



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

**CO-ORDINATED SCIENCES**

**0654/13**

Paper 1 Multiple Choice

**October/November 2010**

**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 **18** printed pages and **2** blank pages.



- 1 How do bacteria cause tooth decay?
- A They release acids that dissolve enamel.
  - B They release alkalis that dissolve enamel.
  - C They release enzymes that digest enamel.
  - D They release ethanol that digests enamel.

- 2 Which row is correct for the blood in veins?

	direction of flow	oxygen content
<b>A</b>	away from heart	always high
<b>B</b>	away from heart	high or low
<b>C</b>	towards heart	always low
<b>D</b>	towards heart	high or low

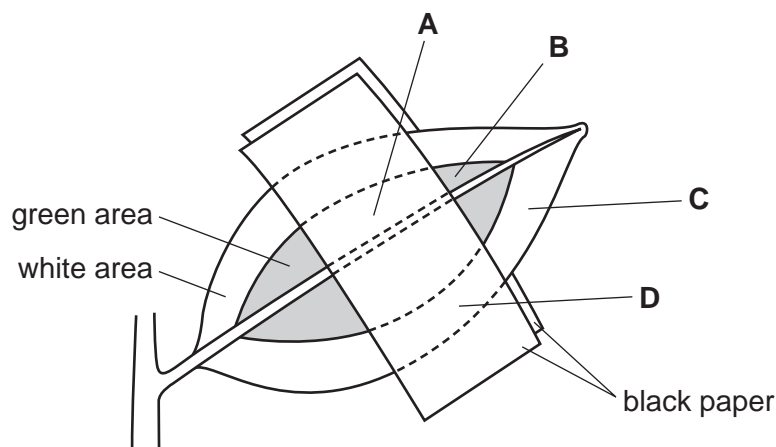
- 3 What happens during anaerobic respiration in muscle cells?

- A carbon dioxide is released
- B energy is released
- C lactic acid is oxidised
- D water is released

- 4 The diagram shows a leaf, still attached to a plant, with both green and white regions that have been partly covered with black paper.

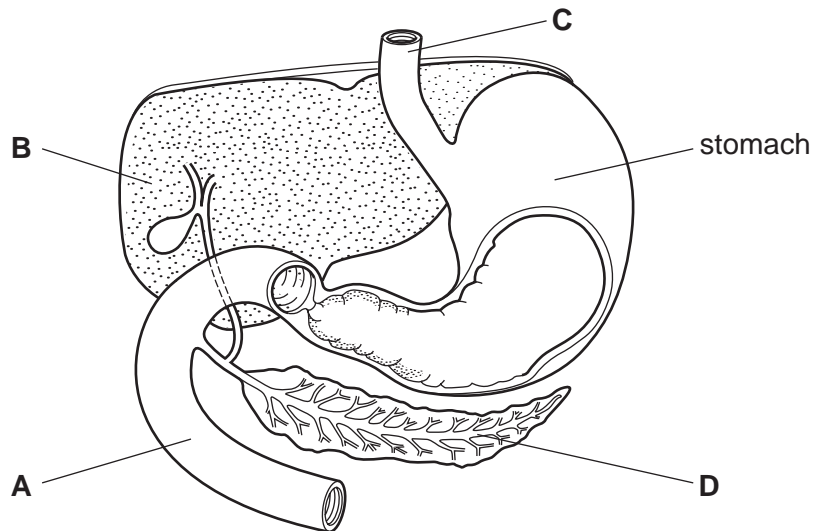
The leaf is left in bright light for six hours and then tested for starch.

Which area of the leaf turns blue-black after the starch test?



- 5 Which cells produce starch in their cytoplasm?
- A all animal cells  
 B all plant cells  
 C some animal cells  
 D some plant cells
- 6 Which features are found in mammals but **not** in other vertebrates?
- A claws and hair  
 B claws and lungs  
 C hair and milk  
 D lungs and milk
- 7 The diagram shows part of the digestive system.

Where does lipase digest fat?



- 8 Which internal conditions in a human being are maintained at a more or less constant level as the result of homeostasis?

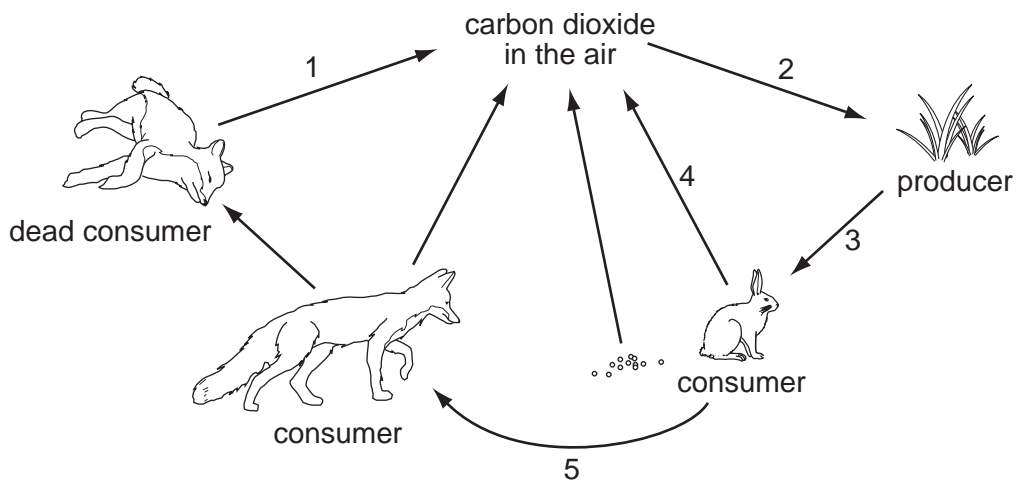
	blood glucose	blood insulin	body temperature
A	✓	✓	✓
B	✓	✓	x
C	✓	x	✓
D	x	✓	✓

- 9 The alleles for a particular character are H and h.

Which term describes an organism whose genotype is Hh?

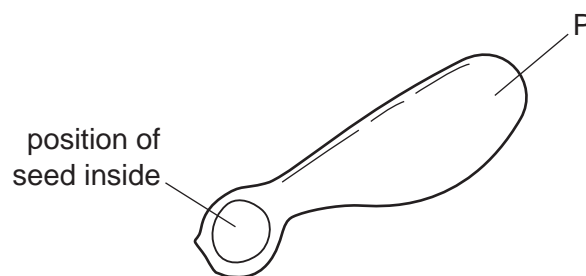
- A heterozygote
- B homozygote
- C phenotype
- D recessive

- 10 The diagram shows part of the carbon cycle which includes a food chain.



Which arrows are part of the food chain?

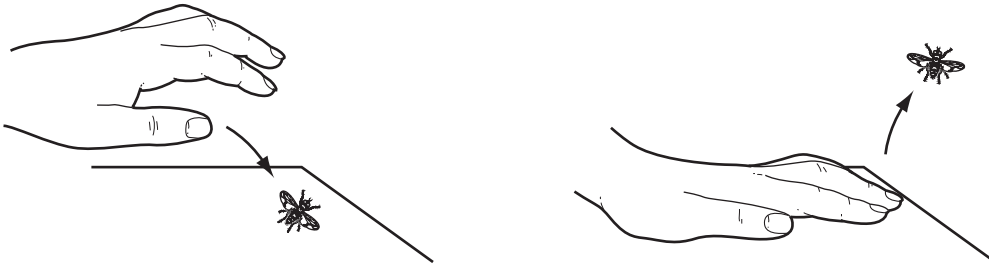
- A 1 and 2
  - B 2 and 3
  - C 3 and 5
  - D 4 and 5
- 11 The diagram shows a wind-dispersed, single-seeded fruit.



Structure P is an extension of which part?

- A cotyledon
- B leaf
- C ovary wall
- D testa

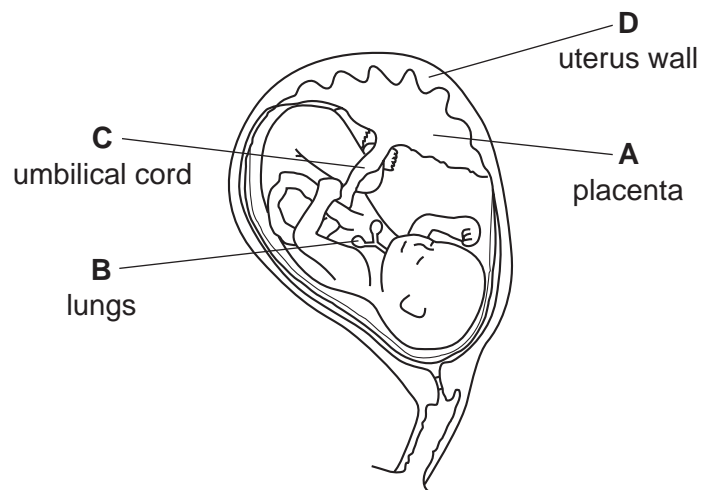
12 The diagram shows two stages in an attempt to kill a fly.



What else does the diagram show?

- A The fly converts impulses to stimuli.
  - B The fly responds to a stimulus.
  - C The hand produces impulses.
  - D The hand is a receptor.
- 13 The diagram shows a developing fetus.

Where does the fetal blood become oxygenated?

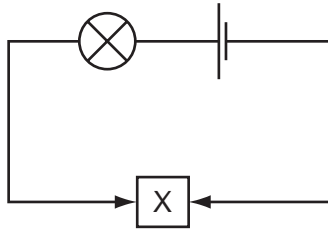


14 Which molecules join into long chains to make proteins?

- A amino acids
- B ethene
- C glucose
- D starch

15 The diagram shows a circuit.

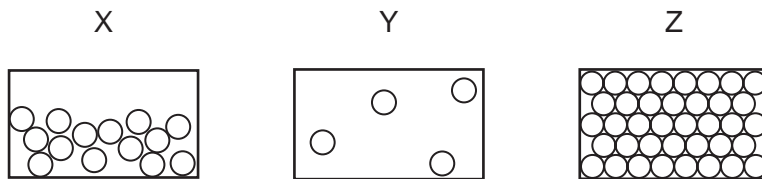
Solid X makes the lamp light.



What is solid X?

- A rubber
- B silicon(IV) oxide
- C sulfur
- D zinc

16 The three states of matter are represented by diagrams X, Y and Z.

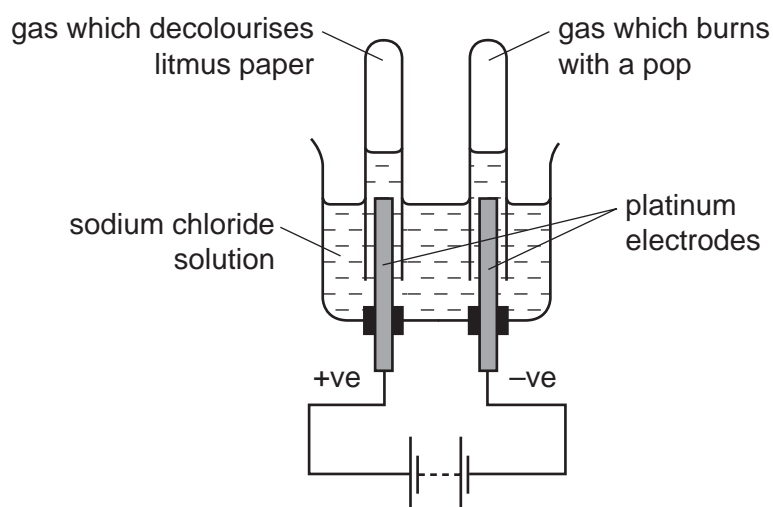


Which change occurs during condensation?

- A X to Y
- B X to Z
- C Y to X
- D Z to X

17 Sodium chloride solution is electrolysed and a gas is collected at each electrode.

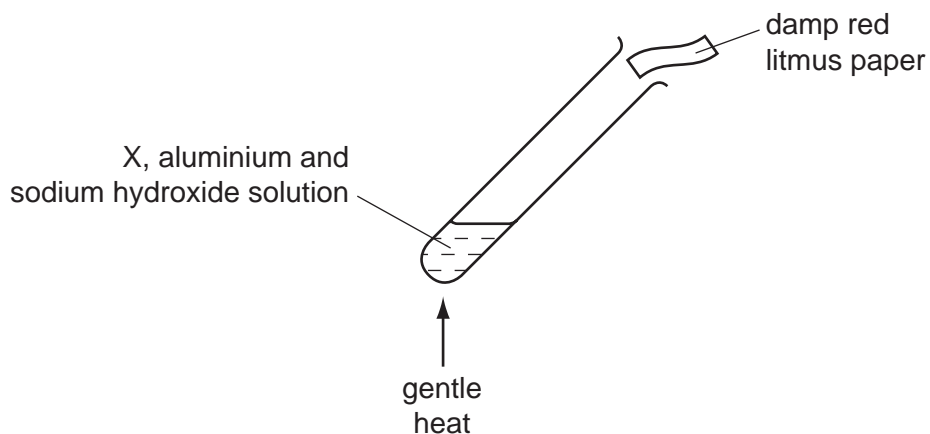
One gas decolourises moist litmus paper, the other gas burns with a pop.



Which statement is correct?

- A Chlorine gas is collected at the anode.
- B Hydrogen gas is collected at the anode.
- C Oxygen gas is collected at the cathode.
- D The cathode is the positive electrode.

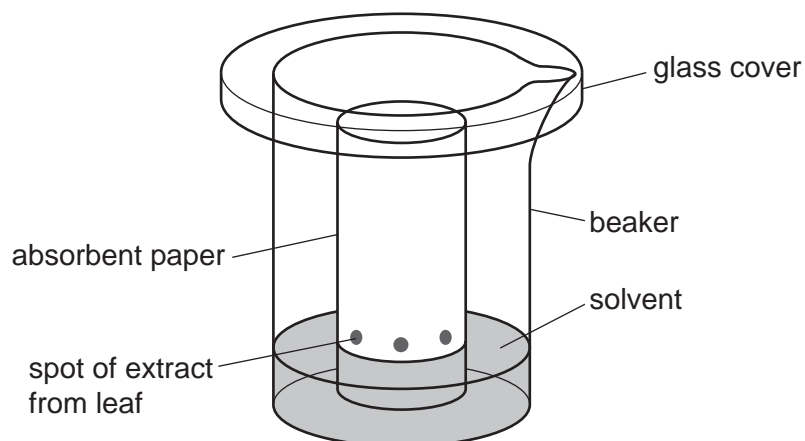
- 18 Compound X is heated gently with aluminium powder and sodium hydroxide solution.



The damp red litmus paper turns blue.

What does X contain?

- A carbonate
  - B chloride
  - C nitrate
  - D sulfate
- 19 A student uses the apparatus shown to find out how many different pigments are in leaves.



What is this separation method called?

- A chromatography
- B distillation
- C evaporation
- D filtration



20 Which two elements are present in the compounds found in petroleum?

- A carbon and nitrogen
- B carbon and oxygen
- C hydrogen and carbon
- D hydrogen and oxygen

21 Carbon is used in the extraction of some metals from their ores because

- 1 carbon forms strong alloys with metals,
- 2 carbon reacts with oxygen in the ore.

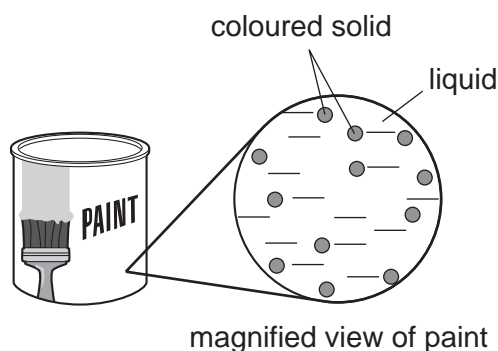
Which of these statements are correct?

- A 1 only
- B 2 only
- C both 1 and 2
- D neither 1 nor 2

22 Which material is made from silicon(IV) oxide combined with metal oxides?

- A brass
- B glass
- C polythene
- D steel

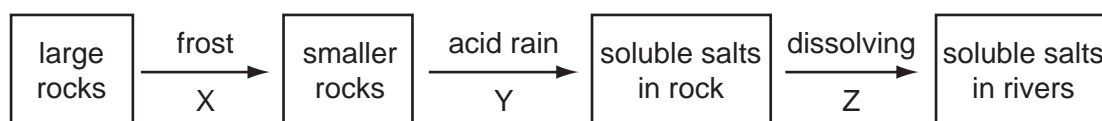
23 Paint contains particles of solid finely dispersed in a liquid.



Which term correctly describes paint?

- A emulsion
- B gel
- C sol
- D solution

24 Rocks can be weathered by natural changes.



Which row correctly describes the type of change?

	X	Y	Z
<b>A</b>	chemical	chemical	chemical
<b>B</b>	chemical	physical	chemical
<b>C</b>	physical	chemical	physical
<b>D</b>	physical	physical	physical

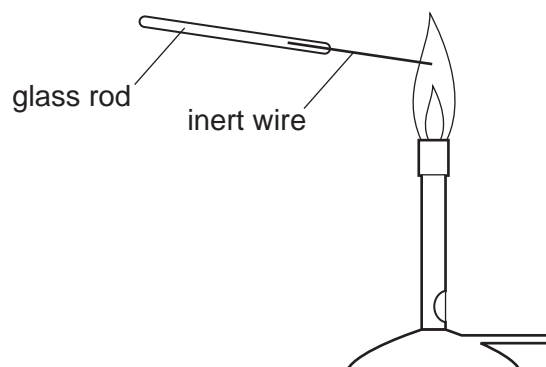
25  $100 \text{ cm}^3$  of a liquid has a mass of 85g.

How does the density of this liquid compare with the density of water ( $1 \text{ g/cm}^3$ )?

- A Its density is higher than that of water.
- B Its density is lower than that of water.
- C Its density is the same as that of water.
- D It is impossible to say with only this data.

26 In separate experiments, an inert wire is dipped into two solutions, P and Q.

The wire is then placed in the flame of a Bunsen burner.



The table shows the results.

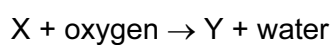
	solution P	solution Q
colour of Bunsen flame	yellow	green

Which metal ions are present in the solutions?

	P	Q
<b>A</b>	copper	calcium
<b>B</b>	copper	sodium
<b>C</b>	sodium	calcium
<b>D</b>	sodium	copper

27 Waste material buried underground can decay to form gas X which can be used as a fuel.

X burns to form an oxide Y and water.

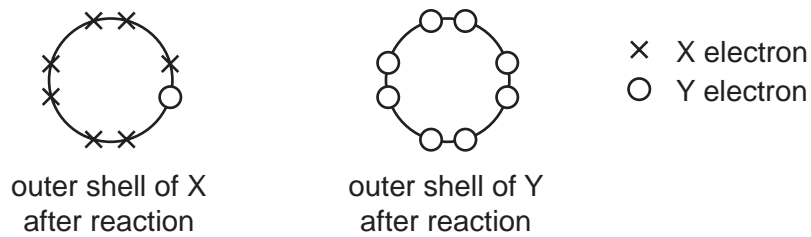


What is Y?

- A** carbon dioxide
- B** nitrogen dioxide
- C** sulfur dioxide
- D** sulfur trioxide

28 Elements X and Y react together to form a compound.

The diagram shows the outer shells of X and Y after reaction.



Which statement is correct?

- A X is in group VII and has formed the  $X^+$  ion.
- B X is in group VII and has formed the  $X^-$  ion.
- C X is in group VIII and has formed the  $X^+$  ion.
- D X is in group VIII and has formed the  $X^-$  ion.

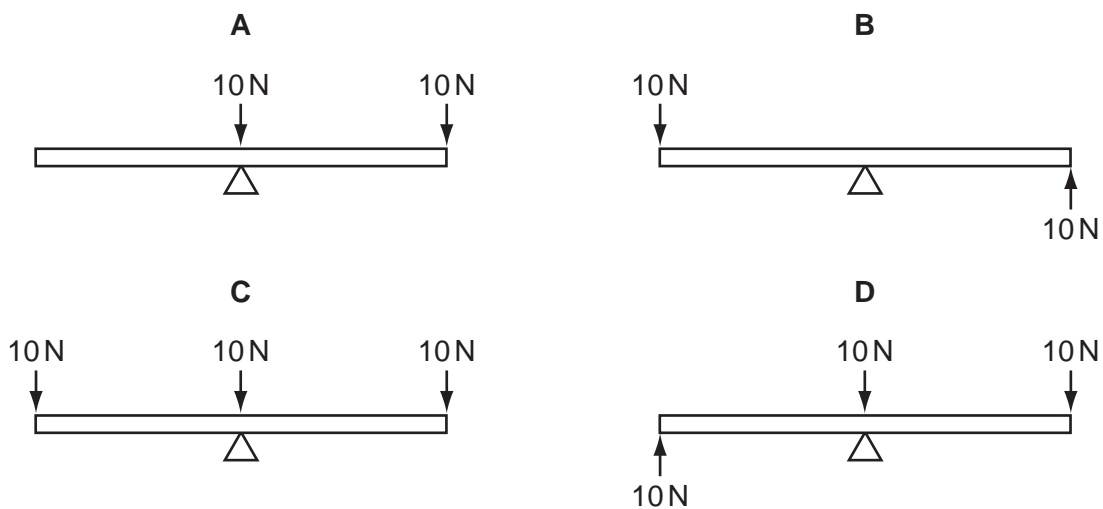
29 A man lifts some weights.

In which activity is the power of the man the **smallest**?

- A lifting a mass of 1 kg through a height of 0.1 m in 1 second
- B lifting a mass of 1 kg through a height of 0.1 m in 10 seconds
- C lifting a mass of 1 kg through a height of 1 m in 1 second
- D lifting a mass of 10 kg through a height of 0.1 m in 1 second

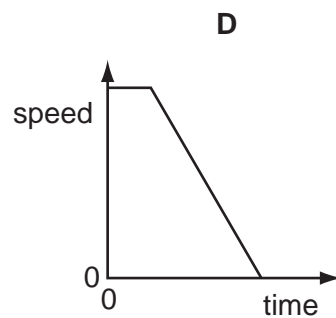
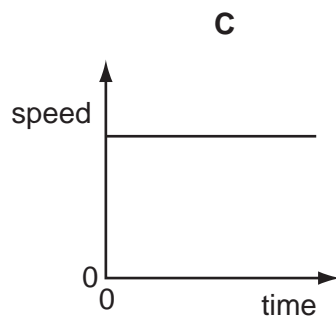
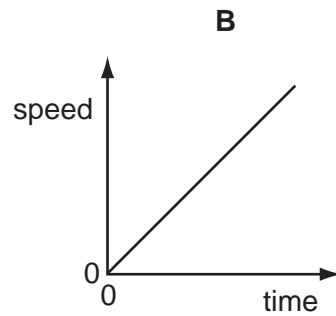
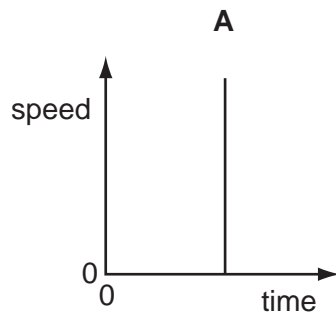
30 Four beams are each balanced on a pivot at their centres as shown. Forces are then applied to the beams as shown.

Which beam will **not** rotate when the forces shown are applied?



31 Four speed-time graphs are shown below.

Which graph could **not** show the motion of a car being driven normally?

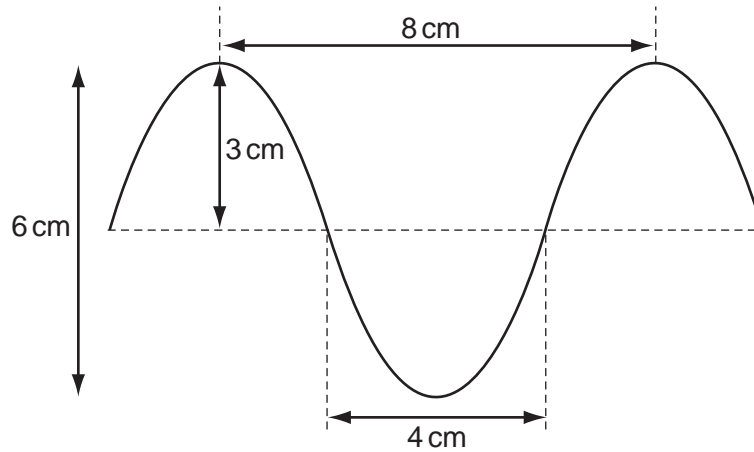


32 1 kg of water and 1 kg of aluminium are heated to the same temperature and then allowed to cool in a room.

Which of these could be a reason why the aluminium cools more quickly than the water?

- A** Aluminium does not evaporate but water does.
- B** Aluminium has a higher specific heat capacity than water.
- C** Aluminium has a lower specific heat capacity than water.
- D** Aluminium is a better insulator of heat than water.

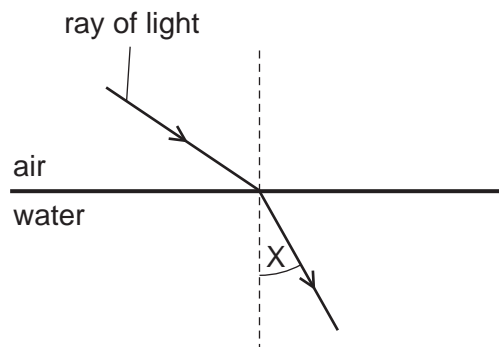
33 The diagram shows a wave.



What are the amplitude and the wavelength of this wave?

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

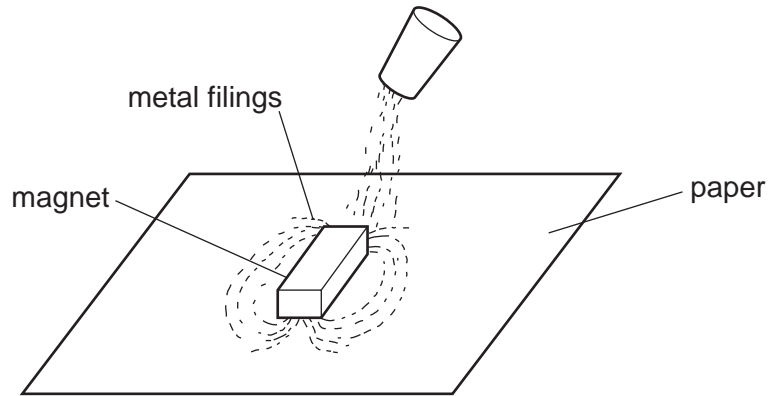
34 The diagram shows a ray of light passing from air into water.



What is the name of angle X?

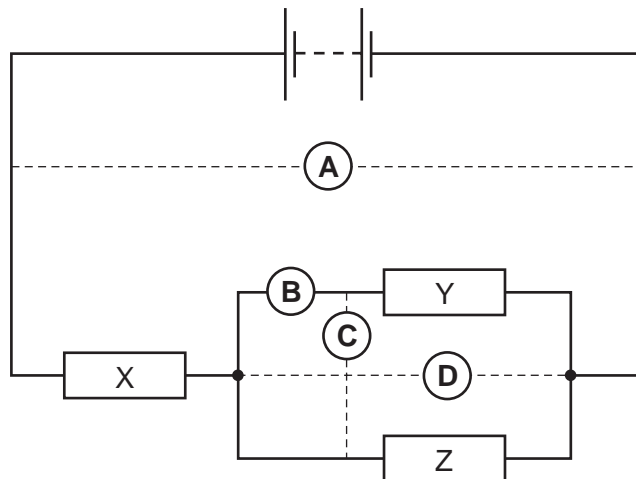
- A** the angle of incidence
- B** the angle of reflection
- C** the angle of refraction
- D** the critical angle

- 35 The pattern of field lines around a bar magnet on a sheet of paper can be shown by sprinkling metal filings on to the paper.

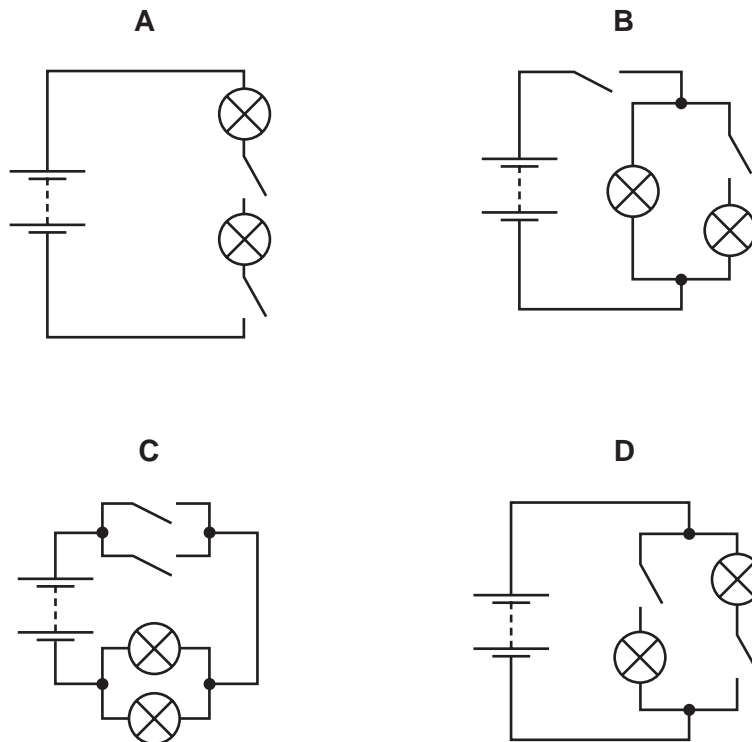


From which metal could the filings be made?

- A aluminium
  - B copper
  - C iron
  - D zinc
- 36 A circuit consists of three resistors, X, Y and Z, connected to a battery as shown in the diagram.  
The potential difference across resistor Y is measured.  
In which position should the voltmeter be connected to do this?



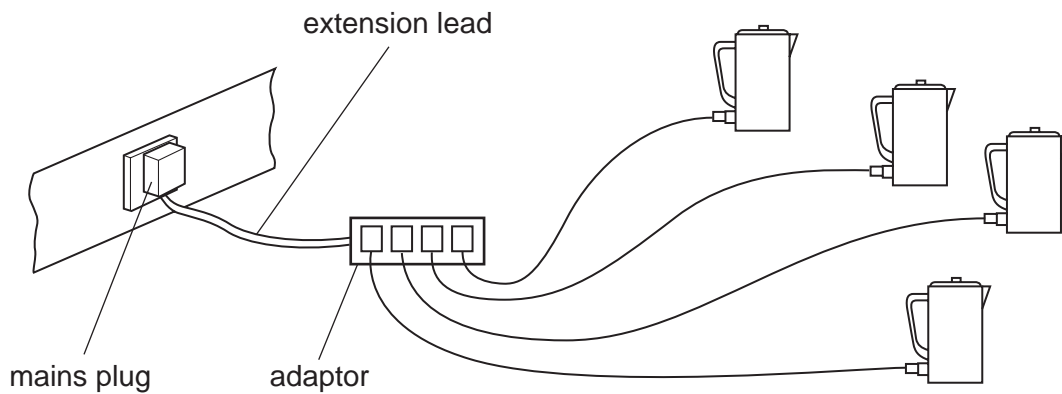
37 Which diagram shows a circuit that will allow the lamps to be switched on and off independently?



38 The diagram shows four electric kettles plugged into a 4-way adaptor.

An extension lead connects the adaptor to a single mains plug.

The mains plug is designed to work without a fuse.



Why is this use of the adaptor dangerous?

- A The extension lead connecting the adaptor to the mains plug will overheat.
- B The heating elements in the kettle will overheat.
- C The leads connecting the kettles to the adaptor will overheat.
- D The water in the kettles will overheat.



39 Compared with beta-particles and gamma-rays, alpha-particles

- A are the only radiation to carry a charge.
- B have the greatest ionising effect.
- C have the greatest penetrating effect.
- D have the smallest mass.

40 A small amount of a substance contains 72 billion radioactive atoms. The half-life of the substance is 4 hours.

How many radioactive atoms would remain after 12 hours?

- A 6 billion
- B 9 billion
- C 18 billion
- D 24 billion





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

		Group											
		I	II	III	IV	V	VI	VII	VIII	IX	X	O	
		1 <b>H</b> Hydrogen 1											
7	9												
<b>Li</b> Lithium 3	<b>Be</b> Beryllium 4												
23	24												
<b>Na</b> Sodium 11	<b>Mg</b> Magnesium 12												
39	40												
<b>K</b> Potassium 19	<b>Ca</b> Calcium 20	45	48	51	52	55	56	59	59	64	65	70	
		<b>Sc</b> Scandium 21	<b>Ti</b> Titanium 22	<b>V</b> Vanadium 23	<b>Cr</b> Chromium 24	<b>Mn</b> Manganese 25	<b>Fe</b> Iron 26	<b>Co</b> Cobalt 27	<b>Ni</b> Nickel 28	<b>Cu</b> Copper 29	<b>Zn</b> Zinc 30	<b>Ga</b> Gallium 31	
85	88	89	91	93	96	101	101	103	106	108	112	115	
<b>Rb</b> Rubidium 37	<b>Sr</b> Strontium 38	<b>Y</b> Yttrium 39	<b>Zr</b> Zirconium 40	<b>Nb</b> Niobium 41	<b>Mo</b> Molybdenum 42	<b>Ru</b> Ruthenium 44	<b>Rh</b> Rhodium 45	<b>Pd</b> Palladium 46	<b>Ag</b> Silver 47	<b>Cd</b> Cadmium 48	<b>In</b> Indium 49	<b>Sn</b> Tin 50	
133	137	139	178	181	184	190	190	192	195	197	201	204	
<b>Cs</b> Caesium 55	<b>Ba</b> Barium 56	<b>La</b> Lanthanum 57	<b>Hf</b> Hafnium 72	<b>Ta</b> Tantalum 73	<b>W</b> Tungsten 74	<b>Os</b> Osmium 76	<b>Ir</b> Iridium 77	<b>Pt</b> Platinum 78	<b>Au</b> Gold 79	<b>Hg</b> Mercury 80	<b>Tl</b> Thallium 81	<b>Pb</b> Lead 82	
226	227												
<b>Fr</b> Francium 87	<b>Ra</b> Radium 88	<b>Ac</b> Actinium 89											
*58-71 Lanthanoid series †90-103 Actinoid series													
		140	141	144	150	152	157	159	162	165	167	169	
		<b>Ce</b> Cerium 58	<b>Pr</b> Praseodymium 59	<b>Nd</b> Neodymium 60	<b>Pm</b> Promethium 61	<b>Sm</b> Samarium 62	<b>Eu</b> Europium 63	<b>Gd</b> Gadolinium 64	<b>Tb</b> Terbium 65	<b>Dy</b> Dysprosium 66	<b>Ho</b> Holmium 67	<b>Er</b> Erbium 68	
		232	238	238	238	238	238	238	238	238	238	238	
		<b>Th</b> Thorium 90	<b>Pa</b> Protactinium 91	<b>U</b> Uranium 92	<b>Np</b> Neptunium 93	<b>Pu</b> Plutonium 94	<b>Am</b> Americium 95	<b>Cm</b> Curium 96	<b>Bk</b> Berkelium 97	<b>Cf</b> Californium 98	<b>Es</b> Einsteinium 99	<b>Fm</b> Fermium 100	
		173	173	173	173	173	173	173	173	173	173	173	
		<b>Yb</b> Ytterbium 70	<b>Lu</b> Lutetium 71	<b>Lr</b> Lawrencium 103	<b>No</b> Nobelium 102	<b>Md</b> Mendelevium 101	<b>Fm</b> Fermium 100	<b>Er</b> Erbium 68	<b>Tm</b> Thulium 69	<b>Yb</b> Ytterbium 70	<b>Lu</b> Lutetium 71	<b>Lr</b> Lawrencium 103	

a = relative atomic mass  
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.).

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