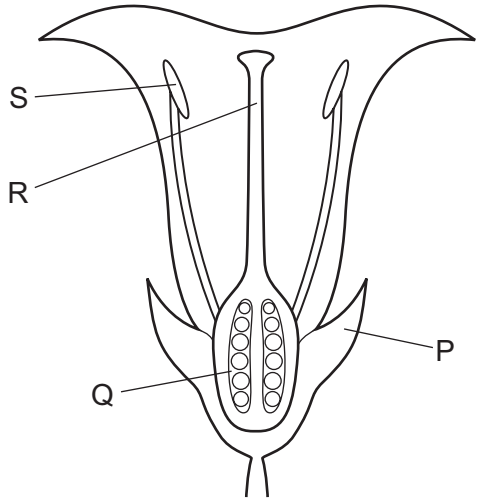
10 The diagram shows a section through human skin.



What happens at Q and R if a person becomes hot?

	Q	R
A	evaporation takes place	increased blood flow
B	sweat collects	reduced blood flow
C	sweat is released	reduced blood flow
D	sweat is secreted	increased blood flow

11 The diagram shows a section through a flower.



Which labelled structures are the anther and the ovary?

	anther	ovary
A	R	P
B	R	Q
C	S	P
D	S	Q

12 What does a human male inherit from his father?

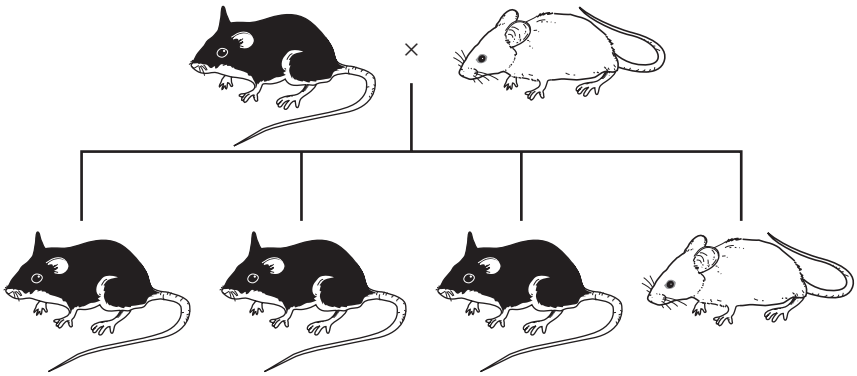
A an X allele

B an X sperm

C a Y chromosome

D a Y gene

13 The diagram shows the results of mating a male mouse that has black fur with a female mouse that has white fur.



If the allele for black fur is dominant, what do the results show?

A The female parent is heterozygous.

B The male parent is heterozygous.

C The offspring with black fur are homozygous.

D The offspring with white fur is heterozygous.

14 Which process is used to separate the coloured compounds in chlorophyll?

A chromatography

B distillation

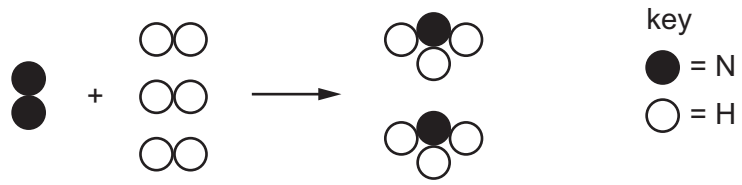
C evaporation

D filtration

15 Which row identifies the types of elements that form covalent compounds and the physical properties of covalent compounds?

	types of elements	physical property
A	metals and non-metals	high volatility
B	metals and non-metals	low volatility
C	non-metals only	high volatility
D	non-metals only	low volatility

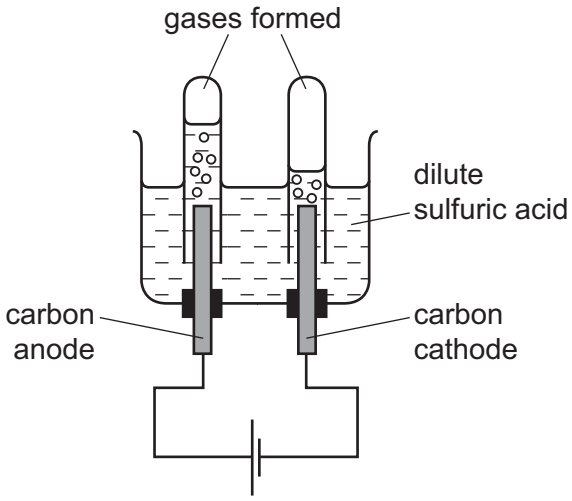
16 Nitrogen and hydrogen react to form ammonia.



How many molecules of ammonia are formed from 3 molecules of nitrogen, N_2?

A 2 **B** 3 **C** 6 **D** 12

17 Dilute sulfuric acid is electrolysed using the apparatus shown.



Which product forms at the cathode?

A hydrogen

B oxygen

C sulfur dioxide

D water

18 The table shows the initial and final temperatures of four different experiments.

reaction	initial temperature / °C	final temperature / °C
1	20	20
2	20	30
3	25	20
4	25	30

Which reactions are exothermic?

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

19 Some white anhydrous copper(II) sulfate powder is put into a beaker of water and stirred.

Which observation shows that the process is exothermic?

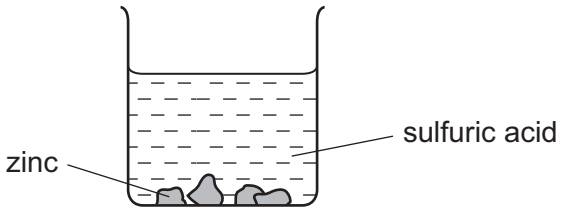
A A blue solution forms.

B A colourless solution forms.

C The beaker feels cooler.

D The beaker feels warmer.

20 Small lumps of zinc are added to sulfuric acid.



Which change increases the speed of the reaction?

A Add the same mass of large lumps of zinc.

B Decrease the concentration of sulfuric acid.

C Decrease the surface area of zinc.

D Increase the temperature of sulfuric acid.

21 Iron is produced in the blast furnace.

One of the reactions involved is shown below:

$$Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$$

Which statement is correct?

A Iron(III) oxide and carbon monoxide are both oxidised.

B Iron(III) oxide and carbon monoxide are both reduced.

C Iron(III) oxide is oxidised and carbon monoxide is reduced.

D Iron(III) oxide is reduced and carbon monoxide is oxidised.

22 A student tests an aqueous solution for the presence of sulfate ions.

What is the correct test and observation for sulfate ions?

A Acidify the solution and add silver ions to produce a cream precipitate.

B Acidify the solution and add aqueous barium ions to produce a white precipitate.

C Add aqueous iron(III) ions to produce a brown precipitate.

D Add copper(II) ions to produce a pale blue precipitate.

23 Which row correctly identifies the types of oxides?

	acidic oxides	basic oxides
A	CaO, Na_2O	CO_2, SO_2
B	CaO, SO_2	CO_2, Na_2O
C	CO_2, Na_2O	CaO, SO_2
D	CO_2, SO_2	CaO, Na_2O

24 Which Group I metal and which Group VII non-metal react together most vigorously?

	Group I	Group VII
A	potassium	bromine
B	potassium	chlorine
C	sodium	bromine
D	sodium	chlorine

25 Which equation describes the manufacture of lime from limestone?

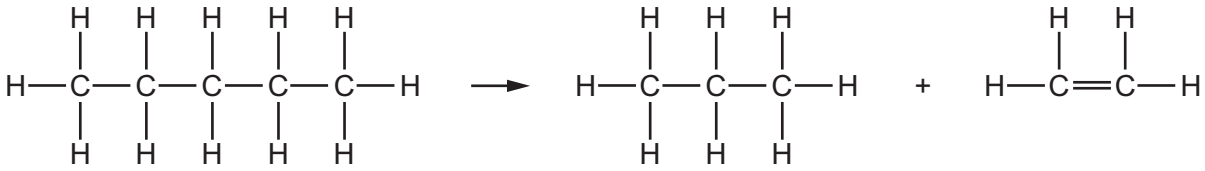
A calcium carbonate $\rightarrow$ calcium hydroxide + carbon dioxide

B calcium carbonate $\rightarrow$ calcium oxide + carbon dioxide

C calcium hydroxide $\rightarrow$ calcium oxide + water

D calcium oxide + carbon dioxide $\rightarrow$ calcium carbonate

26 An alkane molecule undergoes the chemical change shown:



What is the name of the chemical change?

A cracking

B fractional distillation

C polymerisation

D reduction

27 The main element present in coal is ……1…… .

When coal is ……2…… , an ……3…… gas that is harmful to trees is produced.

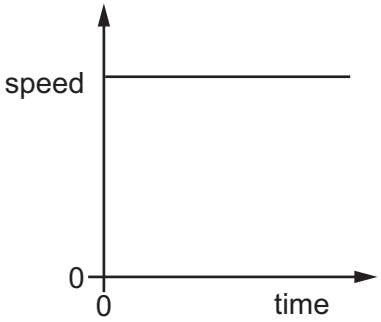
Which words correctly complete gaps 1, 2 and 3?

	1	2	3
A	carbon	burned	acidic
B	carbon	distilled	alkaline
C	nitrogen	reduced	acidic
D	sulfur	burned	alkaline

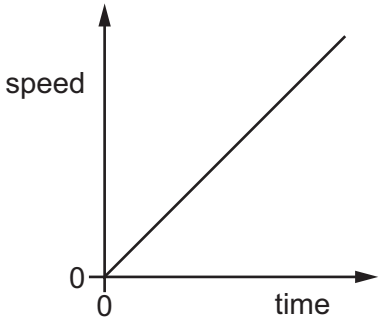
28 The diagram shows forces of equal size acting on a moving car.

Which speed / time graph represents the motion of the car?

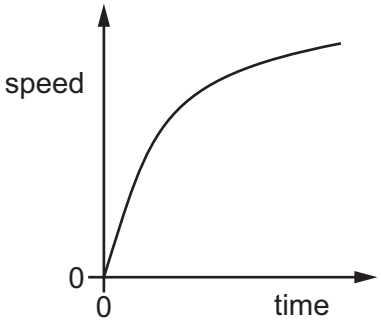
A



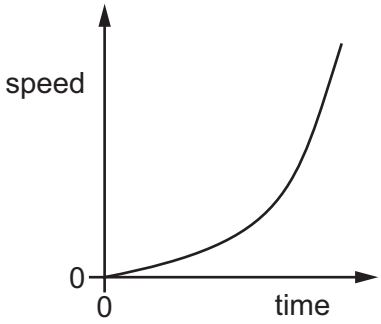
B



C



D



29 A rectangular block of metal has dimensions of 5 cm × 4 cm × 3 cm. The mass of the block is 162 g.

What is the density of the metal?

A 0.37 g / cm^3 **B** 2.7 g / cm^3 **C** 2700 g / cm^3 **D** 9720 g / cm^3

30 Which statement about reserves of fossil fuels is correct?

A They are limited but can be renewed.

B They are limited and cannot be renewed.

C They are unlimited and can be renewed.

D They are unlimited but cannot be renewed.

31 A motorist inflates a tyre with an air pump. The temperature of the air in the tyre remains constant.

What has changed?

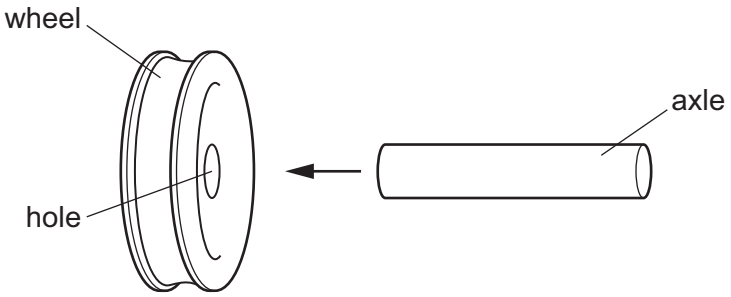
A The air molecules hitting the inside of the tyre are moving more quickly.

B The air molecules hitting the inside of the tyre are moving more slowly.

C There are fewer molecules hitting the inside of the tyre.

D There are more molecules hitting the inside of the tyre.

32 A metal wheel has to be fitted to an axle made from the same metal. The axle is larger than the hole in the wheel.



Which action could make it possible to fit the axle in the hole?

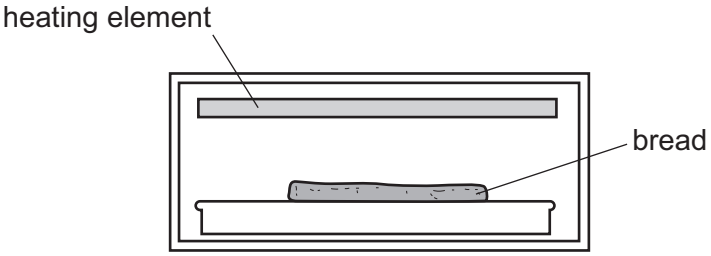
A cooling the axle only

B cooling the axle and cooling the wheel by the same temperature change

C heating the axle only

D heating the axle and heating the wheel by the same temperature change

33 Bread can be cooked by placing it below a heating element.



Which process transfers thermal energy from the heating element to the bread?

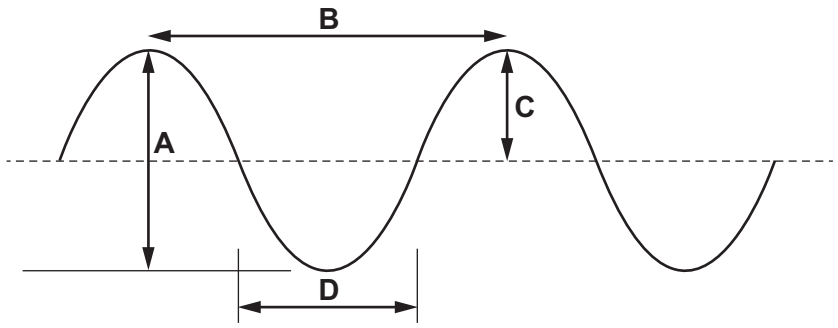
A conduction

B convection

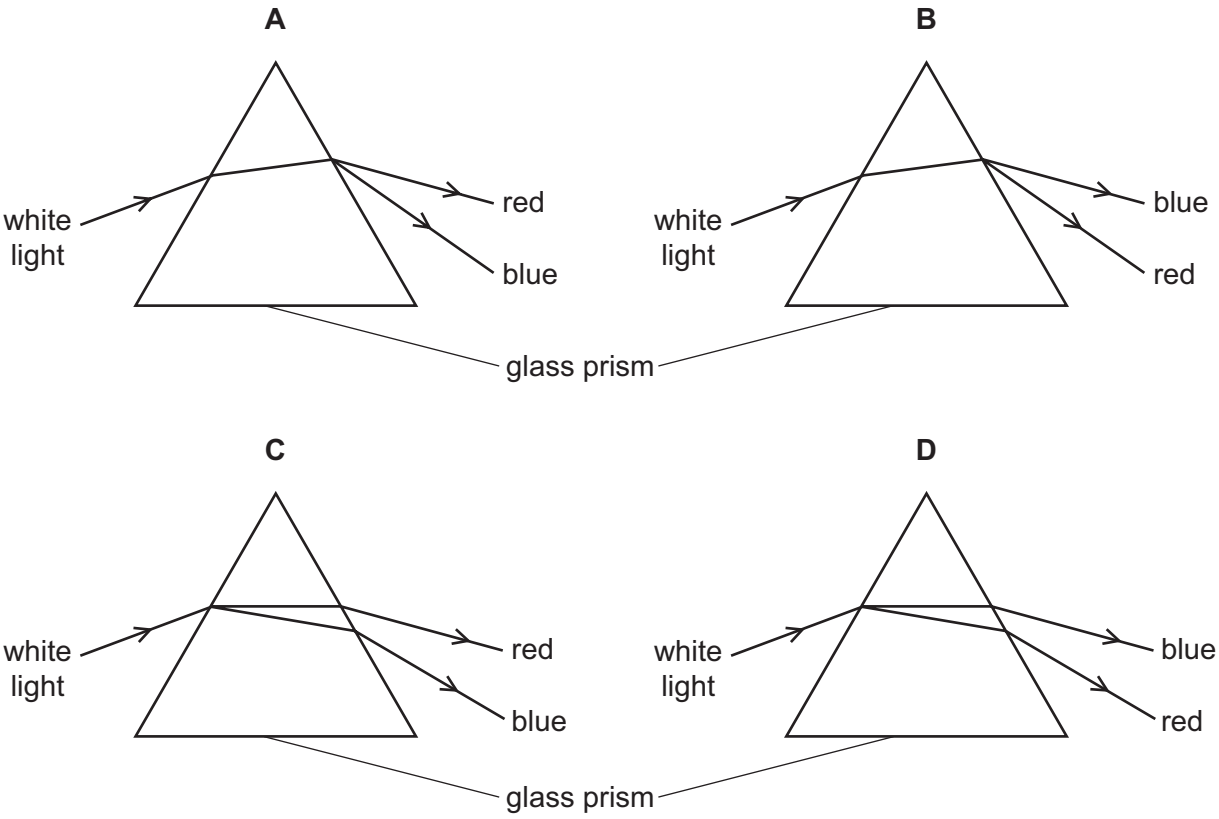
C evaporation

D radiation

34 Which distance on the diagram represents the amplitude of the wave?



35 Which diagram shows the paths taken by the red light and by the blue light when a beam of white light enters a glass prism?

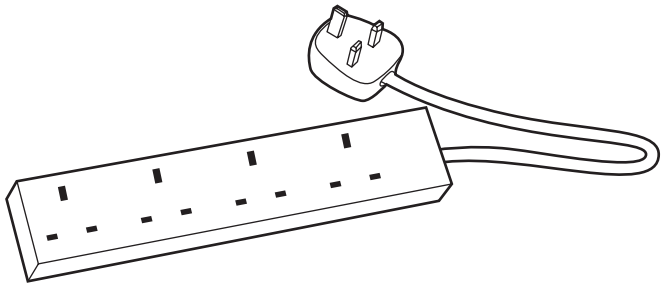


36 A sound wave has a certain amplitude and a certain frequency. The amplitude of the wave increases, and the frequency of the wave decreases.

What is the effect on the loudness of the sound and on the pitch of the sound?

	loudness	pitch
A	greater	higher
B	greater	lower
C	less	higher
D	less	lower

37 An electrical extension block has four sockets, a cable which can safely take a current of 6 A and a plug. It is protected by a fuse rated at 5 A.



The extension block is used with four appliances and the 5 A fuse blows. The owner replaces the 5 A fuse with a 13 A fuse.

Why is the extension block now dangerous?

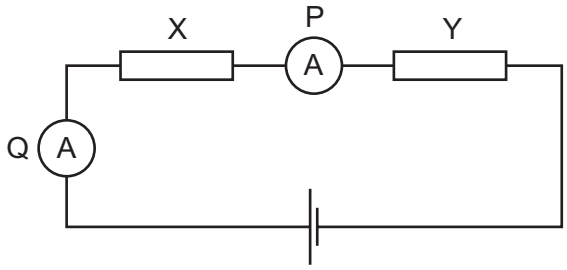
A The appliances may overheat before the fuse blows.

B The cable may overheat before the fuse blows.

C The sockets may burn out before the fuse blows.

D The 13 A fuse may blow too soon.

38 A series circuit contains two resistors, X and Y, and two ammeters, P and Q.



Which ammeter shows the current in resistor Y?

A ammeter P only

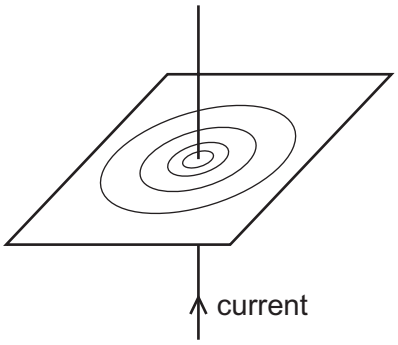
B ammeter Q only

C both ammeter P and ammeter Q

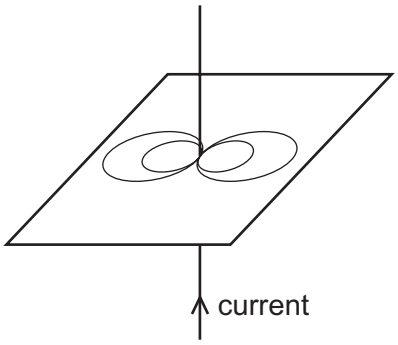
D neither ammeter P nor ammeter Q

39 Which diagram shows the pattern of the magnetic field due to a current in a straight wire?

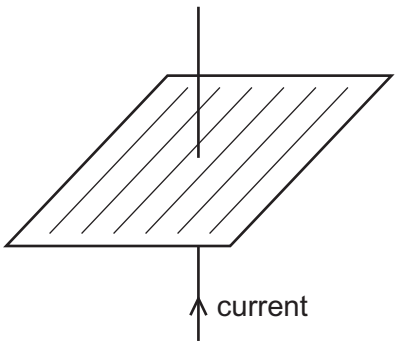
A



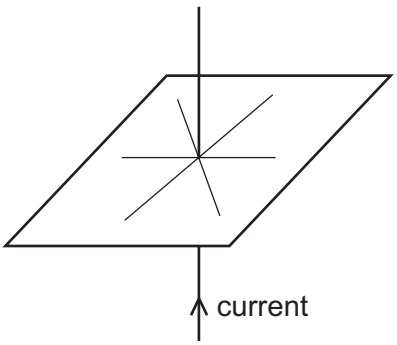
B



C



D



40 Radioactive sources that emit γ-rays are stored in special boxes.

The boxes have a lining to absorb the γ-rays.

Which is the best material for the lining?

A aluminium

B lead

C paper

D plastic

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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	Po Polonium 84	At Astatine 85	Rn Radon 86
Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89 †															

140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	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	Pa Protactinium 91	238 U Uranium 92	Np Neptunium 93	Pu Plutonium 94	Am Americium 95	Cm Curium 96	Bk Berkelium 97	Cf Californium 98	Es Einsteinium 99	Fm Fermium 100	Md Mendelevium 101	No Nobelium 102	Lr Lawrencium 103

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

Key: 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.).