



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CO-ORDINATED SCIENCES

0654/12

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**.

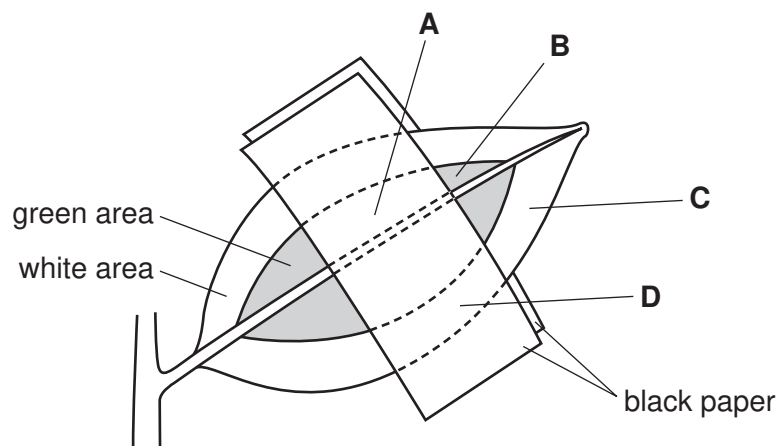
This document consists of **17** printed pages and **3** blank pages.



- 1 Which cells produce starch in their cytoplasm?
- A all animal cells
 - B all plant cells
 - C some animal cells
 - D some plant cells
- 2 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.
- 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.

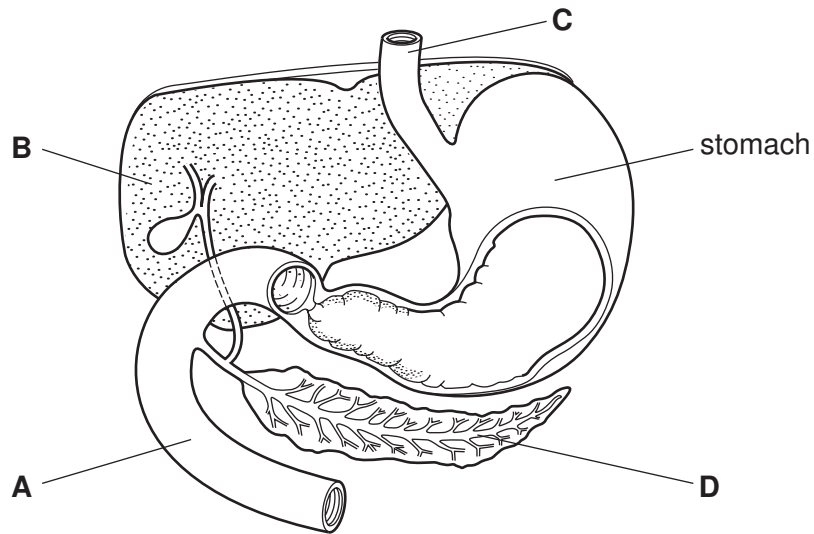
The leaf is left in bright light for six hours and then tested for starch.

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



5 The diagram shows part of the digestive system.

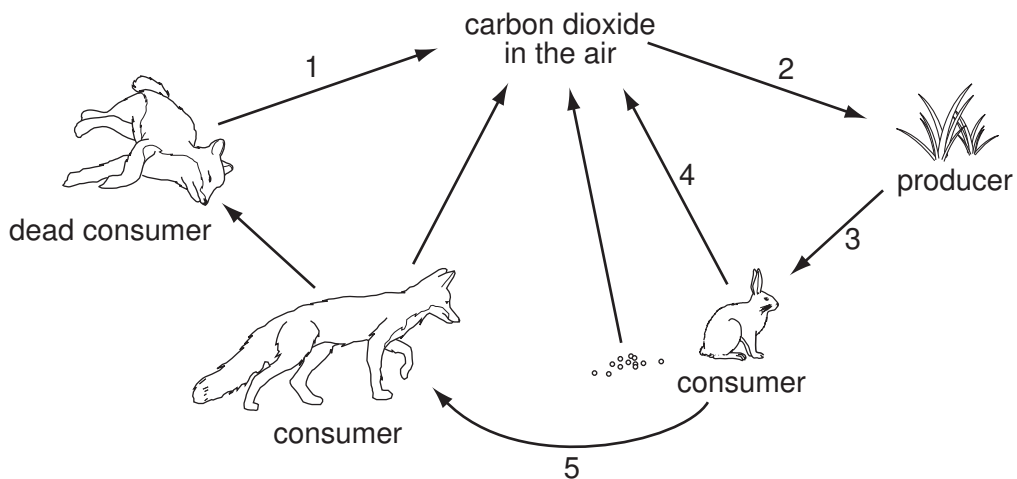
Where does lipase digest fat?



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 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

8 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

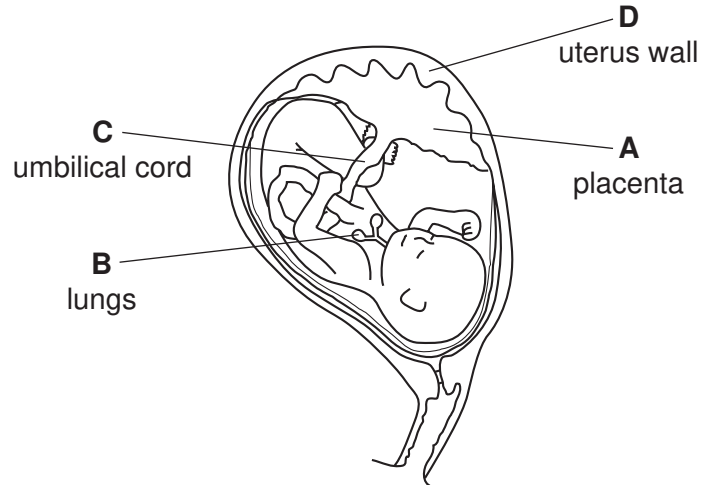
9 The alleles for a particular character are H and h.

Which term describes an organism whose genotype is Hh?

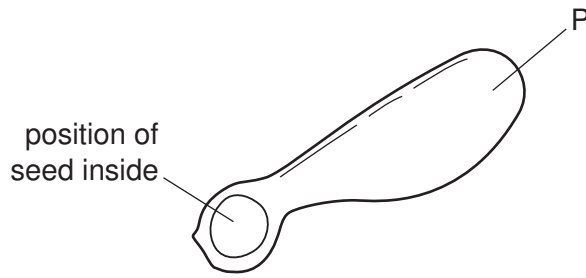
- A** heterozygote
- B** homozygote
- C** phenotype
- D** recessive

10 The diagram shows a developing fetus.

Where does the fetal blood become oxygenated?



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



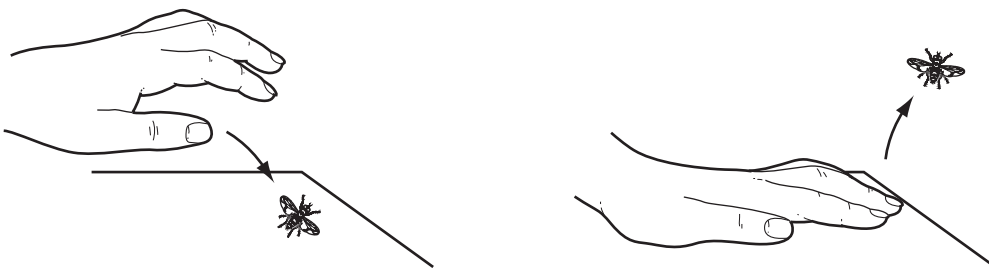
Structure P is an extension of which part?

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

12 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	✓	✓

13 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.

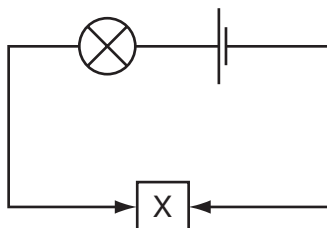
- 14 Which material is made from silicon(IV) oxide combined with metal oxides?
- A brass
 - B glass
 - C polythene
 - D steel
- 15 Which molecules join into long chains to make proteins?
- A amino acids
 - B ethene
 - C glucose
 - D starch
- 16 Which two elements are present in the compounds found in petroleum?
- A carbon and nitrogen
 - B carbon and oxygen
 - C hydrogen and carbon
 - D hydrogen and oxygen
- 17 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

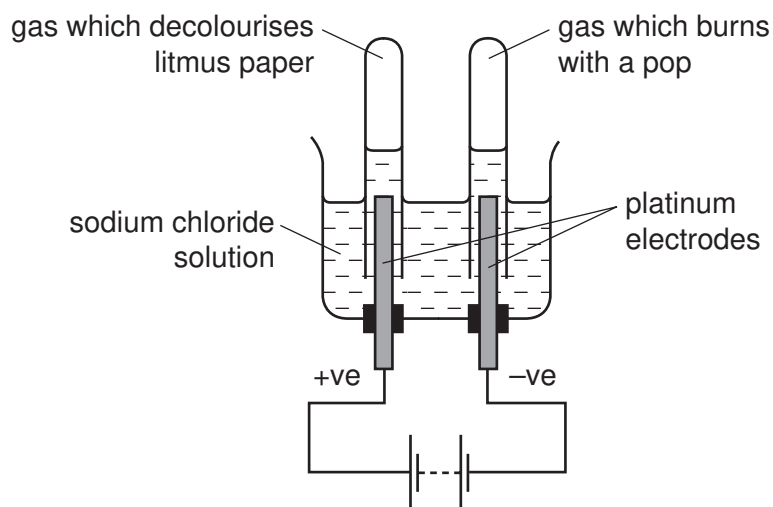
18 The diagram shows a circuit.

Solid X makes the lamp light.



What is solid X?

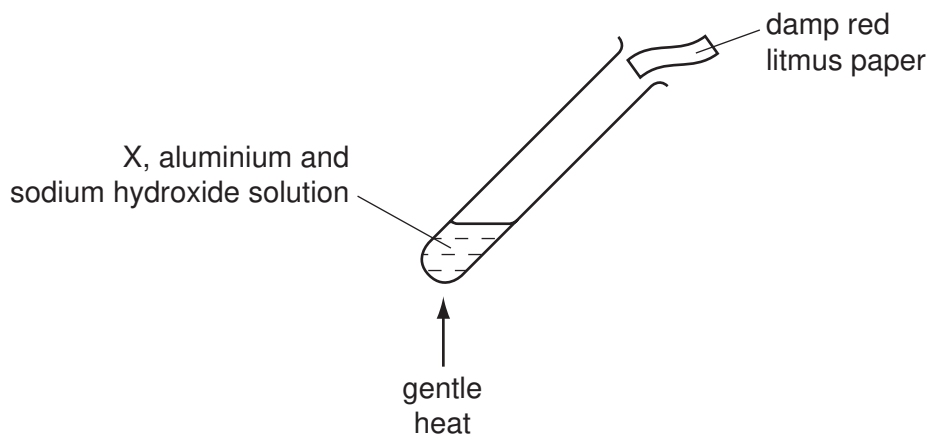
- A rubber
 - B silicon(IV) oxide
 - C sulfur
 - D zinc
- 19 Sodium chloride solution is electrolysed and a gas is collected at each electrode.
- One gas decolourises moist litmus paper, the other gas burns with a pop.



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.

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

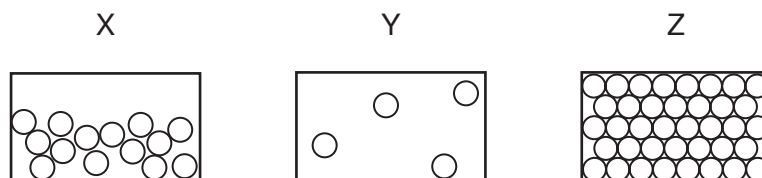


The damp red litmus paper turns blue.

What does X contain?

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

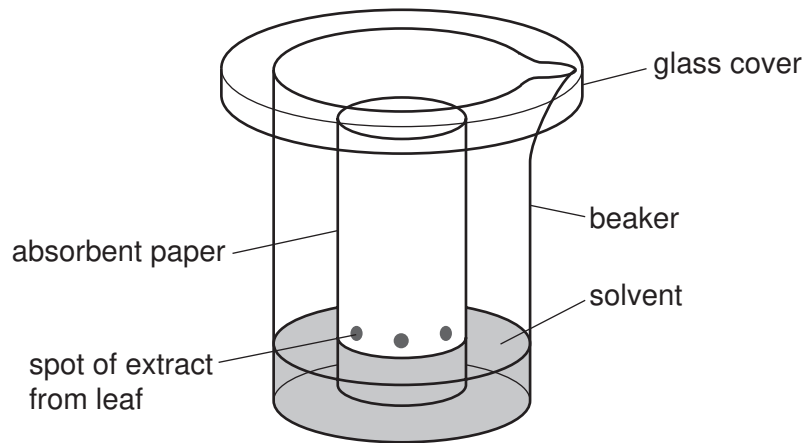
21 The three states of matter are represented by diagrams X, Y and Z.



Which change occurs during condensation?

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

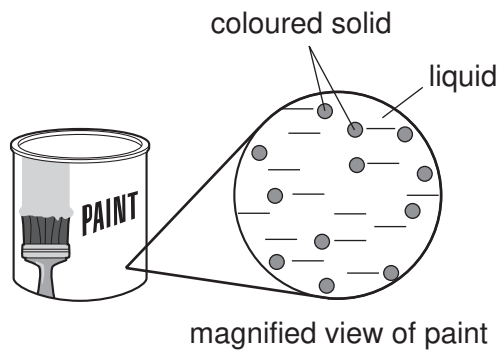
22 A student uses the apparatus shown to find out how many different pigments are in leaves.



What is this separation method called?

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

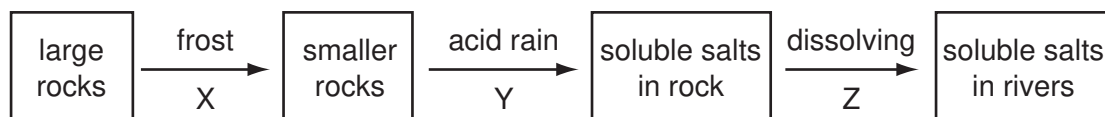
23 Paint contains particles of solid finely dispersed in a liquid.



Which term correctly describes paint?

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

24 Rocks can be weathered by natural changes.

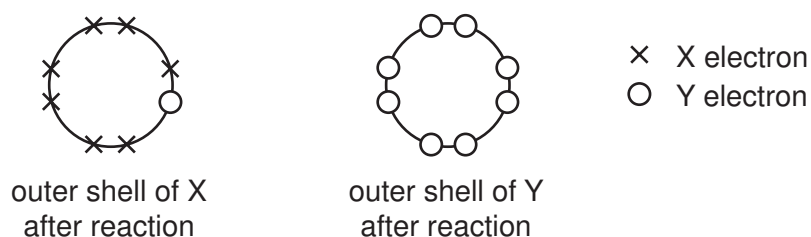


Which row correctly describes the type of change?

	X	Y	Z
A	chemical	chemical	chemical
B	chemical	physical	chemical
C	physical	chemical	physical
D	physical	physical	physical

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

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

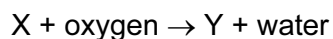


Which statement is correct?

- 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.

26 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.

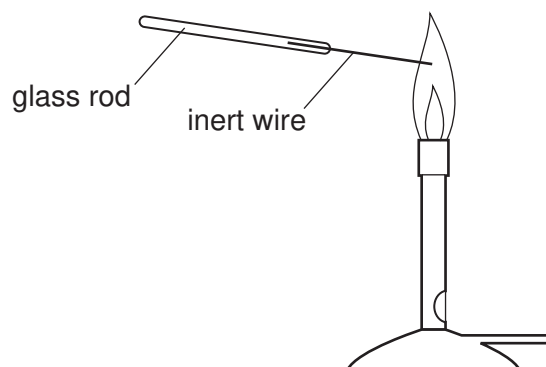


What is Y?

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

27 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?

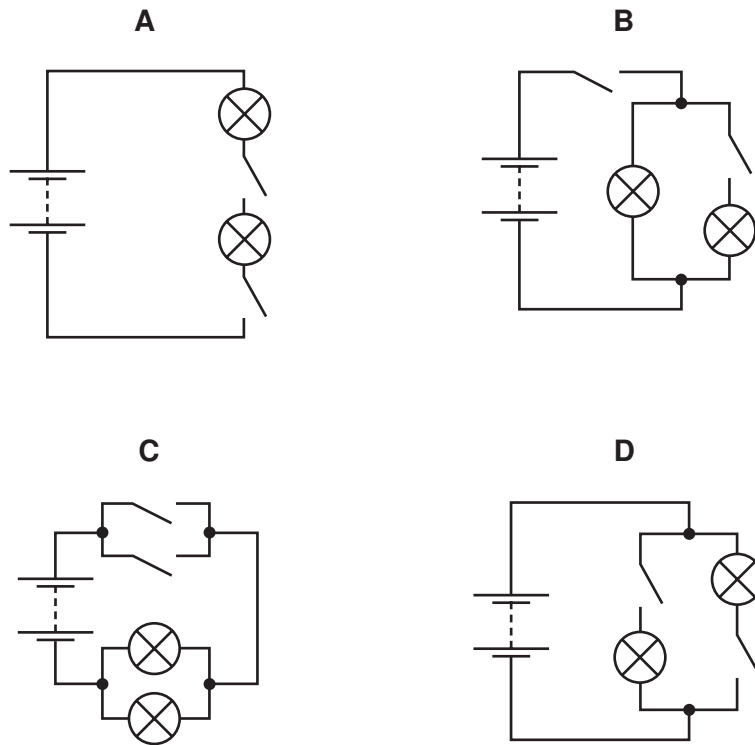
	P	Q
A	copper	calcium
B	copper	sodium
C	sodium	calcium
D	sodium	copper

28 100 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 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.

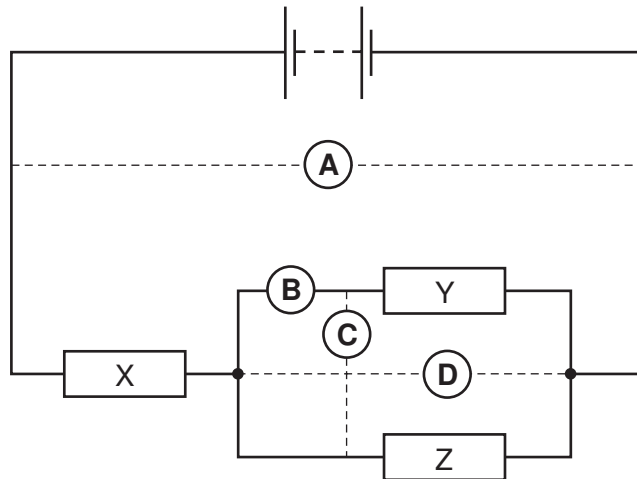
29 Which diagram shows a circuit that will allow the lamps to be switched on and off independently?



30 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.

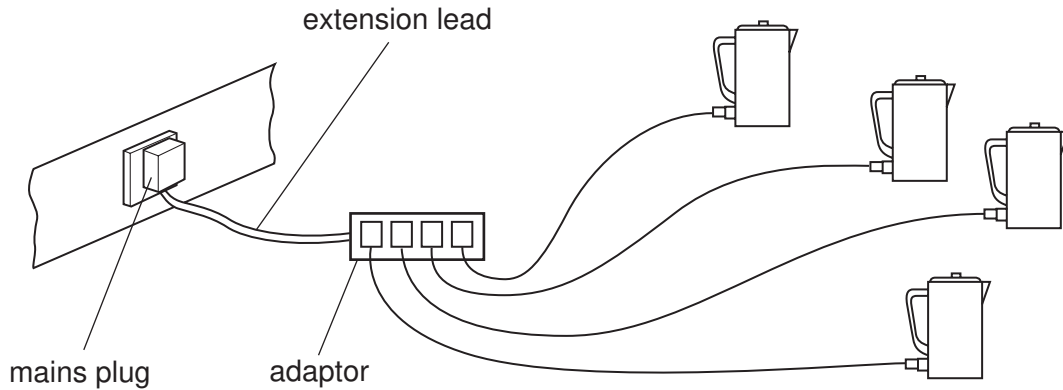
In which position should the voltmeter be connected to do this?



31 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.

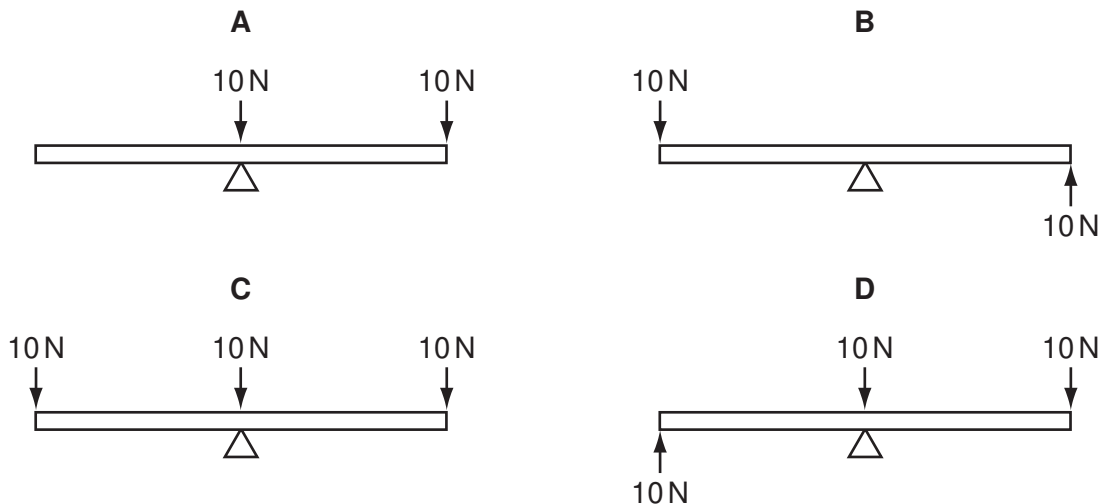


Why is this use of the adaptor dangerous?

- 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.

32 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?



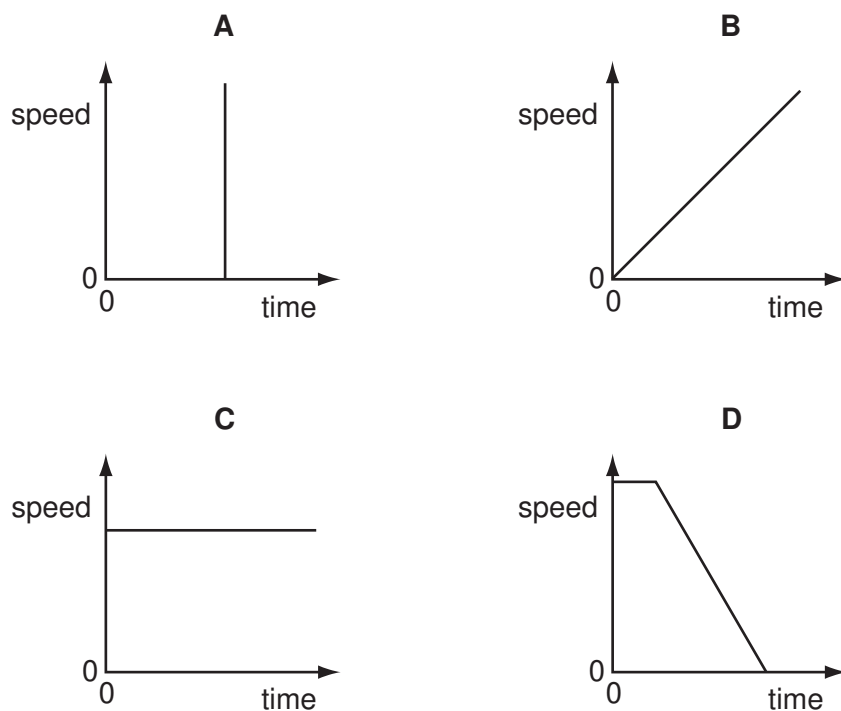
33 A man lifts some weights.

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

34 Four speed-time graphs are shown below.

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

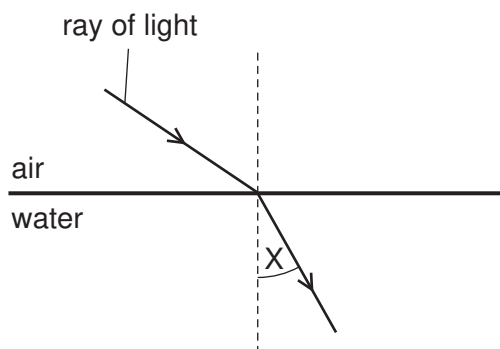


35 1 kg of water and 1 kg of aluminium are heated to the same temperature and then allowed to cool in a room.

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.

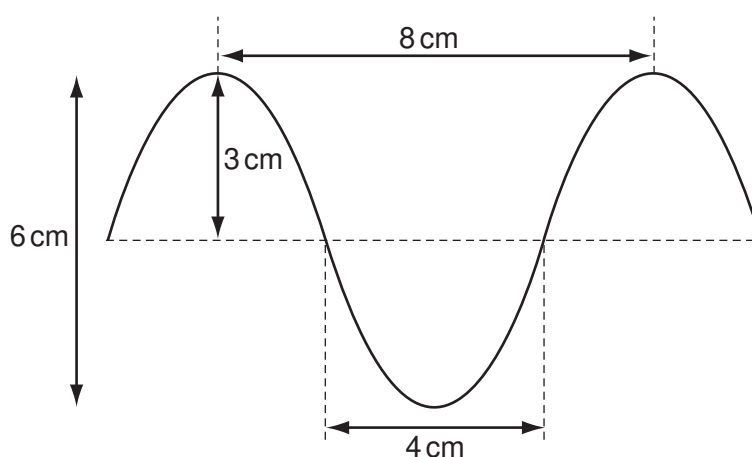
36 The diagram shows a ray of light passing from air into water.



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

37 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

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

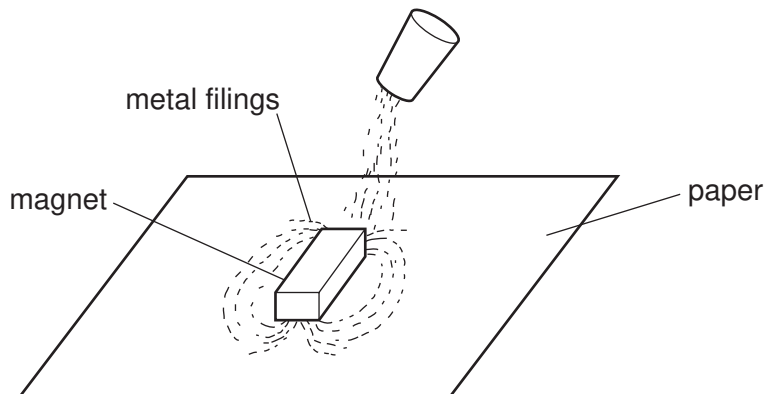
- A are the only radiation to carry a charge.
- B have the greatest ionising effect.
- C have the greatest penetrating effect.
- D have the smallest mass.

39 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

40 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

DATA SHEET
The Periodic Table of the Elements

		Group															
I	II	III	IV	V	VI	VII	0										
1 H Hydrogen 1											2 He Helium 2						
3 Li Lithium 4	4 Be Beryllium 9											5 B Boron 11					
11 Na Sodium 12	12 Mg Magnesium 24	13 Al Aluminium 13	14 Si Silicon 14	15 P Phosphorus 15	16 S Sulfur 16	17 Cl Chlorine 17	18 Ar Argon 18					19 F Fluorine 9					
19 K Potassium 19	20 Ca Calcium 20	21 Sc Scandium 21	22 Ti Titanium 22	23 V Vanadium 23	24 Cr Chromium 24	25 Mn Manganese 25	26 Fe Iron 26	27 Co Cobalt 27	28 Ni Nickel 28	29 Cu Copper 29	30 Zn Zinc 30	31 Ga Gallium 31	32 Ge Germanium 32	33 As Arsenic 33	34 Se Selenium 34	35 Br Bromine 35	36 Kr Krypton 36
37 Rb Rubidium 37	38 Sr Strontium 38	39 Y Yttrium 39	40 Zr Zirconium 40	41 Nb Niobium 41	42 Mo Molybdenum 42	43 Tc Technetium 43	44 Ru Ruthenium 44	45 Rh Rhodium 45	46 Pd Palladium 46	47 Ag Silver 47	48 Cd Cadmium 48	49 In Indium 49	50 Sn Tin 50	51 Sb Antimony 51	52 Te Tellurium 52	53 I Iodine 53	54 Xe Xenon 54
55 Cs Caesium 55	56 Ba Barium 56	57 La Lanthanum 57	72 Hf Hafnium 72	73 Ta Tantalum 73	74 W Tungsten 74	75 Re Rhenium 75	76 Os Osmium 76	77 Ir Iridium 77	78 Pt Platinum 78	79 Au Gold 79	80 Hg Mercury 80	81 Tl Thallium 81	82 Pb Lead 82	83 Bi Bismuth 83	84 Po Polonium 84	85 At Astatine 85	86 Rn Radon 86
87 Fr Francium 87	88 Ra Radium 88	89 Ac Actinium 89															

58 Ce Cerium 58	59 Pr Praseodymium 59	60 Nd Neodymium 60	61 Pm Promethium 61	62 Sm Samarium 62	63 Eu Europium 63	64 Gd Gadolinium 64	65 Tb Terbium 65	66 Dy Dysprosium 66	67 Ho Holmium 67	68 Er Erbium 68	69 Tm Thulium 69	70 Yb Ytterbium 70	71 Lu Lutetium 71
90 Th Thorium 90	91 Pa Protactinium 91	92 U Uranium 92	93 Np Neptunium 93	94 Pu Plutonium 94	95 Am Americium 95	96 Cm Curium 96	97 Bk Berkelium 97	98 Cf Californium 98	99 Es Einsteinium 99	100 Fm Fermium 100	101 Md Mendelevium 101	102 No Nobelium 102	103 Lr Lawrencium 103

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

a	X	b
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Key
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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