



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

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**CO-ORDINATED SCIENCES**

**0654/11**

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)

\* 5 8 3 1 7 4 0 6 9 6 \*

**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 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

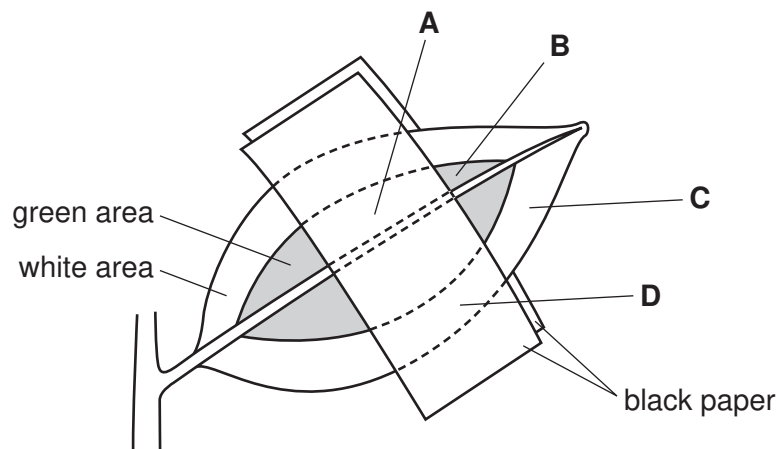
2 Which cells produce starch in their cytoplasm?

- A all animal cells
- B all plant cells
- C some animal cells
- D some plant cells

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

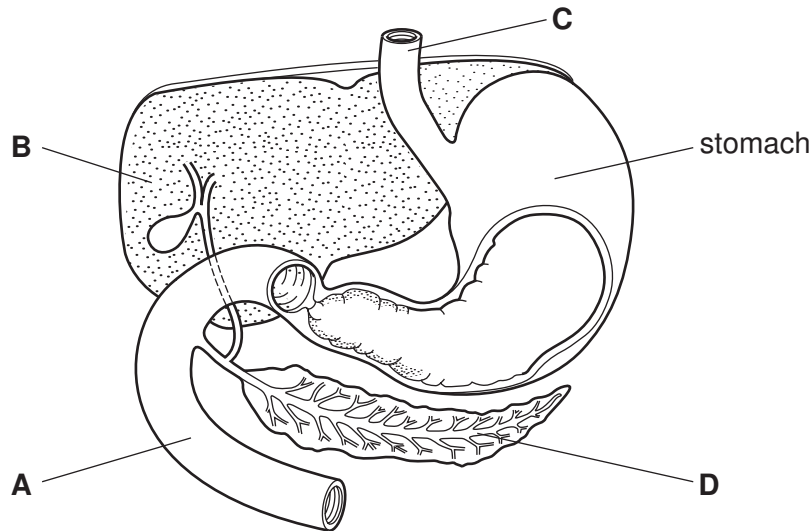
The leaf is left in bright light for six hours and then tested for starch.

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



- 4 The diagram shows part of the digestive system.

Where does lipase digest fat?



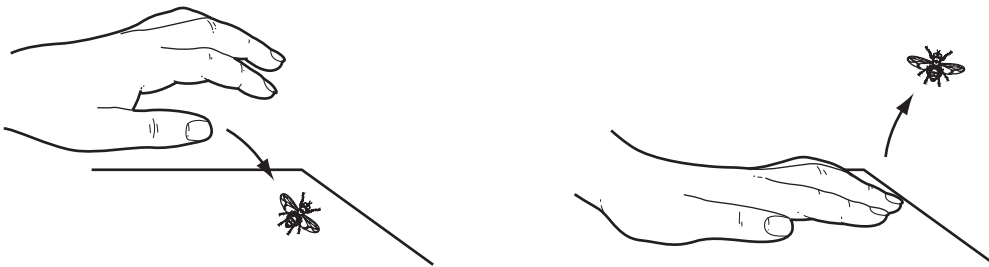
- 5 How do bacteria cause tooth decay?
- A They release acids that dissolve enamel.
  - B They release alkalis that dissolve enamel.
  - C They release enzymes that digest enamel.
  - D They release ethanol that digests enamel.
- 6 What happens during anaerobic respiration in muscle cells?
- A carbon dioxide is released
  - B energy is released
  - C lactic acid is oxidised
  - D water is released
- 7 Which row is correct for the blood in veins?

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

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

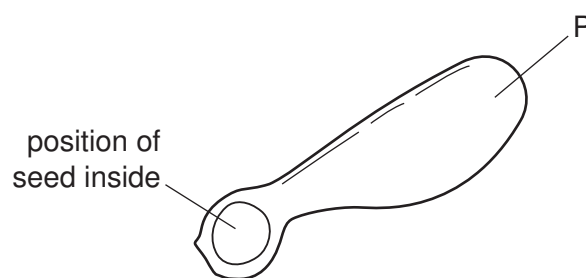
	blood glucose	blood insulin	body temperature
<b>A</b>	✓	✓	✓
<b>B</b>	✓	✓	x
<b>C</b>	✓	x	✓
<b>D</b>	x	✓	✓

- 9 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.
- 10 The diagram shows a wind-dispersed, single-seeded fruit.

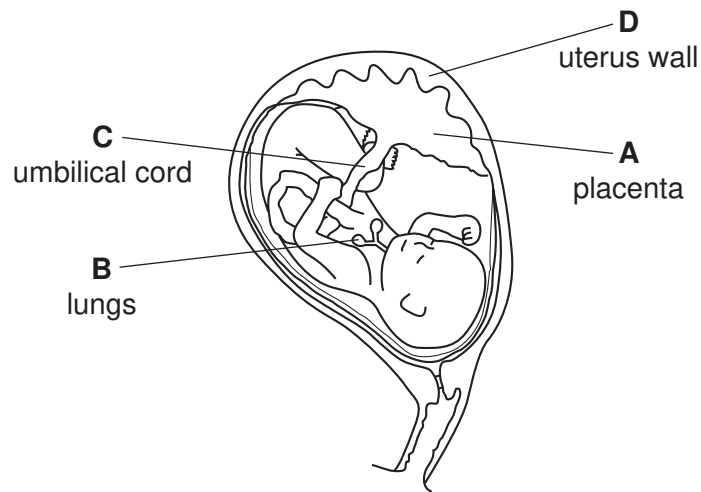


Structure P is an extension of which part?

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

11 The diagram shows a developing fetus.

Where does the fetal blood become oxygenated?

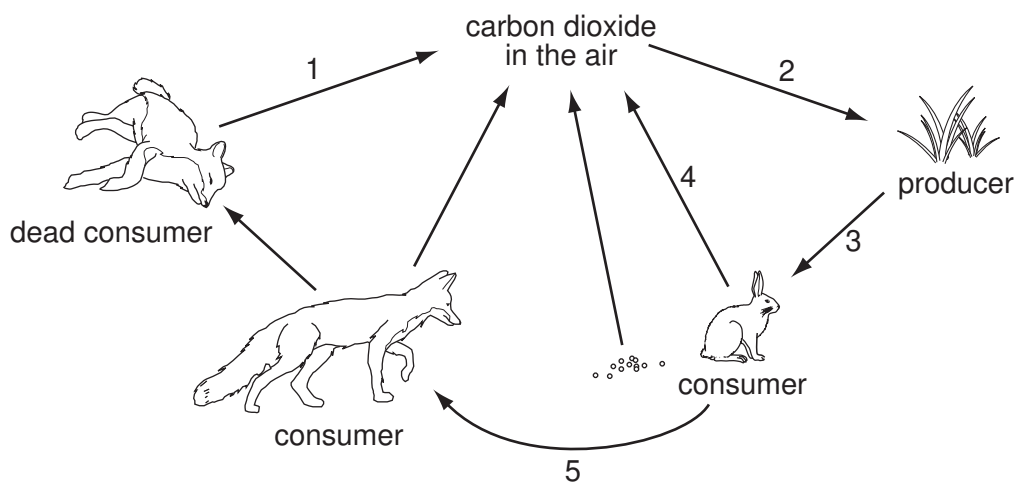


12 The alleles for a particular character are H and h.

Which term describes an organism whose genotype is Hh?

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

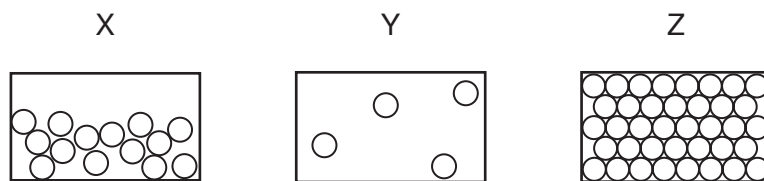
13 The diagram shows part of the carbon cycle which includes a food chain.



Which arrows are part of the food chain?

- A 1 and 2
- B 2 and 3
- C 3 and 5
- D 4 and 5

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

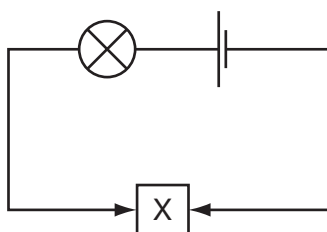


Which change occurs during condensation?

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

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 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

17 Which molecules join into long chains to make proteins?

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

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

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

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

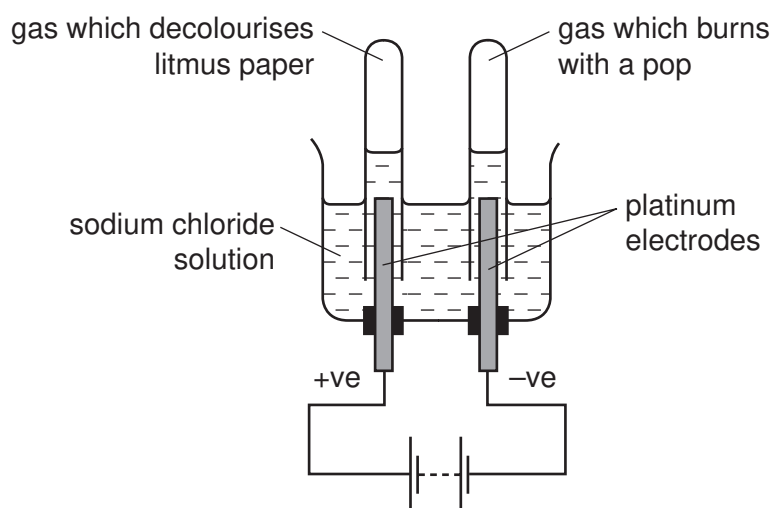
- 1 carbon forms strong alloys with metals,
- 2 carbon reacts with oxygen in the ore.

Which of these statements are correct?

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

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

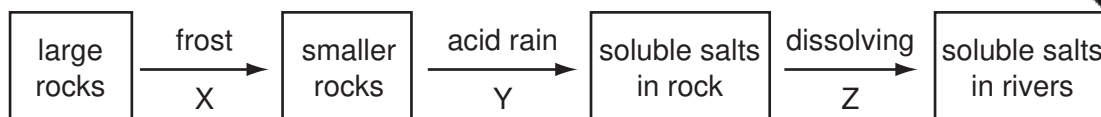
One gas decolourises moist litmus paper, the other gas burns with a pop.



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.

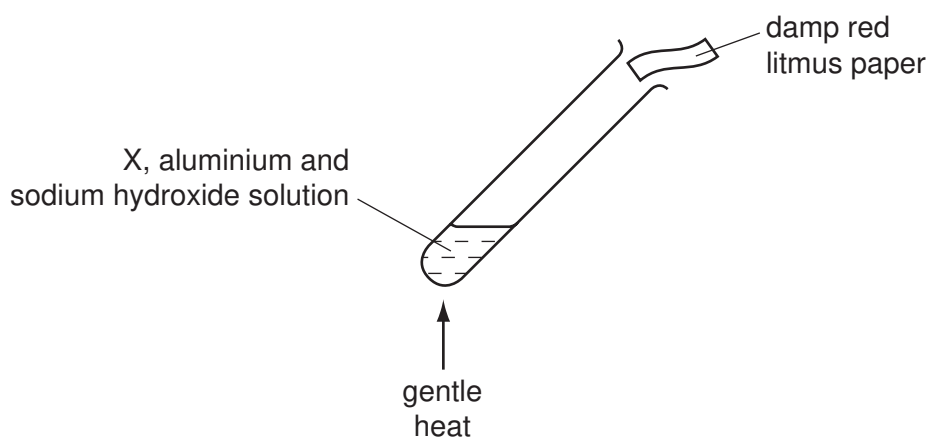
21 Rocks can be weathered by natural changes.



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

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



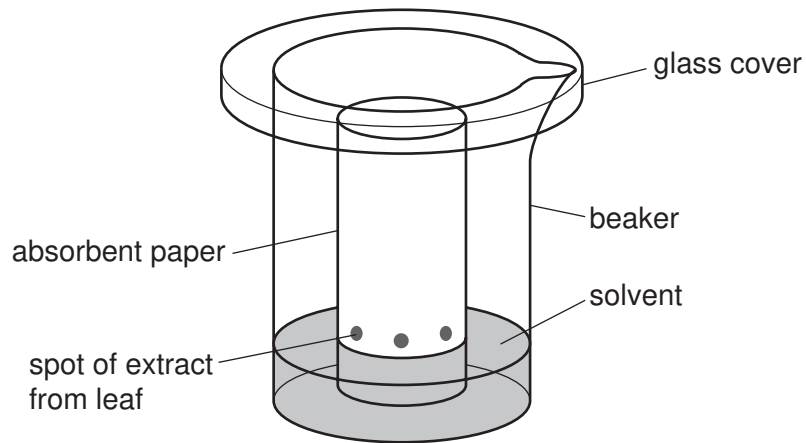
The damp red litmus paper turns blue.

What does X contain?

- A** carbonate
- B** chloride
- C** nitrate
- D** sulfate



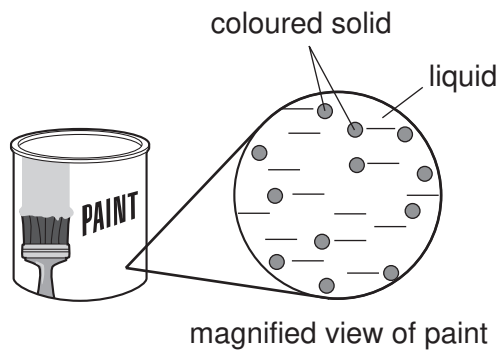
23 A student uses the apparatus shown to find out how many different pigments are in leaf



What is this separation method called?

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

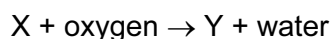
24 Paint contains particles of solid finely dispersed in a liquid.



Which term correctly describes paint?

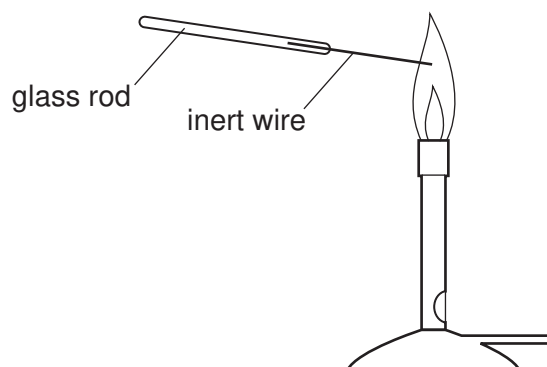
- A emulsion
- B gel
- C sol
- D solution

- 25 Waste material buried underground can decay to form gas X which can be used as a fuel. Gas X burns to form an oxide Y and water.



What is Y?

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

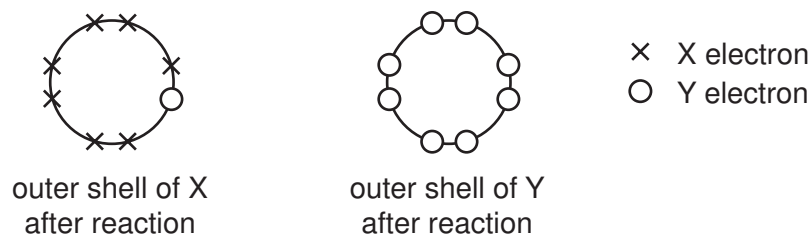
	solution P	solution Q
colour of Bunsen flame	yellow	green

Which metal ions are present in the solutions?

	P	Q
A	copper	calcium
B	copper	sodium
C	sodium	calcium
D	sodium	copper

27 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?

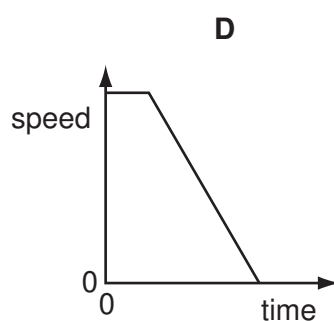
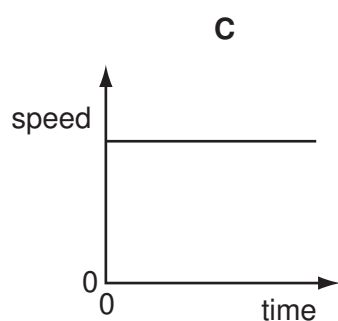
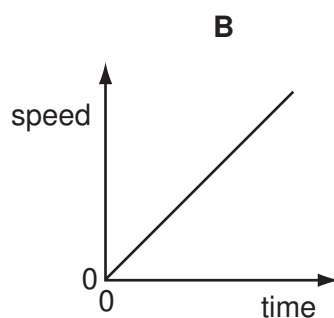
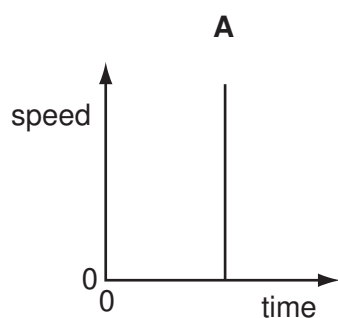
- A X is in group VII and has formed the  $X^+$  ion.
  - B X is in group VII and has formed the  $X^-$  ion.
  - C X is in group VIII and has formed the  $X^+$  ion.
  - D X is in group VIII and has formed the  $X^-$  ion.
- 28  $100\text{ cm}^3$  of a liquid has a mass of 85 g.

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.

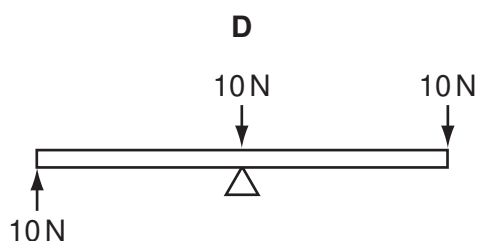
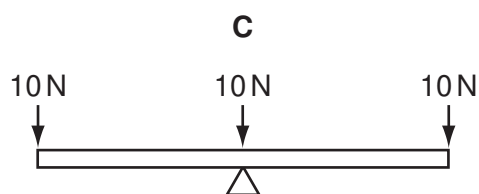
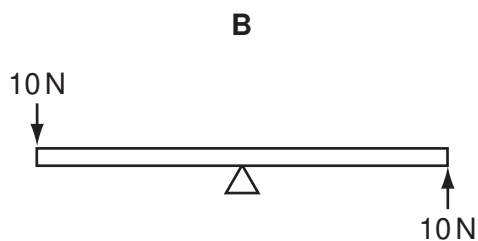
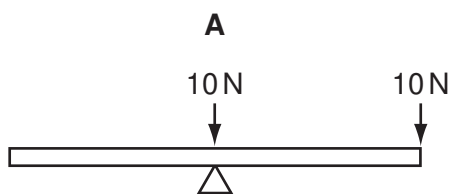
29 Four speed-time graphs are shown below.

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



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 A man lifts some weights.

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

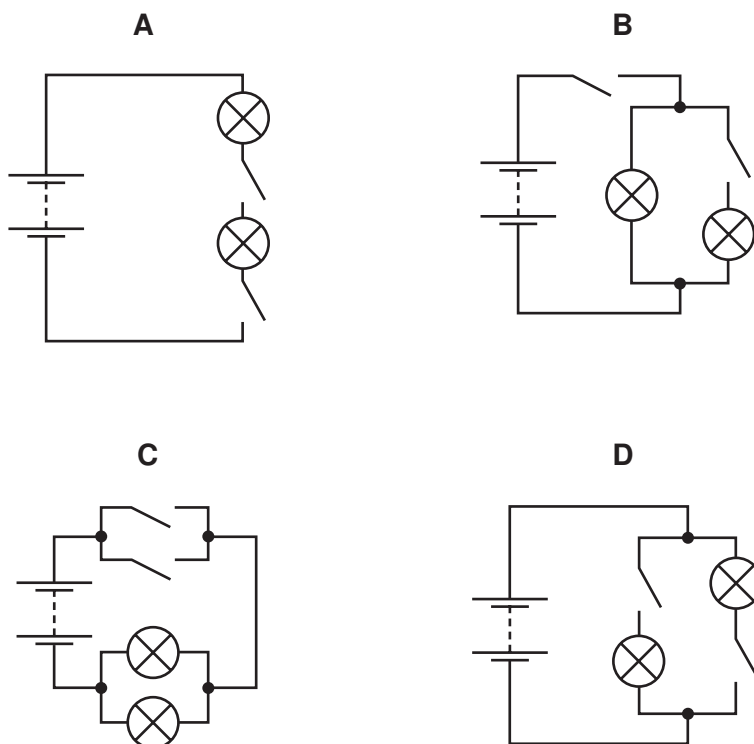
- A lifting a mass of 1 kg through a height of 0.1 m in 1 second
- B lifting a mass of 1 kg through a height of 0.1 m in 10 seconds
- C lifting a mass of 1 kg through a height of 1 m in 1 second
- D lifting a mass of 10 kg through a height of 0.1 m in 1 second

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.

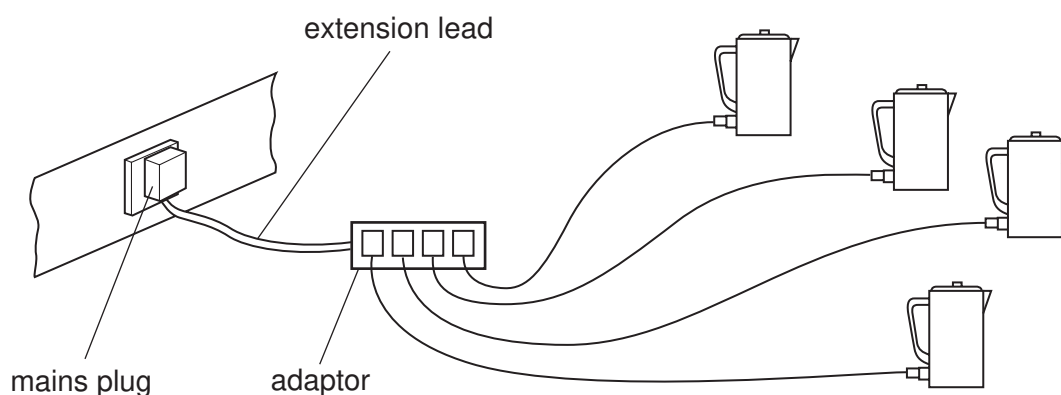
33 Which diagram shows a circuit that will allow the lamps to be switched on and off independently?



34 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.



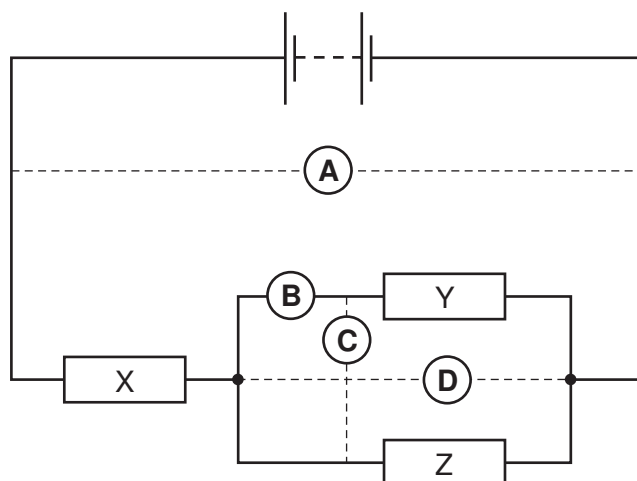
Why is this use of the adaptor dangerous?

- 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.

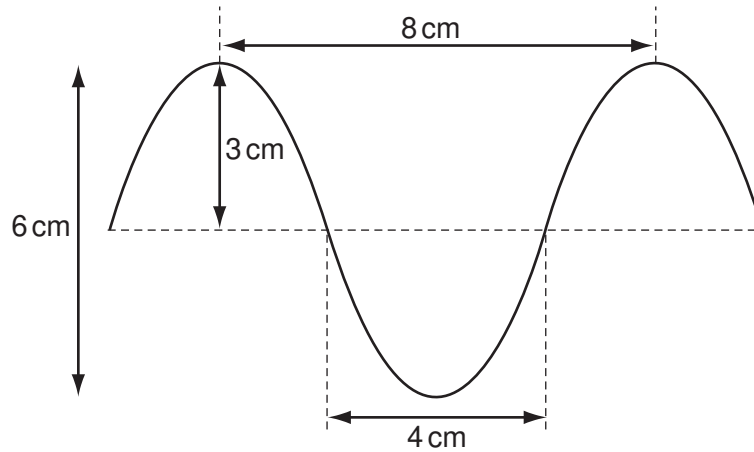
35 A circuit consists of three resistors, X, Y and Z, connected to a battery as shown in the diagram.

The potential difference across resistor Y is measured.

In which position should the voltmeter be connected to do this?



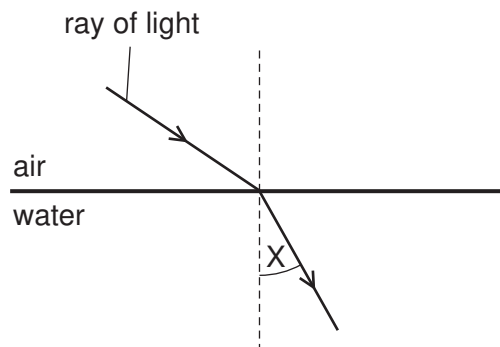
36 The diagram shows a wave.



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

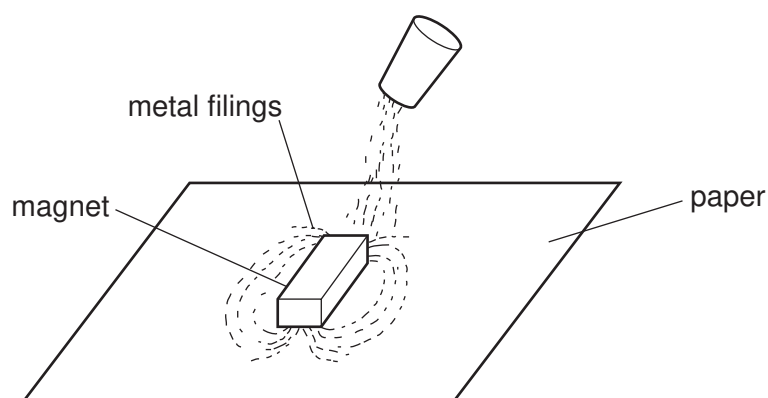
37 The diagram shows a ray of light passing from air into water.



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

- 38 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
- 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	0				
										1 <b>H</b> Hydrogen 1											4 <b>He</b> Helium 2
7 <b>Li</b> Lithium 3	9 <b>Be</b> Beryllium 4											11 <b>B</b> Boron 5	12 <b>C</b> Carbon 6	14 <b>N</b> Nitrogen 7	16 <b>O</b> Oxygen 8	19 <b>F</b> Fluorine 9	20 <b>Ne</b> Neon 10				
23 <b>Na</b> Sodium 11	24 <b>Mg</b> Magnesium 12											27 <b>Al</b> Aluminium 13	28 <b>Si</b> Silicon 14	31 <b>P</b> Phosphorus 15	32 <b>S</b> Sulfur 16	35.5 <b>Cl</b> Chlorine 17	40 <b>Ar</b> Argon 18				
39 <b>K</b> Potassium 19	40 <b>Ca</b> Calcium 20	45 <b>Sc</b> Scandium 21	48 <b>Ti</b> Titanium 22	51 <b>V</b> Vanadium 23	52 <b>Cr</b> Chromium 24	55 <b>Mn</b> Manganese 25	56 <b>Fe</b> Iron 26	59 <b>Co</b> Cobalt 27	59 <b>Ni</b> Nickel 28	64 <b>Cu</b> Copper 29	65 <b>Zn</b> Zinc 30	70 <b>Ga</b> Gallium 31	73 <b>Ge</b> Germanium 32	75 <b>As</b> Arsenic 33	79 <b>Se</b> Selenium 34	80 <b>Br</b> Bromine 35	84 <b>Kr</b> Krypton 36				
85 <b>Rb</b> Rubidium 37	88 <b>Sr</b> Strontium 38	89 <b>Y</b> Yttrium 39	91 <b>Zr</b> Zirconium 40	93 <b>Nb</b> Niobium 41	96 <b>Mo</b> Molybdenum 42	96 <b>Tc</b> Technetium 43	101 <b>Ru</b> Ruthenium 44	103 <b>Rh</b> Rhodium 45	106 <b>Pd</b> Palladium 46	108 <b>Ag</b> Silver 47	112 <b>Cd</b> Cadmium 48	115 <b>In</b> Indium 49	119 <b>Sn</b> Tin 50	122 <b>Sb</b> Antimony 51	128 <b>Te</b> Tellurium 52	127 <b>I</b> Iodine 53	131 <b>Xe</b> Xenon 54				
133 <b>Cs</b> Caesium 55	137 <b>Ba</b> Barium 56	139 <b>La</b> Lanthanum 57 *	178 <b>Hf</b> Hafnium 72	181 <b>Ta</b> Tantalum 73	184 <b>W</b> Tungsten 74	186 <b>Re</b> Rhenium 75	190 <b>Os</b> Osmium 76	192 <b>Ir</b> Iridium 77	195 <b>Pt</b> Platinum 78	197 <b>Au</b> Gold 79	201 <b>Hg</b> Mercury 80	204 <b>Tl</b> Thallium 81	207 <b>Pb</b> Lead 82	209 <b>Bi</b> Bismuth 83	209 <b>Po</b> Polonium 84	209 <b>At</b> Astatine 85	209 <b>Rn</b> Radon 86				
87 <b>Fr</b> Francium	226 <b>Ra</b> Radium	227 <b>Ac</b> Actinium †																			

\*58-71 Lanthanoid series

†90-103 Actinoid series

a	a = relative atomic mass
<b>X</b>	X = atomic symbol
b	b = proton (atomic) number

140 <b>Ce</b> Cerium 58	141 <b>Pr</b> Praseodymium 59	144 <b>Nd</b> Neodymium 60	<b>Pm</b> Promethium 61	150 <b>Sm</b> Samarium 62	152 <b>Eu</b> Europium 63	157 <b>Gd</b> Gadolinium 64	159 <b>Tb</b> Terbium 65	162 <b>Dy</b> Dysprosium 66	165 <b>Ho</b> Holmium 67	167 <b>Er</b> Erbium 68	169 <b>Tm</b> Thulium 69	173 <b>Yb</b> Ytterbium 70	175 <b>Lu</b> Lutetium 71
232 <b>Th</b> Thorium 90	238 <b>Pa</b> Protactinium 91	238 <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	<b>Md</b> Mendelevium 101	<b>No</b> Nobelium 102	<b>Lr</b> Lawrencium 103

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