

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

COMBINED SCIENCE

0653/01

Paper 1 Multiple Choice

October/November 2005

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 **19** printed pages and **1** blank page.



2

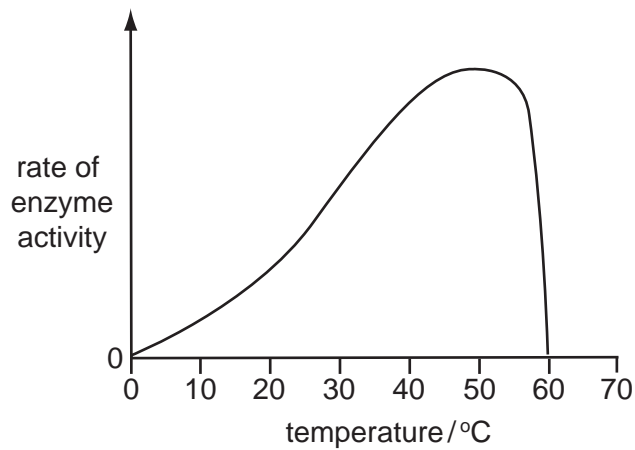
1 Which pair of features is found in plant cells but **not** in animal cells?

A	cell membrane	cell sap
B	cell sap	cell wall
C	cell wall	nucleus
D	nucleus	cell membrane

2 Which part of a plant cell is partially permeable?

- A** cell membrane
- B** cell wall
- C** chloroplast
- D** nucleus

3 The diagram shows how the activity of an enzyme varies with temperature.

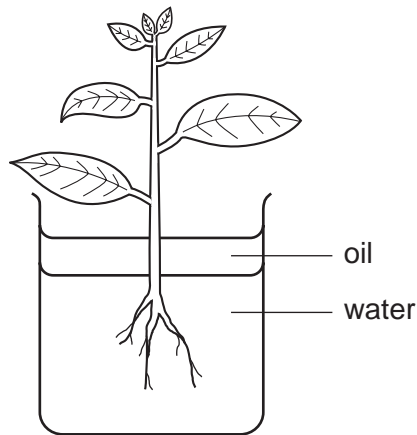


At which temperature is this enzyme completely denatured?

- A** 0°C
- B** 40°C
- C** 50°C
- D** 60°C

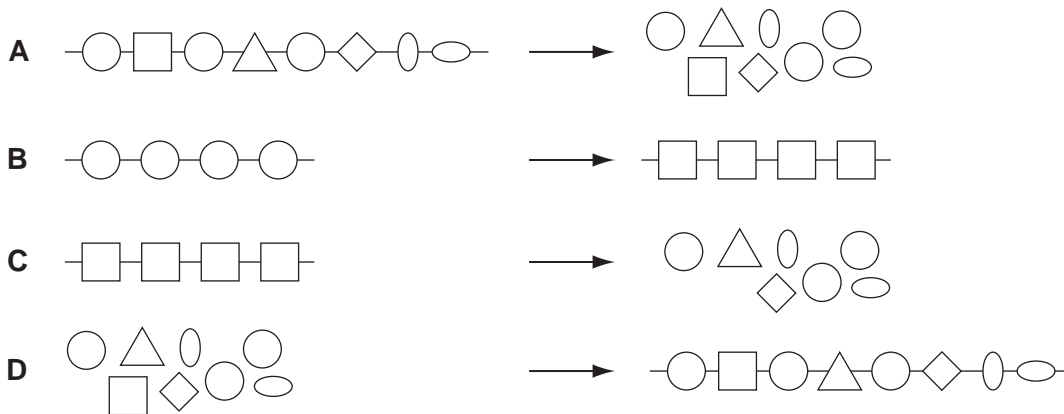
- 4 The drawing shows a plant in a container of water. There is a layer of oil on top of the water to stop the water evaporating. The apparatus weighs 300g.

After two hours it weighs 296g.



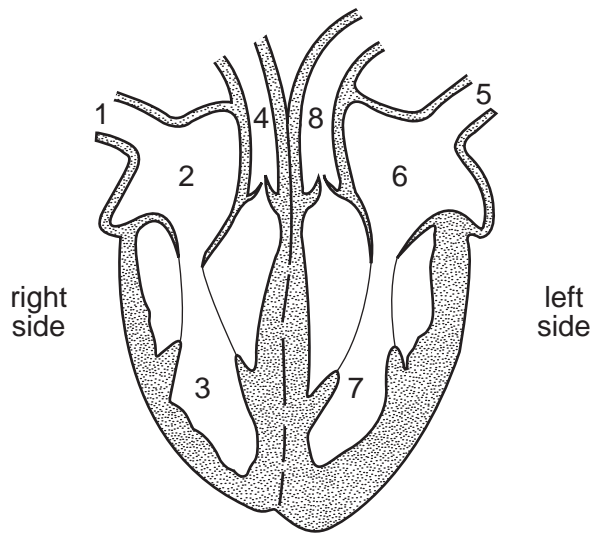
What is the rate of transpiration?

- A 150g water/hour
 - B 148g water/hour
 - C 4g water/hour
 - D 2g water/hour
- 5 Which diagram represents the digestion of food molecules in the alimentary canal?



- 6 Which structures in the human breathing system contain goblet cells and cilia?
- A alveoli and bronchi
 - B alveoli and pleural membranes
 - C bronchi and trachea
 - D pleural membranes and trachea

7 The diagram shows a section through a human heart.



In which order does oxygenated blood pass through the heart?

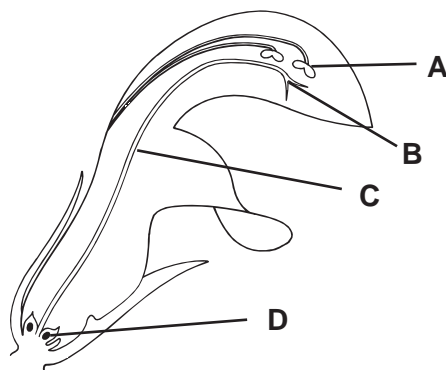
- A 1 → 2 → 3 → 4
- B 4 → 3 → 2 → 1
- C 5 → 6 → 7 → 8
- D 8 → 7 → 6 → 5

8 What causes the signals passing along the nerves to slow down?

- A drinking alcohol
- B eating fat
- C running
- D smoking

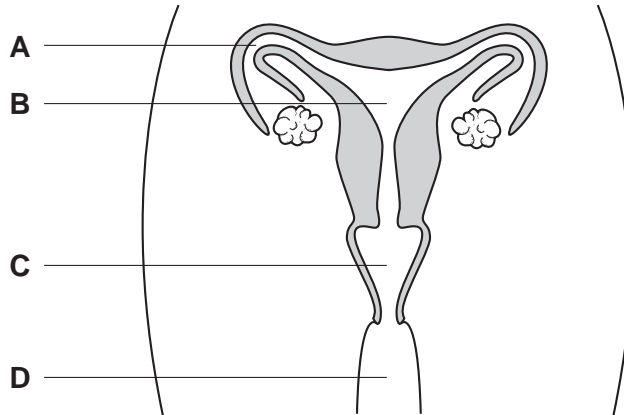
9 The diagram shows a section through a flower.

Where does fertilisation occur?



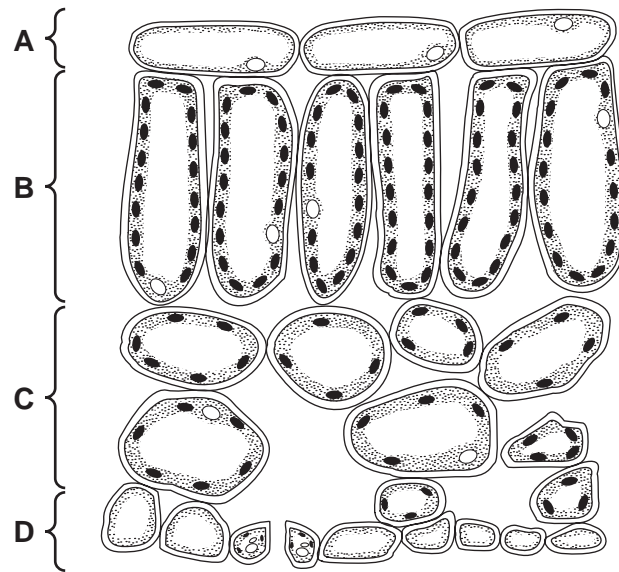
10 The diagram shows the human female reproductive system.

If a woman uses an IUD (intra-uterine device) as a contraceptive, where would it be placed?



11 The diagram shows a section through a leaf.

During photosynthesis, where would the greatest conversion of light energy to chemical energy take place?

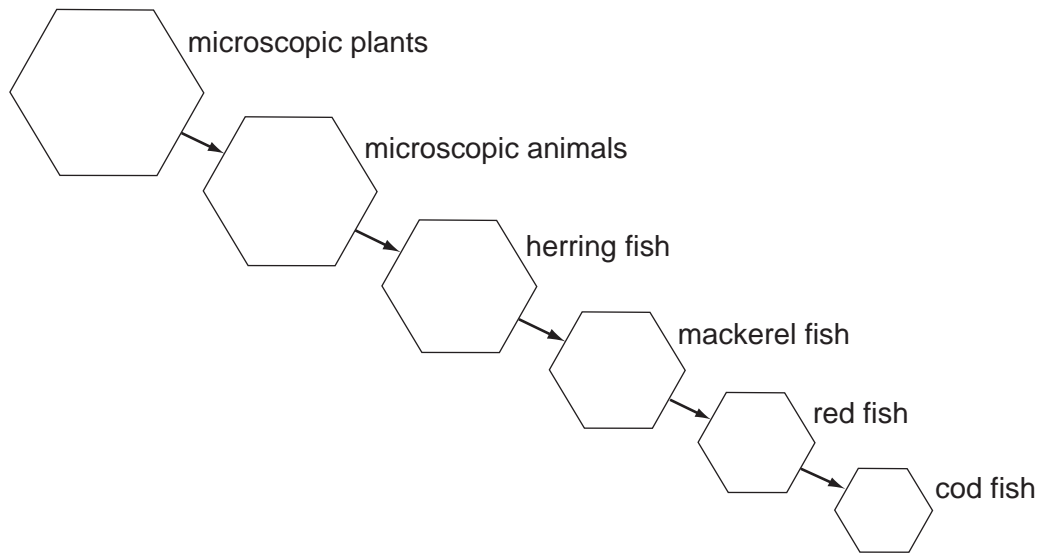


12 What can cause animals of the same species to vary?

	genes	environment
A	✓	✓
B	✓	x
C	x	✓
D	x	x

6

13 The diagram represents a food chain found in the sea.



How many consumer levels are there?

- A** 1 **B** 4 **C** 5 **D** 6

14 Which fact about crude oil shows that it is a mixture?

- A** Crude oil can be burned as a fuel.
B Crude oil can be separated into fractions by distillation.
C Crude oil is a fossil fuel formed over millions of years.
D Crude oil is a thick, black liquid.

15 Which diagrams show the bonding in the molecules of carbon dioxide and ethene?

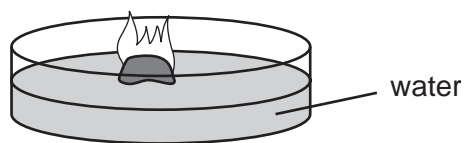
- | | carbon dioxide | ethene |
|----------|------------------------------|--------|
| A | $\text{O}-\text{C}-\text{O}$ | |
| B | $\text{O}-\text{C}-\text{O}$ | |
| C | $\text{O}=\text{C}=\text{O}$ | |
| D | $\text{O}=\text{C}=\text{O}$ | |

16 A solid is ionic.

Which property confirms this fact?

- A** its behaviour as an electrolyte
- B** its melting point
- C** its solubility in water
- D** the shape of its crystals

- 17 The diagram shows a solid element dropped into a bowl of water. The element catches fire and burns with a lilac flame.



What is the element?

- A aluminium
 - B magnesium
 - C potassium
 - D sodium
- 18 Element X has a high melting point and forms a green chloride.

Where in the Periodic Table is X most likely to be found?

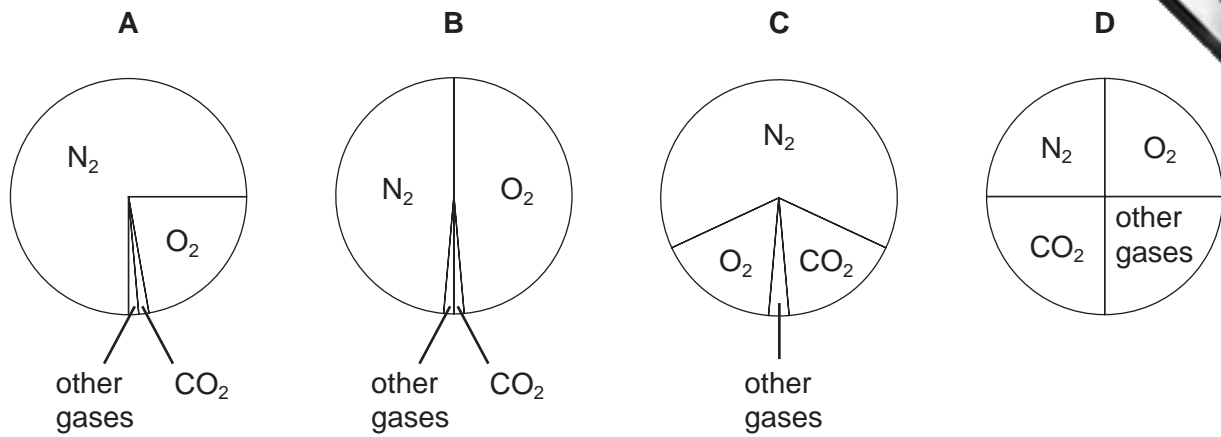
- A Group O
 - B Group I
 - C Group VII
 - D Transition elements
- 19 The diagram shows a lorry delivering a large container of a corrosive chemical to a factory.



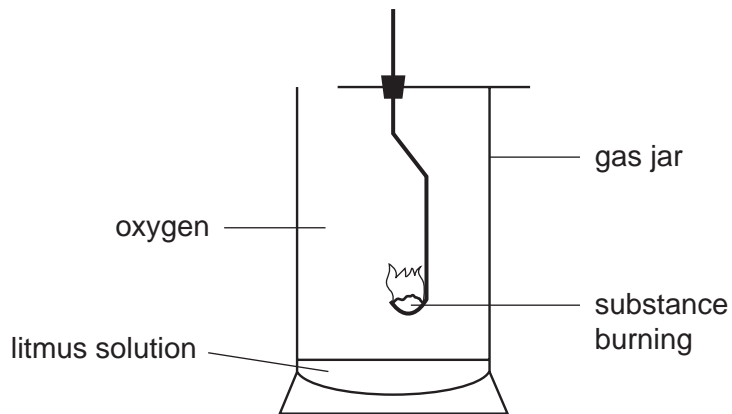
Which metals are used for the lorry and for the container?

	lorry	container
A	aluminium	stainless steel
B	mild steel	mild steel
C	mild steel	stainless steel
D	stainless steel	mild steel

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



21 The diagram shows an experiment on combustion.

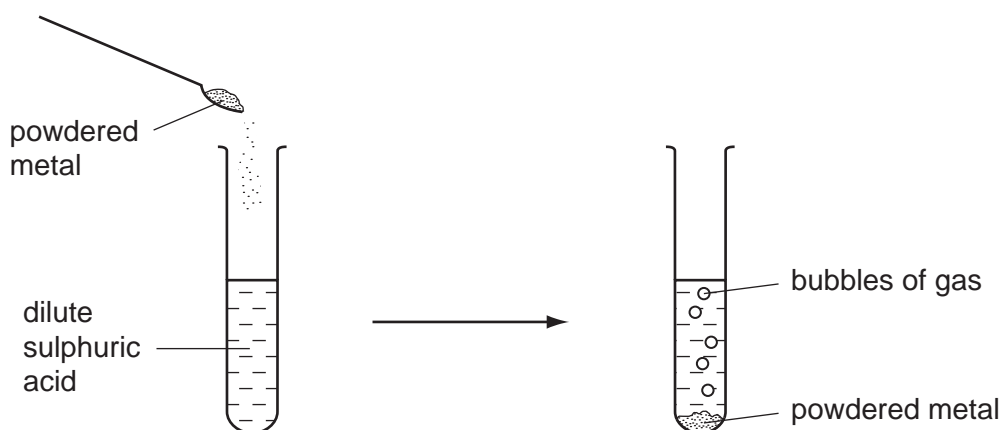


The litmus solution turns red.

Which substance is burning?

- A** copper
- B** magnesium
- C** sulphur
- D** zinc

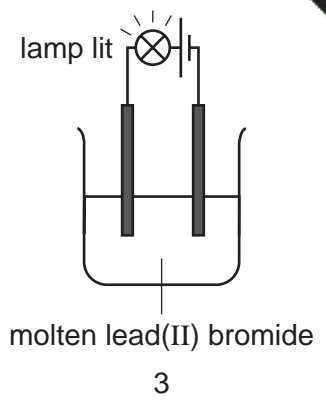
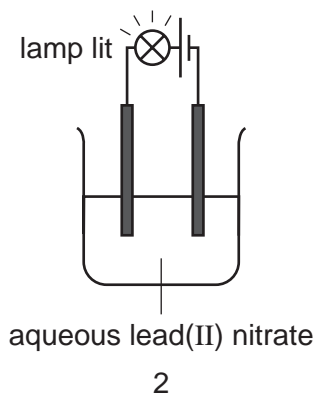
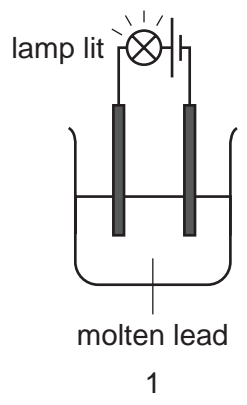
22 The diagrams show the result of adding a powdered metal to dilute sulphuric acid.



Which of the metals copper, magnesium and zinc react in this way?

- A copper only
 - B copper and magnesium only
 - C magnesium and zinc only
 - D zinc only
- 23 Which of the reactions shown is a thermal decomposition?
- A calcium carbonate \rightarrow calcium oxide + carbon dioxide
 - B methane + air \rightarrow carbon dioxide + water
 - C sodium carbonate + hydrochloric acid \rightarrow sodium chloride + water + carbon dioxide
 - D sodium hydroxide + hydrochloric acid \rightarrow sodium chloride + water

24 The diagram shows the results of three experiments.

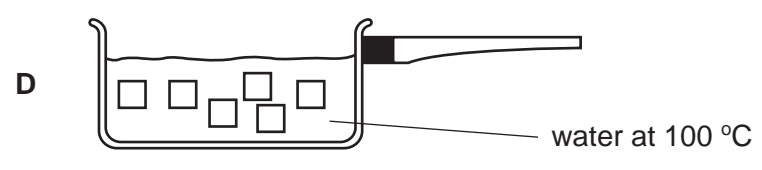
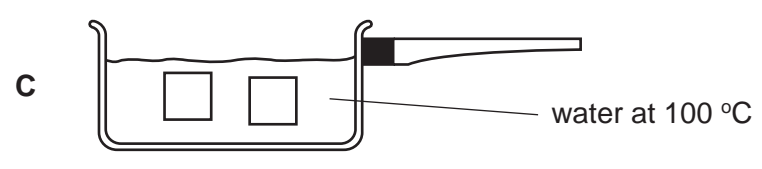
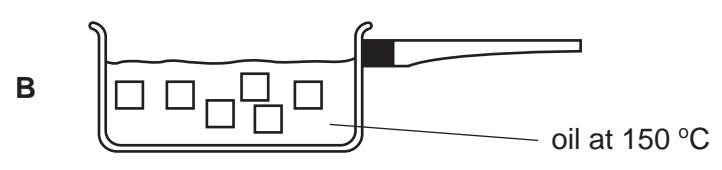
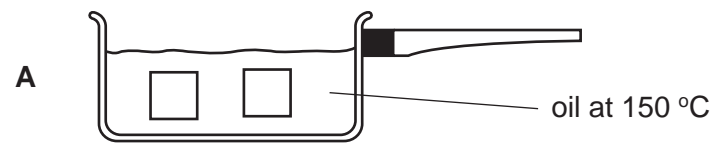


In which experiment is an electrolyte present?

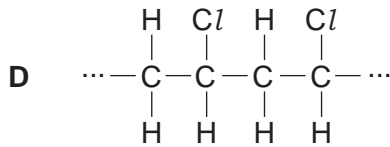
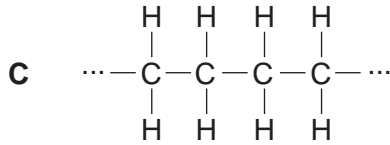
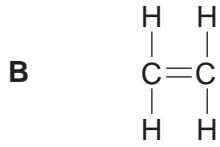
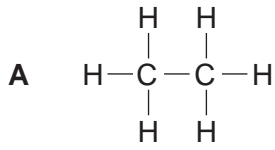
- A 1 and 2 only
- B 1 and 3 only
- C 2 and 3 only
- D 1, 2 and 3

25 A sweet potato is cut into pieces and cooked.

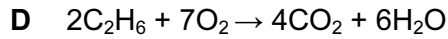
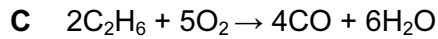
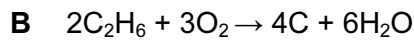
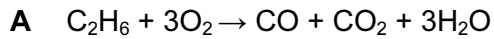
In which pan does the potato cook most quickly?



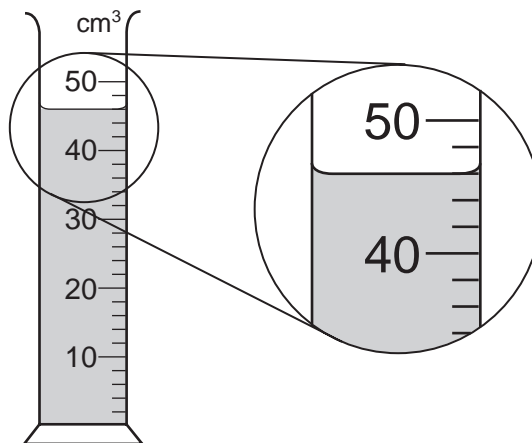
26 Which structure shows a polymer that is also a hydrocarbon?



27 Which equation shows the complete combustion of ethane, C_2H_6 ?



28 A measuring cylinder is used to measure the volume of a liquid.



What is the volume of the liquid?

A 43 cm^3

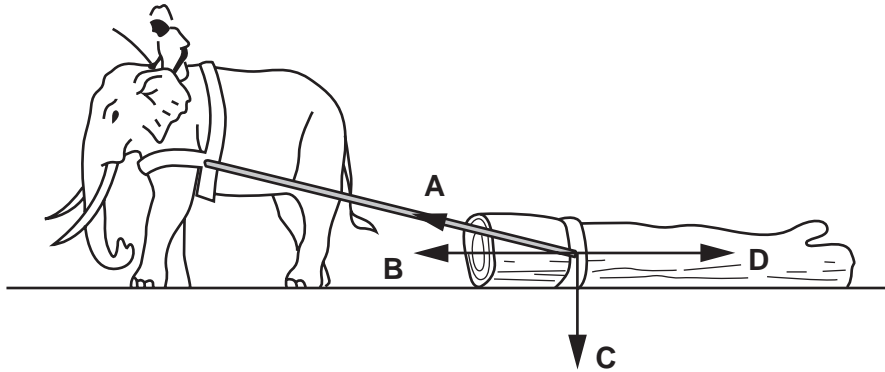
B 46 cm^3

C 48 cm^3

D 54 cm^3

29 An elephant pulls a heavy log along the ground at a steady speed.

Which arrow shows the force of the rope on the log?



30 The table shows the length of a wire as the load on it is increased.

load / N	0	10	20	30
length / cm	50.0	52.1	54.1	56.3

Which subtraction should be made to find the extension caused by the 20N load?

- A $54.1\text{ cm} - 0\text{ cm}$
- B $54.1\text{ cm} - 50.0\text{ cm}$
- C $54.1\text{ cm} - 52.1\text{ cm}$
- D $56.3\text{ cm} - 54.1\text{ cm}$

31 The arrow in each picture shows the direction of the force exerted by a person.

Which picture shows work being done?

A



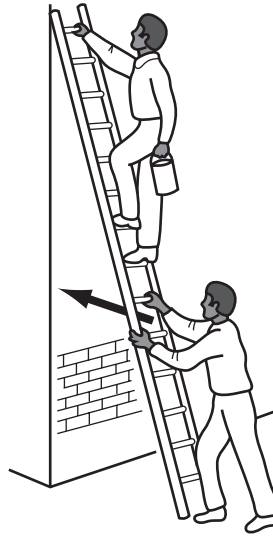
standing holding
a bag

B



lifting
a box

C



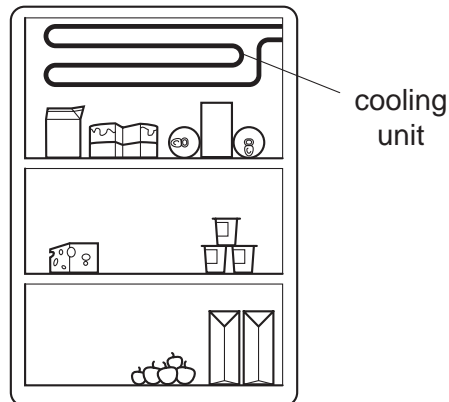
holding
a ladder

D



sitting on
a chair

32 The diagram shows a cooling unit in a refrigerator.



Why is the cooling unit placed at the top?

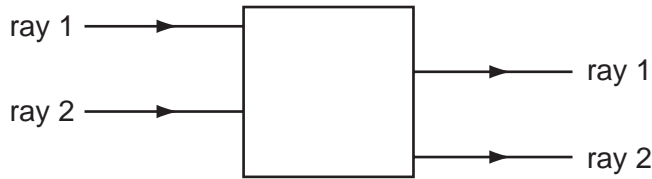
- A Cold air falls and warm air is displaced upwards.
- B Cold air is a bad conductor so heat is not conducted into the refrigerator.
- C Cold air is a good conductor so heat is conducted out of the refrigerator.
- D Cold air stops at the top and so prevents convection.

33 At the end of a long race, a runner is wrapped in a thin, plastic blanket that has a shiny surface.

Which type of heat loss is the shiny surface intended to reduce?

- A conduction
- B convection
- C evaporation
- D radiation

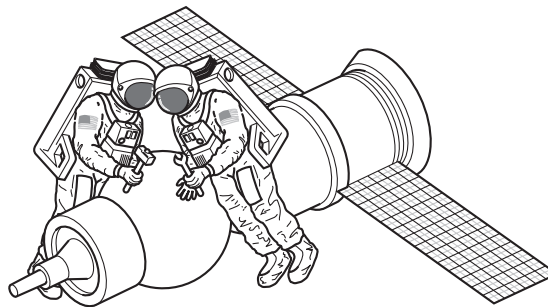
34 Rays of light enter and leave a box.



What could be inside the box to make the rays behave as shown?

- A a converging lens
- B a parallel-sided glass block
- C a plane mirror
- D a triangular prism

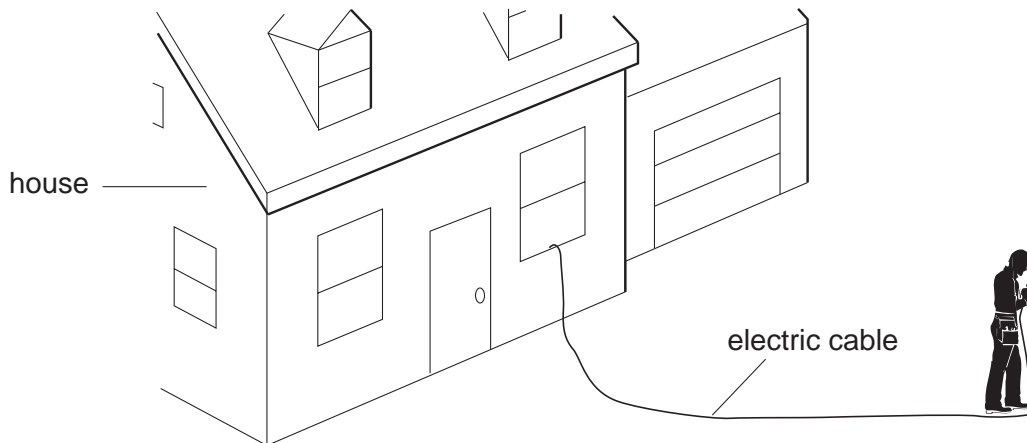
35 Two astronauts without radios can only communicate in space if their helmets are touching. There is no air in space.



What does this show about sound?

	through a solid	through a vacuum
A	can travel	can travel
B	can travel	cannot travel
C	cannot travel	can travel
D	cannot travel	cannot travel

36 A builder plugs an electric drill into a socket inside a house.



He uses the drill outdoors. It starts to rain heavily.

Why is it dangerous to continue using the electric drill in the rain?

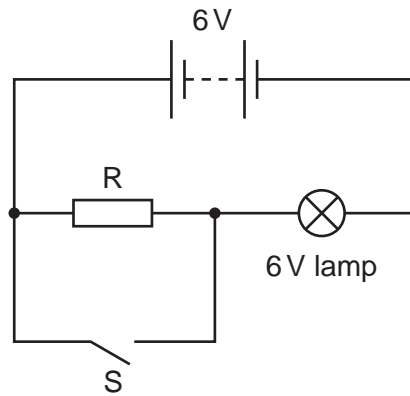
- A The drill could give the builder an electric shock.
- B The drill could overheat.
- C The fuse could blow.
- D The rain could rust the drill.

37 The table shows the voltage and current ratings for four electric heaters.

Which heater has the least resistance?

	voltage/V	current/A
A	110	5.0
B	110	10
C	230	5.0
D	230	10

38 When the circuit shown is connected with switch S open, the 6 V lamp glows.

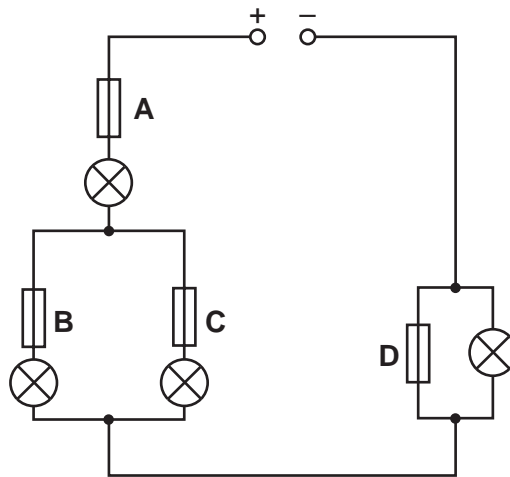


What happens to the brightness of the lamp when switch S is closed?

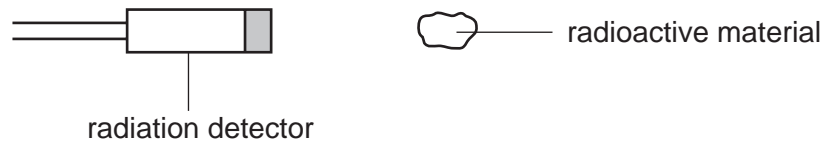
- A It becomes brighter.
- B It remains the same.
- C It becomes dimmer.
- D It goes off.

39 In the circuit shown, one of the fuses blows and all the lamps go out.

Which fuse blows?



- 40 A radiation detector is placed near a sample of radioactive material and is used to count rate.



The radioactive material is removed but there is still a count rate.

Why is this?

- A It takes a long time for all emissions from the material to reach the detector.
- B The detector has become radioactive.
- C The radioactive material has not finished decaying.
- D There is always some background radiation.

DATA SHEET
The Periodic Table of the Elements

		Group															
I	II	III	IV	V	VI	VII	O										
1 H Hydrogen											2 He Helium						
3 Li Lithium	4 Be Beryllium											10 Ne Neon					
11 Na Sodium	12 Mg Magnesium	13 Al Aluminium	14 Si Silicon	15 P Phosphorus	16 S Sulphur	17 Cl Chlorine	18 Ar Argon										
19 K Potassium	20 Ca Calcium	21 Sc Scandium	22 Ti Titanium	23 V Vanadium	24 Cr Chromium	25 Mn Manganese	26 Fe Iron	27 Co Cobalt	28 Ni Nickel	29 Cu Copper	30 Zn Zinc	31 Ga Gallium	32 Ge Germanium	33 As Arsenic	34 Se Selenium	35 Br Bromine	36 Kr Krypton
37 Rb Rubidium	38 Sr Strontium	39 Y Yttrium	40 Zr Zirconium	41 Nb Niobium	42 Mo Molybdenum	43 Tc Technetium	44 Ru Ruthenium	45 Rh Rhodium	46 Pd Palladium	47 Ag Silver	48 Cd Cadmium	49 In Indium	50 Sn Tin	51 Sb Antimony	52 Te Tellurium	53 I Iodine	54 Xe Xenon
55 Cs Caesium	56 Ba Barium	57 La Lanthanum	72 Hf Hafnium	73 Ta Tantalum	74 W Tungsten	75 Re Rhenium	76 Os Osmium	77 Ir Iridium	78 Pt Platinum	79 Au Gold	80 Hg Mercury	81 Tl Thallium	82 Pb Lead	83 Bi Bismuth	84 Po Polonium	85 At Astatine	86 Rn Radon
87 Fr Francium	88 Ra Radium	89 Ac Actinium															

140 Ce Cerium	141 Pr Praseodymium	144 Nd Neodymium	150 Sm Samarium	152 Eu Europium	157 Gd Gadolinium	162 Dy Dysprosium	165 Ho Holmium	167 Er Erbium	169 Tm Thulium	173 Yb Ytterbium	175 Lu Lutetium
90 Th Thorium	91 Pa Protactinium	92 U Uranium	94 Pu Plutonium	95 Am Americium	96 Cm Curium	98 Cf Californium	99 Es Einsteinium	100 Fm Fermium	101 Md Mendelevium	102 No Nobelium	103 Lr Lawrencium

*58-71 Lanthanoid series
90-103 Actinoid series

Key

a	X
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 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.).