



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

COMBINED SCIENCE

Paper 1 Multiple Choice

0653/11

October/November 2012

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, highlighters, 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.

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.

This document consists of **17** printed pages and **3** blank pages.



- 1 Water enters a plant cell.

In what order does the water pass through the cell structures before reaching the vacuole?

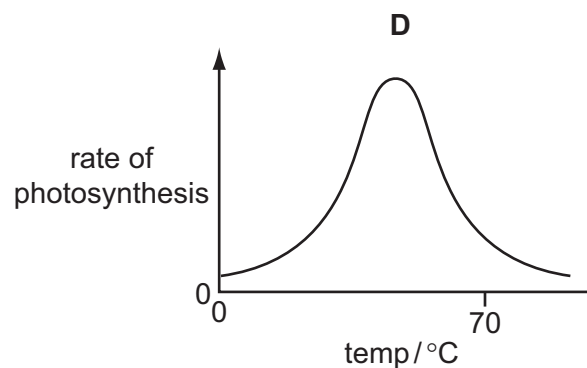
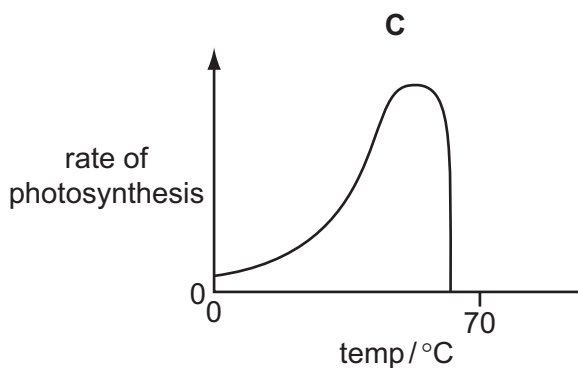
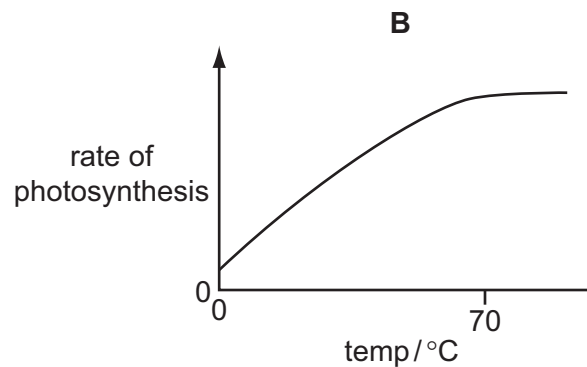
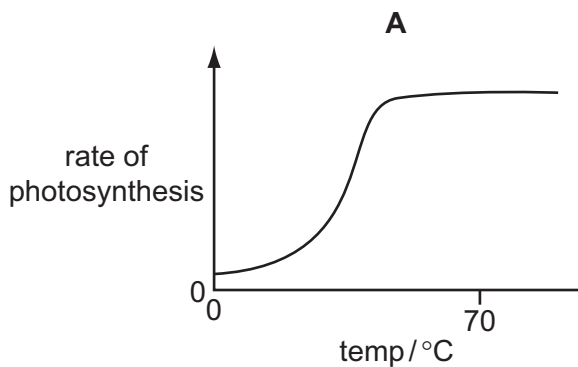
- A cell surface membrane → cell wall → cytoplasm
- B cell wall → cell surface membrane → cytoplasm
- C cell wall → cytoplasm → cell surface membrane
- D cytoplasm → cell wall → cell surface membrane

- 2 What is diffusion?

- A net movement of molecules down a concentration gradient
- B net movement of molecules up a concentration gradient
- C total movement of molecules down a concentration gradient
- D total movement of molecules up a concentration gradient

- 3 The chemical reactions in photosynthesis depend on enzymes.

Which graph shows the effect of temperature on the rate of these reactions?



- 4 Water moves through the stomata of leaves during transpiration.

In which direction, and in which form, does it move?

	direction	form
A	into the leaf	liquid
B	into the leaf	vapour
C	out of the leaf	liquid
D	out of the leaf	vapour

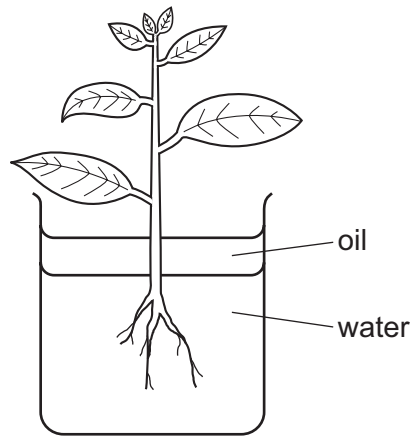
- 5 Which of these places parts of the alimentary canal in the order in which food passes through them?

- A** oesophagus → colon → small intestine
- B** small intestine → oesophagus → rectum
- C** small intestine → rectum → anus
- D** stomach → colon → small intestine

- 6 Which part of blood contains haemoglobin?

- A** plasma
- B** platelets
- C** red blood cells
- D** white blood cells

- 7 The diagram shows a plant in a container of water. The layer of oil stops the water evaporating.



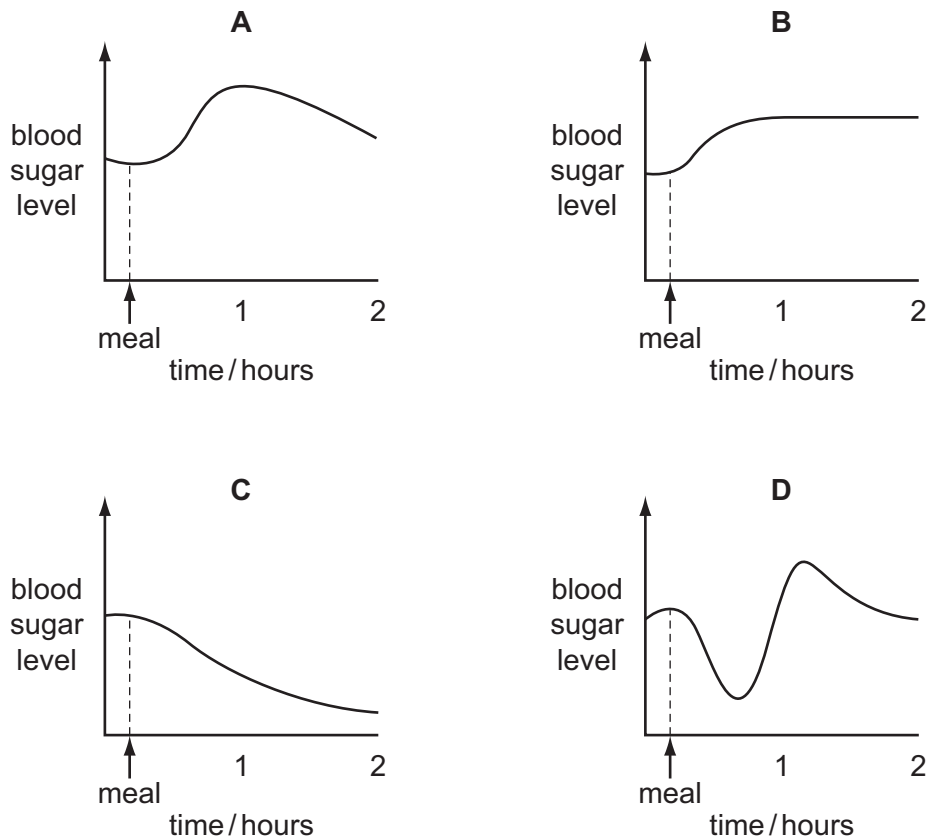
When set up, the apparatus weighs 296 g.
After two hours it weighs 292 g.

What is the rate of transpiration?

- A 150 g water / hour
- B 148 g water / hour
- C 4 g water / hour
- D 2 g water / hour

- 8 A person does not eat for several hours but then has a meal rich in carbohydrate.

Which graph shows how the person's blood sugar level changes after the meal?



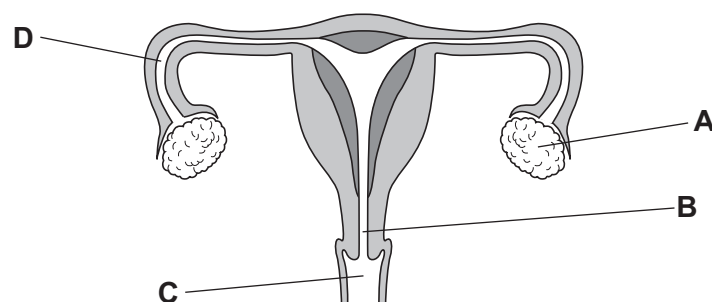
- 9 It is possible to grow plants that are genetically identical.

What are plants grown in this way called?

- A clones
- B gametes
- C seeds
- D zygotes

- 10 The diagram shows the human female reproductive system.

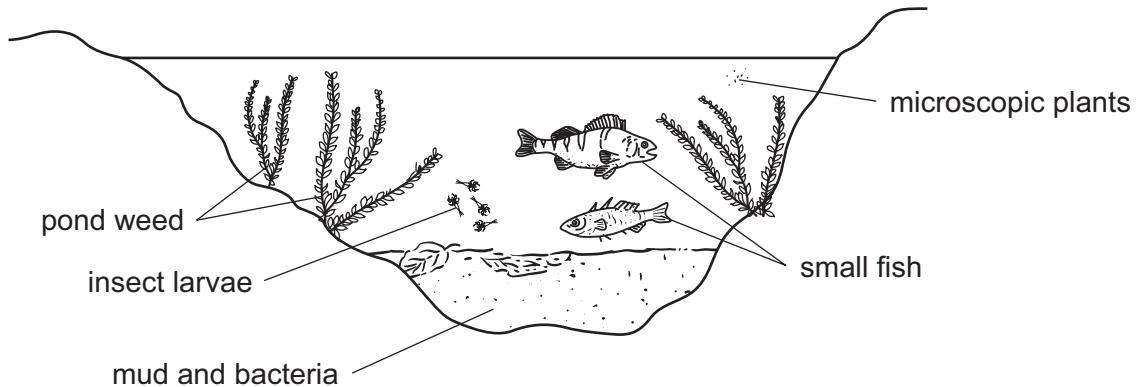
Where is the egg fertilised?



11 Which structures in flowers contain female gametes?

- A anthers
- B ovules
- C stamens
- D stigmas

12 The diagram shows the organisms in a pond.



Which is a food chain in this pond?

- A bacteria → pond weed → insect larvae → small fish
- B microscopic plants → insect larvae → small fish → bacteria
- C pond weed → small fish → bacteria → microscopic plants
- D small fish → insect larvae → microscopic plants → pond weed

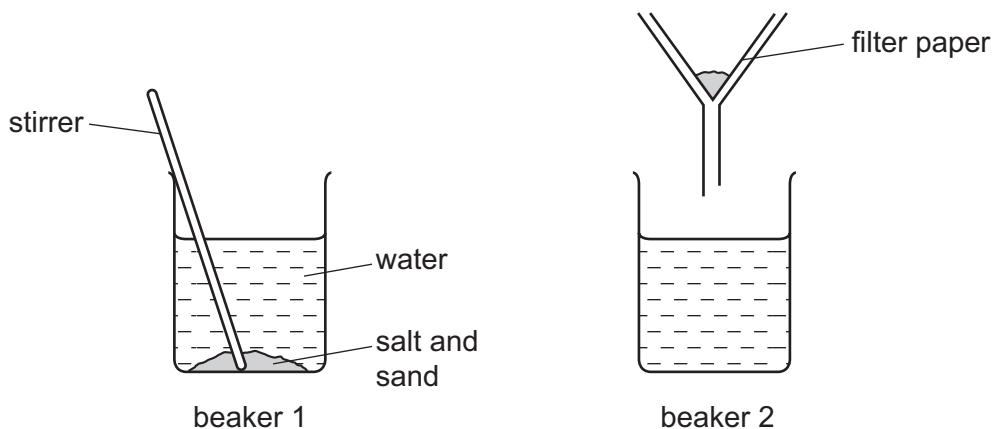
13 Some of the gases present in the atmosphere are listed.

- 1 carbon dioxide
- 2 methane
- 3 nitrogen
- 4 oxygen

Which gases increase global warming when their levels in the atmosphere increase?

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

14 The apparatus shown is used to remove sand from a mixture of salt and sand.



The contents of beaker 1 are filtered.

What is obtained in beaker 2?

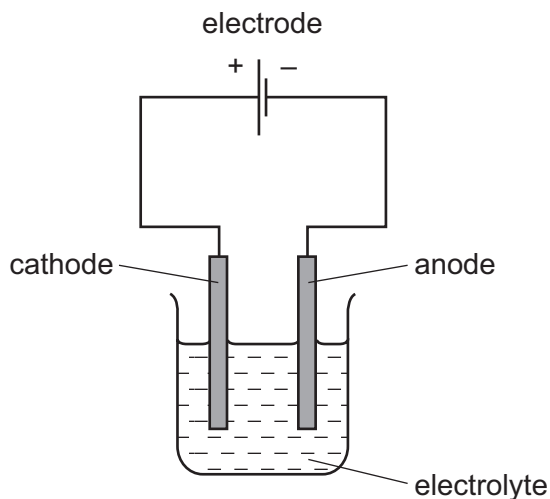
- A** a mixture of an element and a compound
- B** a mixture of two compounds
- C** one compound only
- D** one element only

15 The electronic configurations of four elements are given.

Which element is found on the left-hand side of the Periodic Table?

- A** 2 **B** 2, 8, 7 **C** 2, 8, 8 **D** 2, 8, 8, 2

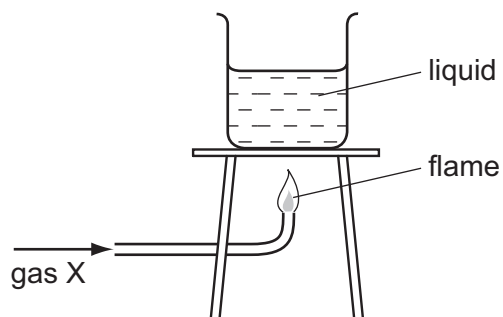
16 The diagram shows a simple cell.



Which label on the diagram is correct?

- A anode
- B cathode
- C electrode
- D electrolyte

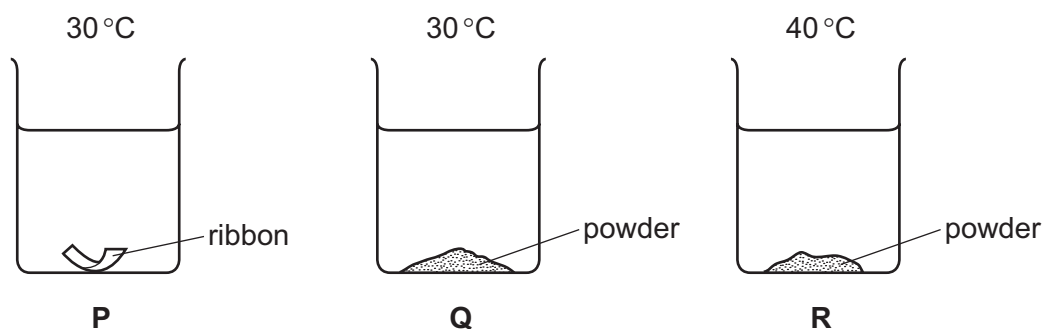
17 The diagram shows gas X burning and heating a liquid.



Which row is correct?

	gas X could be	the burning of gas X is exothermic
A	hydrogen	✓
B	hydrogen	x
C	oxygen	✓
D	oxygen	x

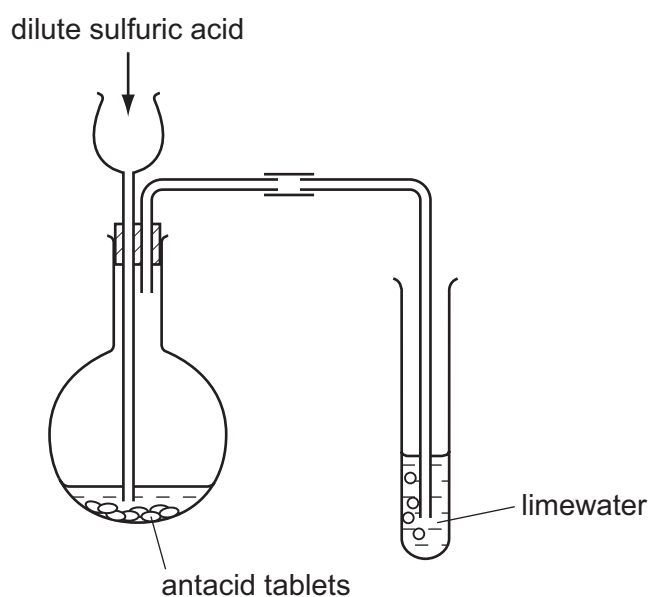
- 18 In the beakers, equal masses of magnesium are added to equal volumes of acid of the same concentration.



What is the order of the speed of reaction in the beakers?

	slowest	→	fastest
A	P	Q	R
B	P	R	Q
C	Q	P	R
D	Q	R	P

- 19 Dilute sulfuric acid is added to antacid tablets in the apparatus shown.



The limewater turns milky.

What does the experiment show these antacid tablets contain?

- A** magnesium
- B** magnesium carbonate
- C** magnesium hydroxide
- D** magnesium oxide

20 Which ion gives a white precipitate **both** with aqueous sodium hydroxide **and** with aqueous ammonia?

- A** $\text{Cu}^{2+}(\text{aq})$ **B** $\text{Fe}^{2+}(\text{aq})$ **C** $\text{Fe}^{3+}(\text{aq})$ **D** $\text{Zn}^{2+}(\text{aq})$

21 The diagram shows an outline of the Periodic Table.

Which two elements have similar chemical properties?

[illegible]

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

22 The list shows different properties.

- 1 density
- 2 melting point
- 3 reactivity

Which properties show an increase for elements in Group VII as the group is descended?

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

23 Platinite is a material used for parts of light bulbs. It is made by mixing iron and zinc.

Which type of substance is platinite?

- A** alloy
B hydrocarbon
C ionic compound
D transition metal

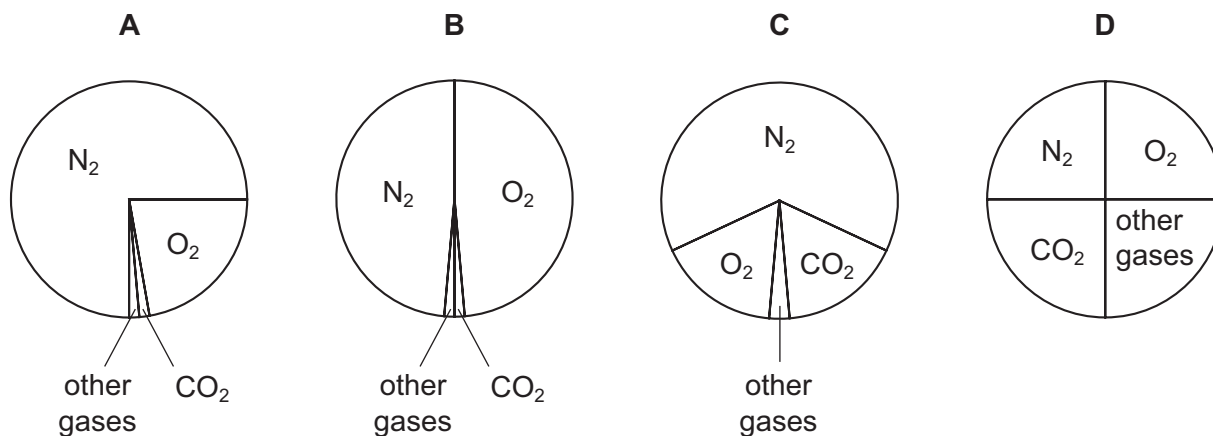
24 Element X is unaffected by acids and is used in an alloy to make jewellery.

X is1..... transition metal and the alloy is2..... than the pure element.

Which words correctly complete gaps 1 and 2?

	1	2
A	an unreactive	harder
B	an unreactive	softer
C	a reactive	harder
D	a reactive	softer

25 Which pie chart correctly shows the proportions of gases in the air?



26 A hydrocarbon fuel is burned completely.



What are X and Y?

	X	Y
A	CO	H ₂
B	CO	H ₂ O
C	CO ₂	H ₂
D	CO ₂	H ₂ O

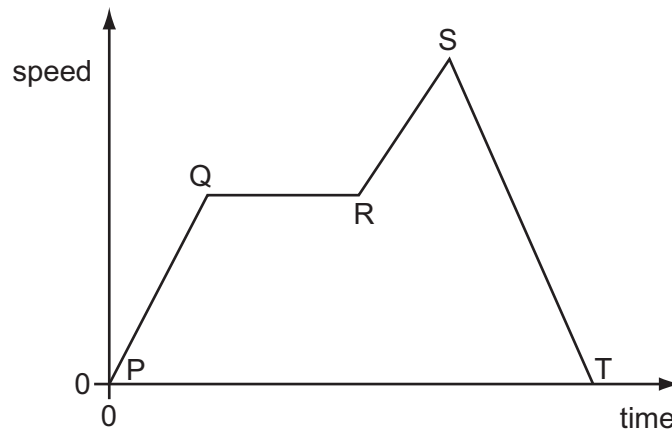
27 Petroleum is a source of hydrocarbon fuels.

Other fuels are coal and wood.

Which of these are fossil fuels?

	coal	wood	petroleum
A	yes	yes	no
B	yes	no	yes
C	no	yes	yes
D	yes	yes	yes

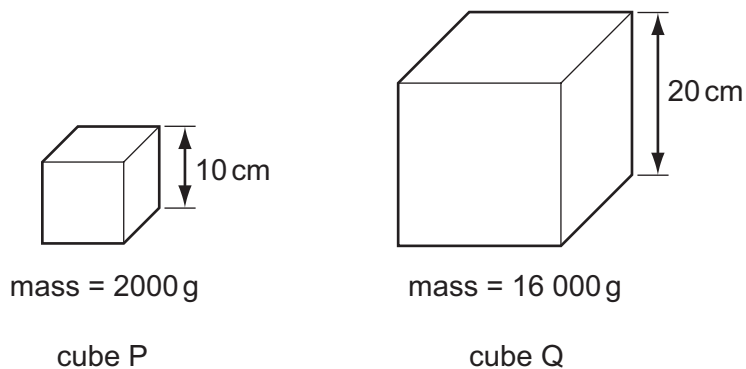
28 The diagram is a speed/time graph for a car travelling along a city street.



Where on the graph is the car moving with changing speed?

- A** PQ, QR, RS and ST
- B** PQ, RS and ST only
- C** PQ and RS only
- D** QR only

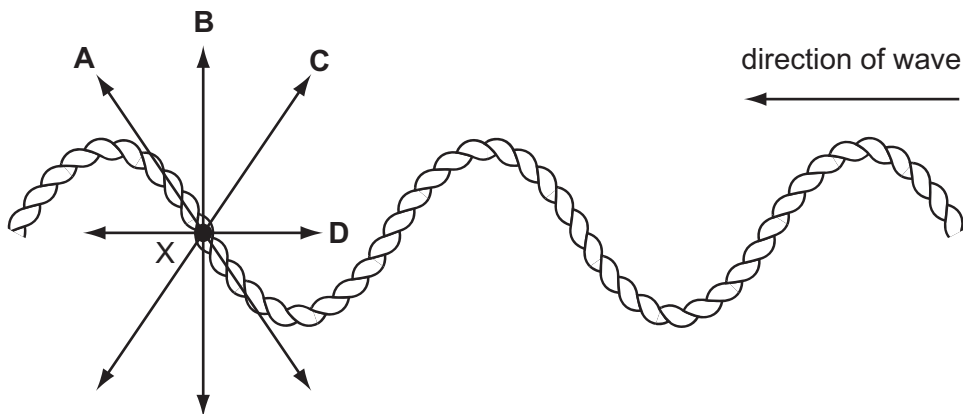
- 29 The diagram shows two cubes P and Q. The lengths of their sides and their masses are given.



What is the density of the material of cube Q?

- A half that of cube P
 - B the same as that of cube P
 - C twice that of cube P
 - D four times that of cube P
- 30 What is the unit of work?
- A joule
 - B kilogram
 - C newton
 - D watt
- 31 The melting point of water is 0°C and the boiling point of water is 100°C .
- Which statement about water is correct?
- A At 100°C boiling occurs throughout the water.
 - B Between 0°C and 100°C the lowest energy molecules escape.
 - C Between 0°C and 100°C water does not evaporate.
 - D Ice only melts when its temperature is above 0°C .
- 32 In which state(s) of matter can convection occur?
- A solids and liquids
 - B solids and gases
 - C liquids and gases
 - D liquids only

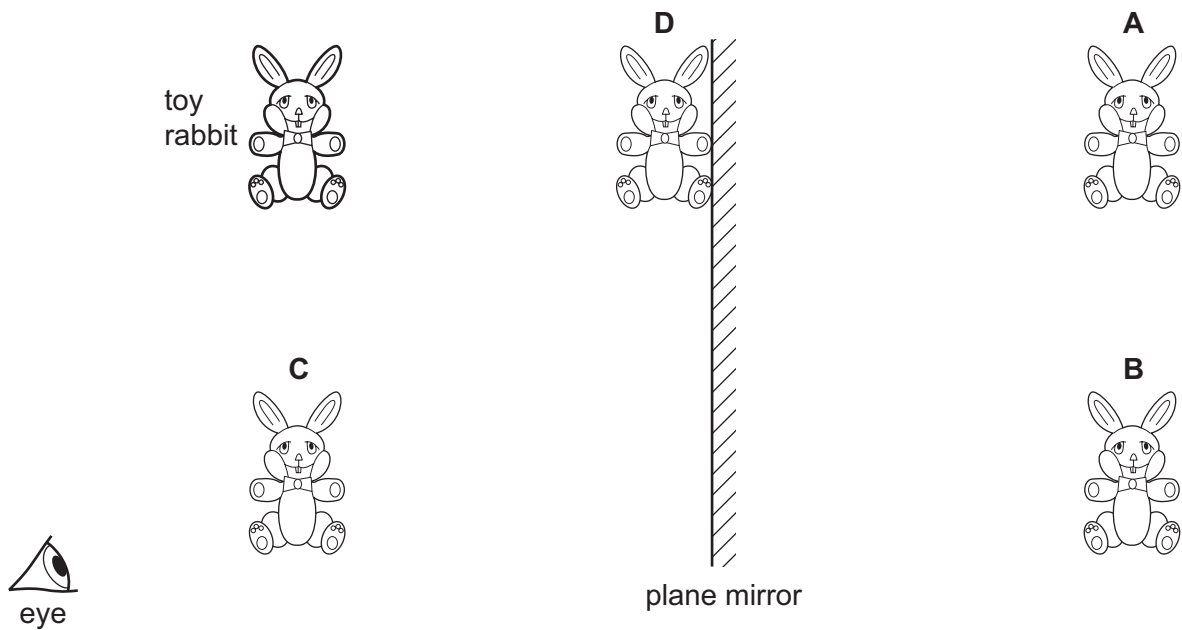
- 33 A wave is sent along a rope in the direction shown in the diagram.



Which arrow shows the direction of vibration of the rope at point X?

- 34 The diagram shows the position of the eye of a person looking at the reflection of a toy rabbit in a plane mirror.

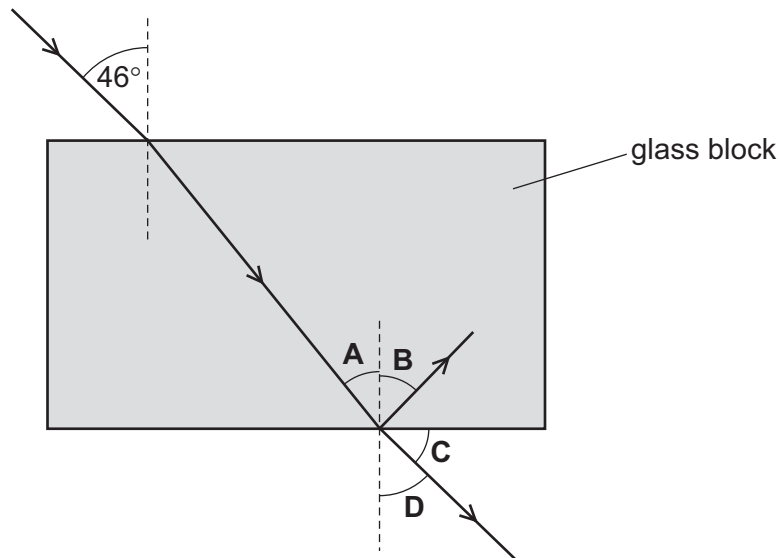
At which position is the image seen?



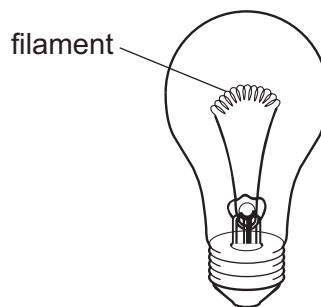
- 35** A ray of light strikes one face of a parallel-sided glass block. The angle of incidence is 46° .

At the opposite face, part of the ray is reflected and part is refracted into the air.

Which other angle has a value of 46° ?



- 36** The diagram shows a filament lamp.



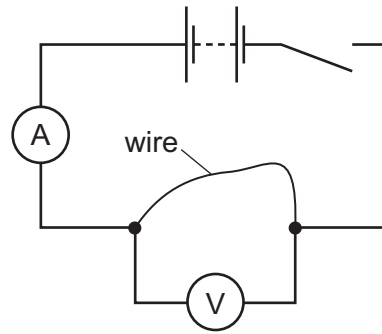
What are the main types of wave given out by the filament once the lamp is lit?

- A** visible light and infra-red
 - B** visible light and microwaves
 - C** visible light and radio
 - D** visible light and ultraviolet
- 37** A starting pistol is fired. An echo from a wall 150 m away is heard one second later.

What is the speed of sound calculated from these results?

- A** 75 m/s
- B** 150 m/s
- C** 225 m/s
- D** 300 m/s

- 38 A student sets up a circuit to find the resistance of a length of wire.

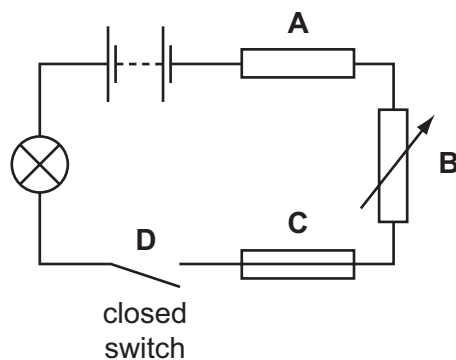


When the switch is closed, the ammeter reads 2 A and the voltmeter reads 10 V.

What is the resistance of the length of wire?

- A** $0.2\ \Omega$ **B** $5\ \Omega$ **C** $8\ \Omega$ **D** $20\ \Omega$
- 39 In an electrical circuit, what is the purpose of a fuse?
- A** to connect the metal case of an appliance to the earth
B to cut off the electrical supply if too much current flows
C to keep an electrical appliance dry in damp conditions
D to maintain a steady voltage as the current varies
- 40 When the switch in the circuit shown is closed, the lamp glows dimly.

Which component can be adjusted to make the lamp brighter?



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DATA SHEET
The Periodic Table of the Elements

Group																				
I	II											III	IV	V	VI	VII	0			
		<div>1 H Hydrogen</div>																<div>4 He Helium</div>		
<div>7 Li Lithium</div> <div>3</div>	<div>9 Be Beryllium</div> <div>4</div>												<div>11 B Boron</div> <div>5</div>	<div>12 C Carbon</div> <div>6</div>	<div>14 N Nitrogen</div> <div>7</div>	<div>16 O Oxygen</div> <div>8</div>	<div>19 F Fluorine</div> <div>9</div>	<div>20 Ne Neon</div> <div>10</div>		
	<div>23 Na Sodium</div> <div>11</div>	<div>24 Mg Magnesium</div> <div>12</div>												<div>27 Al Aluminium</div> <div>13</div>	<div>28 Si Silicon</div> <div>14</div>	<div>31 P Phosphorus</div> <div>15</div>	<div>32 S Sulfur</div> <div>16</div>	<div>35.5 Cl Chlorine</div> <div>17</div>	<div>40 Ar Argon</div> <div>18</div>	
<div>39 K Potassium</div> <div>19</div>	<div>40 Ca Calcium</div> <div>20</div>	<div>45 Sc Scandium</div> <div>21</div>	<div>48 Ti Titanium</div> <div>22</div>	<div>51 V Vanadium</div> <div>23</div>	<div>52 Cr Chromium</div> <div>24</div>	<div>55 Mn Manganese</div> <div>25</div>	<div>56 Fe Iron</div> <div>26</div>	<div>59 Co Cobalt</div> <div>27</div>	<div>59 Ni Nickel</div> <div>28</div>	<div>64 Cu Copper</div> <div>29</div>	<div>65 Zn Zinc</div> <div>30</div>	<div>70 Ga Gallium</div> <div>31</div>	<div>73 Ge Germanium</div> <div>32</div>	<div>75 As Arsenic</div> <div>33</div>	<div>79 Se Selenium</div> <div>34</div>	<div>80 Br Bromine</div> <div>35</div>	<div>84 Kr Krypton</div> <div>36</div>			
<div>85 Rb Rubidium</div> <div>37</div>	<div>88 Sr Strontium</div> <div>38</div>	<div>89 Y Yttrium</div> <div>39</div>	<div>91 Zr Zirconium</div> <div>40</div>	<div>93 Nb Niobium</div> <div>41</div>	<div>96 Mo Molybdenum</div> <div>42</div>	<div>98 Tc Technetium</div> <div>43</div>	<div>101 Ru Ruthenium</div> <div>44</div>	<div>103 Rh Rhodium</div> <div>45</div>	<div>106 Pd Palladium</div> <div>46</div>	<div>108 Ag Silver</div> <div>47</div>	<div>112 Cd Cadmium</div> <div>48</div>	<div>115 In Indium</div> <div>49</div>	<div>119 Sn Tin</div> <div>50</div>	<div>122 Sb Antimony</div> <div>51</div>	<div>128 Te Tellurium</div> <div>52</div>	<div>127 I Iodine</div> <div>53</div>	<div>131 Xe Xenon</div> <div>54</div>			
<div>133 Cs Caesium</div> <div>55</div>	<div>137 Ba Barium</div> <div>56</div>	<div>139 La Lanthanum</div> <div>57</div>	<div>178 Hf Hafnium</div> <div>72</div>	<div>181 Ta Tantalum</div> <div>73</div>	<div>184 W Tungsten</div> <div>74</div>	<div>186 Re Rhenium</div> <div>75</div>	<div>190 Os Osmium</div> <div>76</div>	<div>192 Ir Iridium</div> <div>77</div>	<div>195 Pt Platinum</div> <div>78</div>	<div>197 Au Gold</div> <div>79</div>	<div>201 Hg Mercury</div> <div>80</div>	<div>204 Tl Thallium</div> <div>81</div>	<div>207 Pb Lead</div> <div>82</div>	<div>209 Bi Bismuth</div> <div>83</div>	<div>210 Po Polonium</div> <div>84</div>	<div>210 At Astatine</div> <div>85</div>	<div>210 Rn Radon</div> <div>86</div>			
<div>Fr Francium</div> <div>87</div>	<div>226 Ra Radium</div> <div>88</div>	<div>227 Ac Actinium</div> <div>89</div>																		
*58-71 Lanthanoid series																				
†90-103 Actinoid series																				
													<div>162 Dy Dysprosium</div> <div>66</div>	<div>165 Ho Holmium</div> <div>67</div>	<div>167 Er Erbium</div> <div>68</div>	<div>169 Tm Thulium</div> <div>69</div>	<div>173 Yb Ytterbium</div> <div>70</div>	<div>175 Lu Lutetium</div> <div>71</div>		
													<div>110 Df Dubnium</div> <div>105</div>	<div>112 Rf Rutherfordium</div> <div>106</div>	<div>115 Db Dubnium</div> <div>107</div>	<div>117 Sg Seaborgium</div> <div>108</div>	<div>120 Nh Nihonium</div> <div>109</div>	<div>122 Ts Tennessine</div> <div>110</div>	<div>123 Lv Livermorium</div> <div>111</div>	
Key													<div>a</div>	<div>X</div>	a = relative atomic mass					
													<div>b</div>	<div>X</div>	X = atomic symbol					
															b = proton (atomic) number					

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 dm³ at room temperature and pressure (r.t.p.).

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