



COMBINED SCIENCE

0653/11

Paper 1 Multiple Choice

May/June 2015

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, 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.

DO NOT WRITE IN ANY BARCODES.

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.

Electronic calculators may be used.

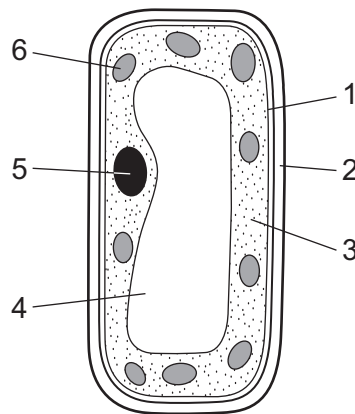
This document consists of **17** printed pages and **3** blank pages.

1 A biologist keeps a potted plant in a laboratory.

Which feature of the potted plant shows that it is a living organism?

- A It grows larger over time.
- B It has green leaves.
- C The compost in the pot dries after he waters it.
- D The stems contain xylem.

2 The diagram shows a palisade cell.



Which parts are found in plant cells and **not** in animal cells?

| | 1 | 2 | 3 | 4 | 5 | 6 |
|----------|---|---|---|---|---|---|
| A | ✓ | x | ✓ | ✓ | x | x |
| B | ✓ | x | ✓ | x | ✓ | x |
| C | x | ✓ | x | ✓ | x | ✓ |
| D | x | ✓ | x | x | ✓ | ✓ |

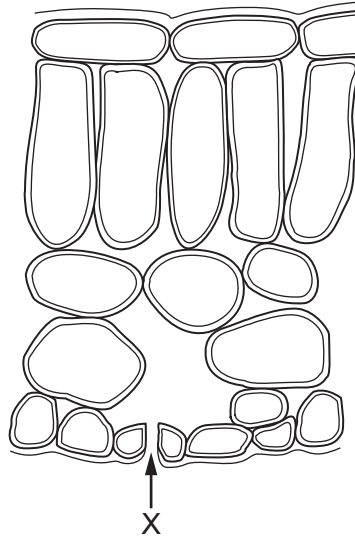
3 Which substances may diffuse into and out of plant cells?

| | into plant cells | out of plant cells |
|----------|------------------|--------------------|
| A | chlorophyll | oxygen |
| B | oxygen | water |
| C | starch | chlorophyll |
| D | water | starch |

4 Proteins that function as biological catalysts are called

- A enzymes
- B hormones
- C solvents
- D vitamins

5 The diagram shows a section through part of a leaf.



The leaf is photosynthesising in bright light.

What enters the leaf at X?

- A carbon dioxide
- B light
- C oxygen
- D water

- 6 Diagram 1 shows a water plant exposed to sunlight.

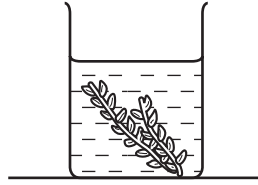
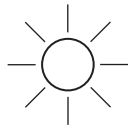


diagram 1

What change would take place if a black box is placed over the plant, as in diagram 2, and left for eight hours?

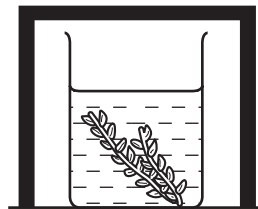
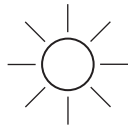
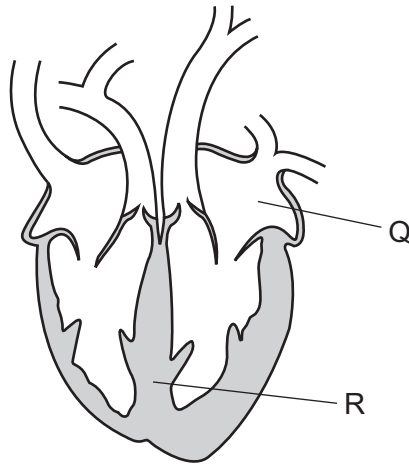


diagram 2

- A Carbon dioxide production would fall.
 - B Oxygen production would fall.
 - C Stomata would open wider.
 - D Respiration would stop.
- 7 A tree has lost most of its leaves.
- How does this affect the rate at which water is taken up by the trees?
- A Water uptake decreases but does not stop.
 - B Water uptake increases.
 - C Water uptake remains the same.
 - D Water uptake stops.

- 8 The diagram shows a heart in section and some of its blood vessels.



What are the parts Q and R?

| | Q | R |
|----------|--------|-----------|
| A | aorta | septum |
| B | aorta | vena cava |
| C | atrium | septum |
| D | atrium | vena cava |

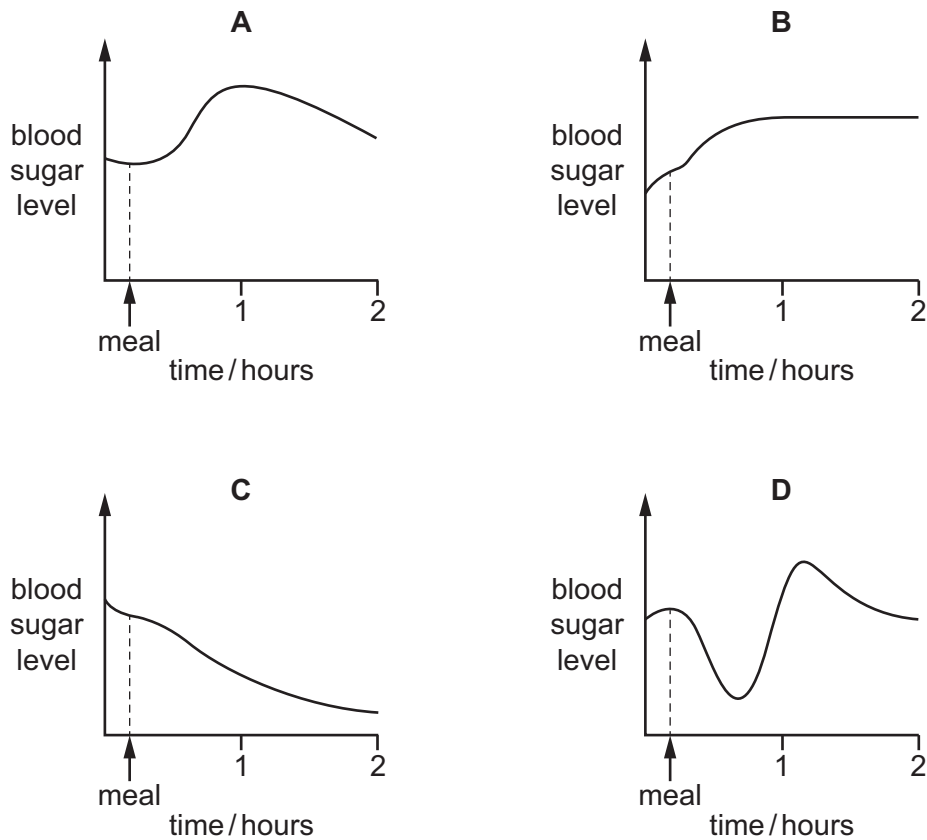
- 9 *Monstera* is a climbing plant. Some of its shoots grow away from light, which helps the plant to find support.

What is this an example of?

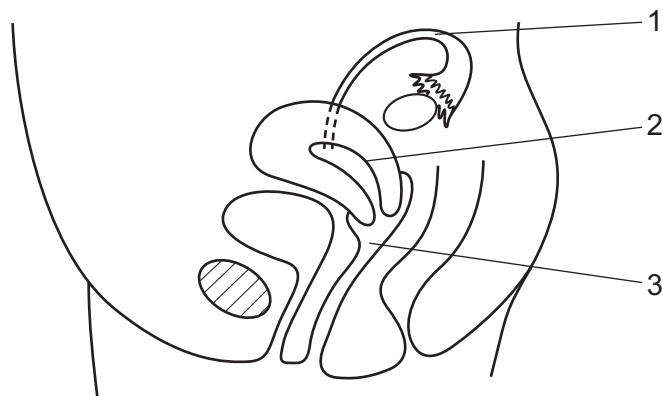
- A** geotropism
- B** photosynthesis
- C** phototropism
- D** respiration

10 A healthy 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?



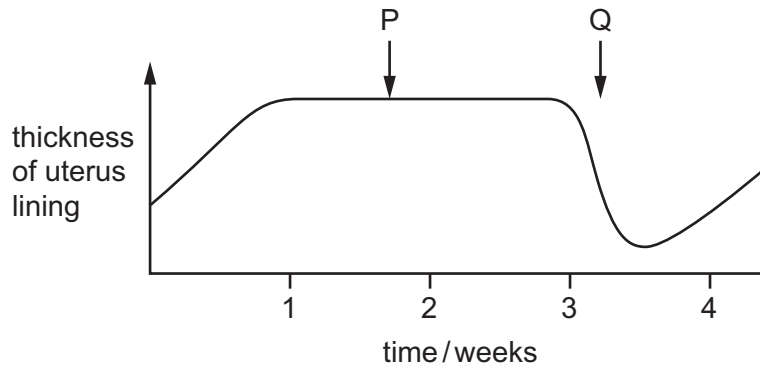
11 The diagram shows a side view of the female reproductive system in a human.



Where do fertilisation and implantation occur?

| | fertilisation | implantation |
|----------|---------------|--------------|
| A | 1 | 2 |
| B | 2 | 1 |
| C | 2 | 3 |
| D | 3 | 2 |

12 The diagram shows the thickness of the uterus lining of a woman over a 4-week period.



What happens at P and Q?

| | P | Q |
|----------|---------------|---------------|
| A | fertilisation | ovulation |
| B | menstruation | fertilisation |
| C | menstruation | ovulation |
| D | ovulation | menstruation |

13 An oxpecker bird perches on the back of a buffalo while the buffalo feeds on grass. The bird eats ticks that feed on the blood of the buffalo.

Which food chain represents these feeding relationships?

- A** grass → buffalo → oxpecker → ticks
- B** grass → buffalo → ticks → oxpecker
- C** oxpecker → ticks → buffalo → grass
- D** ticks → oxpecker → buffalo → grass

14 Which method is used to obtain a solid salt from the salt solution?

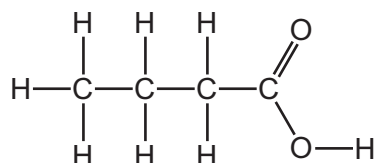
- A** crystallisation
- B** distillation
- C** filtration
- D** fractional distillation

15 Fluorine and chlorine are in Group VII of the Periodic Table.

Which number increases by eight from fluorine to chlorine?

- A the number of atoms in one molecule
- B the number of electrons in one atom
- C the number of electrons in one molecule
- D the number of nucleons in one atom

16 The structure of an organic compound is shown.



What is the formula of the compound?

- A $C_3H_8O_2$
- B C_4H_8O
- C $C_4H_8O_2$
- D $C_3H_7O_2$

17 Which substances are formed at the electrodes during the electrolysis of aqueous copper chloride?

| | anode | cathode |
|----------|----------|----------|
| A | chlorine | copper |
| B | chlorine | hydrogen |
| C | copper | chlorine |
| D | hydrogen | copper |

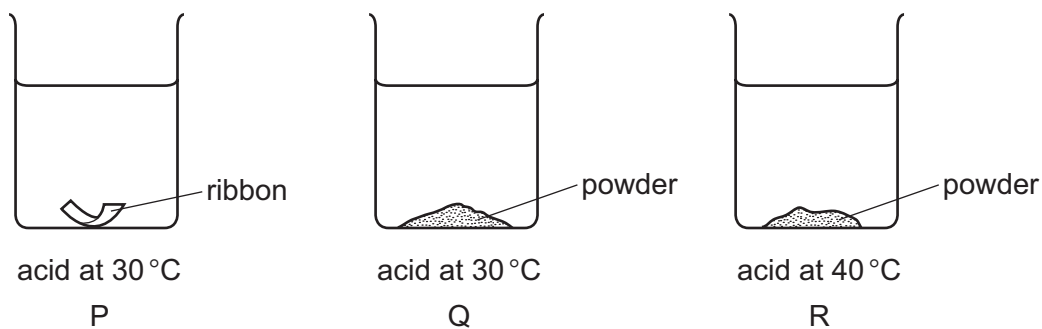
18 Sherbet is a mixture of citric acid and sodium hydrogencarbonate.

When sherbet is eaten, the chemicals react and cool the tongue.

Which word describes this type of reaction?

- A combustion
- B crystallisation
- C endothermic
- D exothermic

- 19 The diagram shows equal masses of magnesium added to equal volumes of acid of the same concentration.



What is the order of the speed of reaction?

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

- 20 In the blast furnace, iron(III) oxide reacts with carbon forming iron and carbon monoxide.

What happens to the iron(III) oxide?

- A** It is oxidised by gaining oxygen.
B It is oxidised by losing oxygen.
C It is reduced by gaining oxygen.
D It is reduced by losing oxygen.

- 21 The table shows the results of tests on an aqueous solution of X.

| test | result |
|------------------------|--------------------------|
| blue litmus paper | turns red |
| aqueous silver nitrate | white precipitate formed |

What is X?

- A** HCl **B** HNO_3 **C** NaCl **D** NaOH

22 Which element has similar chemical properties to bromine?

- A argon
- B iodine
- C selenium
- D sulfur

23 An electrical cable contains a copper wire surrounded by a layer of plastic.

Which properties explain why copper and plastic are used in this cable?

| | copper | plastic |
|---|------------------------|------------------------|
| A | electrical conductor | electrical insulator |
| B | high melting point | low melting point |
| C | no reaction with acids | no reaction with acids |
| D | shiny surface | dull surface |

24 A new alloy is resistant to corrosion.

It costs about the same as aluminium but it is slightly poisonous.

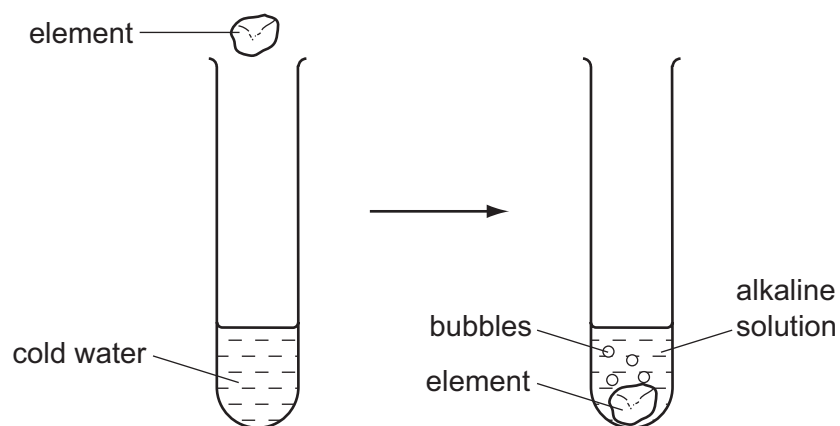
Its density, compared with stainless steel and aluminium, is shown.

| | aluminium | new alloy | stainless steel |
|-------------------------------------|-----------|-----------|-----------------|
| <u>density</u> g/cm ³ | 2.7 | 2.8 | 7.9 |

What is this new alloy used to make?

- A aircraft frames
- B cutlery
- C electrical insulators
- D food containers

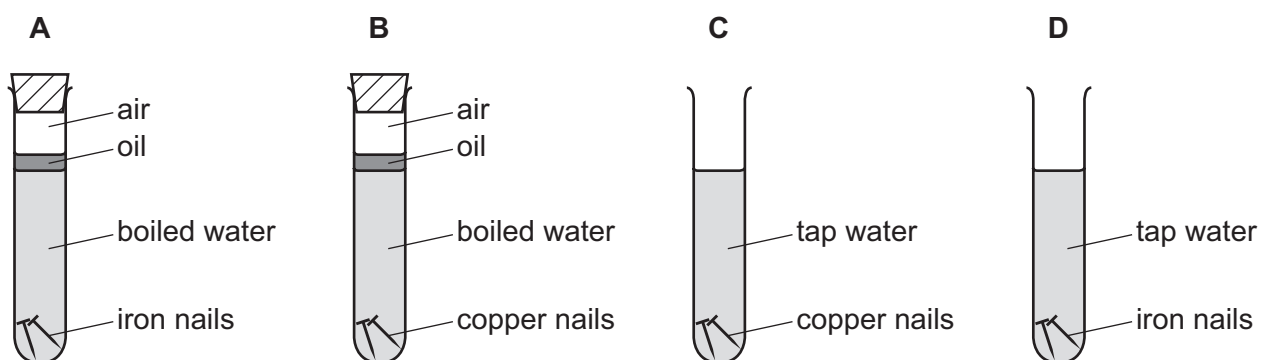
25 The diagram shows an element being added to cold water to form a gas and an alkaline solution.



What is the element?

- A calcium
- B carbon
- C copper
- D sulfur

26 In which test-tube does a chemical change take place most quickly?



27 Which compound is the main constituent of natural gas?

- A butane
- B ethane
- C methane
- D propane

28 An athlete runs 10 000 metres in 30 minutes.

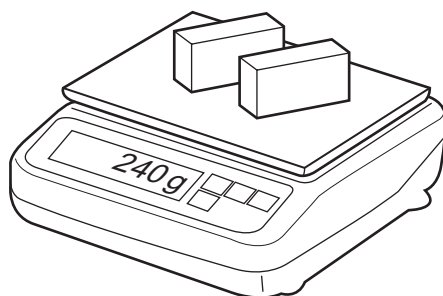
What is her average speed?

- A 3 km/hour
- B 5 km/hour
- C 10 km/hour
- D 20 km/hour

29 A shop-keeper places **two** identical blocks of cheese on a balance.

The combined mass of the two blocks of cheese is 240 g.

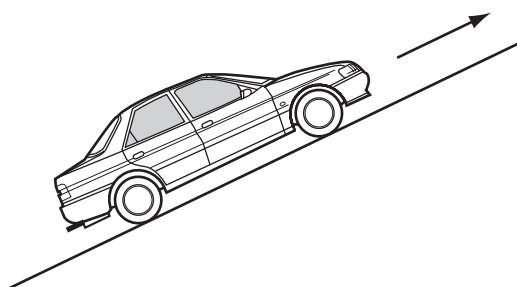
Each block measures 2.0 cm × 5.0 cm × 10.0 cm.



What is the density of the cheese?

- A 0.42 g/cm³
- B 0.83 g/cm³
- C 1.2 g/cm³
- D 2.4 g/cm³

30 The speed of a car increases as it moves up a hill.



Which energy changes are taking place?

| | gravitational energy | kinetic energy |
|----------|----------------------|----------------|
| A | decreasing | decreasing |
| B | increasing | decreasing |
| C | decreasing | increasing |
| D | increasing | increasing |

31 Cold water evaporates as molecules leave it.

Which molecules leave the water and from which part of the water do they leave?

| | molecules that leave the water | where they leave from |
|----------|--------------------------------|-----------------------|
| A | least energetic | the surface only |
| B | least energetic | throughout the water |
| C | most energetic | the surface only |
| D | most energetic | throughout the water |

32 The table shows the melting points and boiling points of four substances.

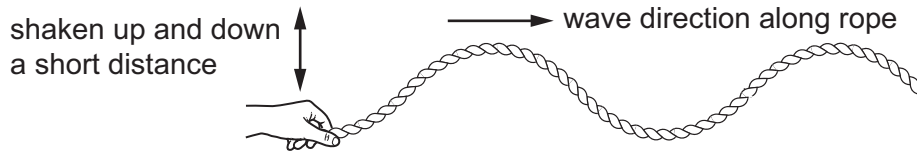
Which substance is a liquid at a room temperature of 20 °C?

| | melting point/°C | boiling point/°C |
|----------|------------------|------------------|
| A | -101 | -35 |
| B | -39 | 357 |
| C | 30 | 2100 |
| D | 327 | 1750 |

33 Which row is correct?

| | conduction of heat | convection of heat |
|----------|-----------------------------------|-----------------------------------|
| A | can happen in a solid | can happen in a solid |
| B | can happen in a solid | only happens in liquids and gases |
| C | only happens in liquids and gases | can happen in a solid |
| D | only happens in liquids and gases | only happens in liquids and gases |

34 A student shakes one end of a long rope up and down. A wave travels along the rope in the direction shown.

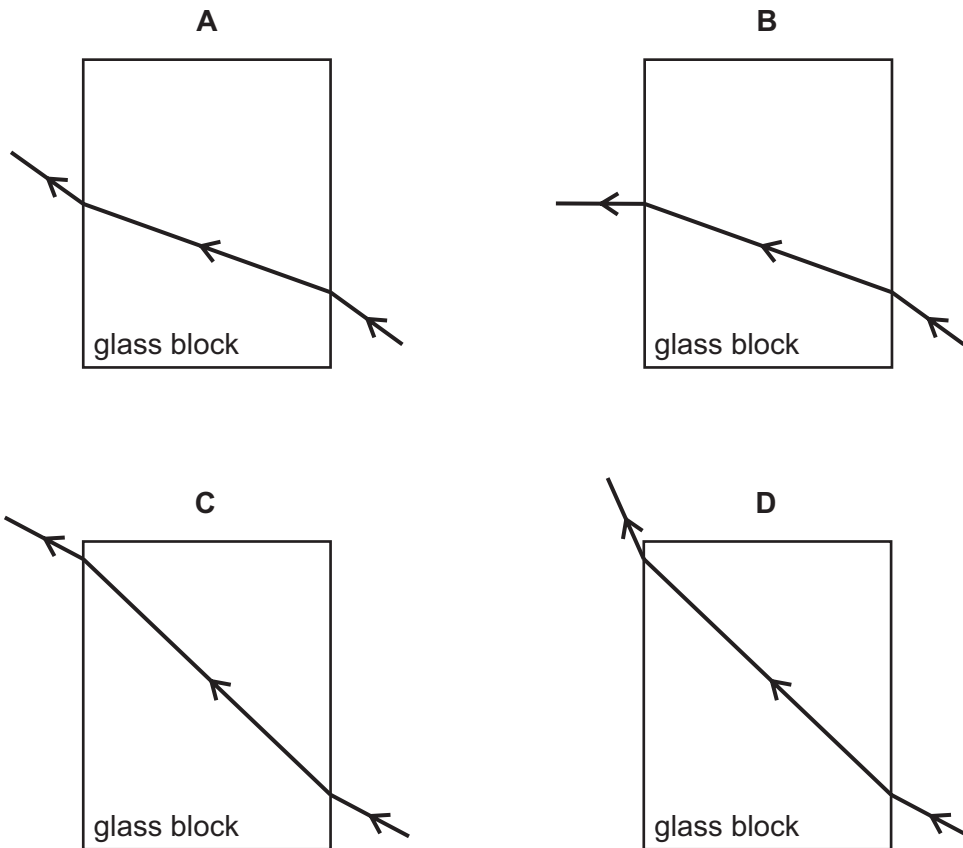


The student now moves the rope up and down through a larger distance. He also shakes it fewer times each minute.

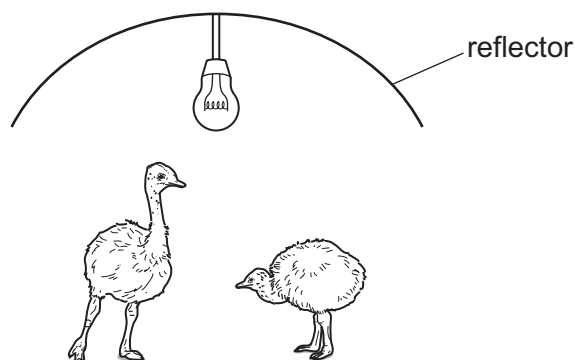
Which row shows the effects of these two changes?

| | amplitude of the wave | frequency of the wave |
|----------|-----------------------|-----------------------|
| A | decreases | decreases |
| B | decreases | increases |
| C | increases | decreases |
| D | increases | increases |

35 Which diagram shows a ray of light passing through a glass block in air?



36 A filament lamp is used in a zoo to keep young animals warm.



What are the main types of wave given out by the lamp?

- A visible light and infra-red
 - B visible light and microwaves
 - C visible light and radio waves
 - D visible light and X-rays
- 37 A loudspeaker is made to vibrate at four different frequencies.

Which frequency **cannot** produce a sound that a human can hear?

- A 60 Hz B 600 Hz C 6.0 kHz D 60 kHz

38 A mains circuit can safely supply a current of 40 A.

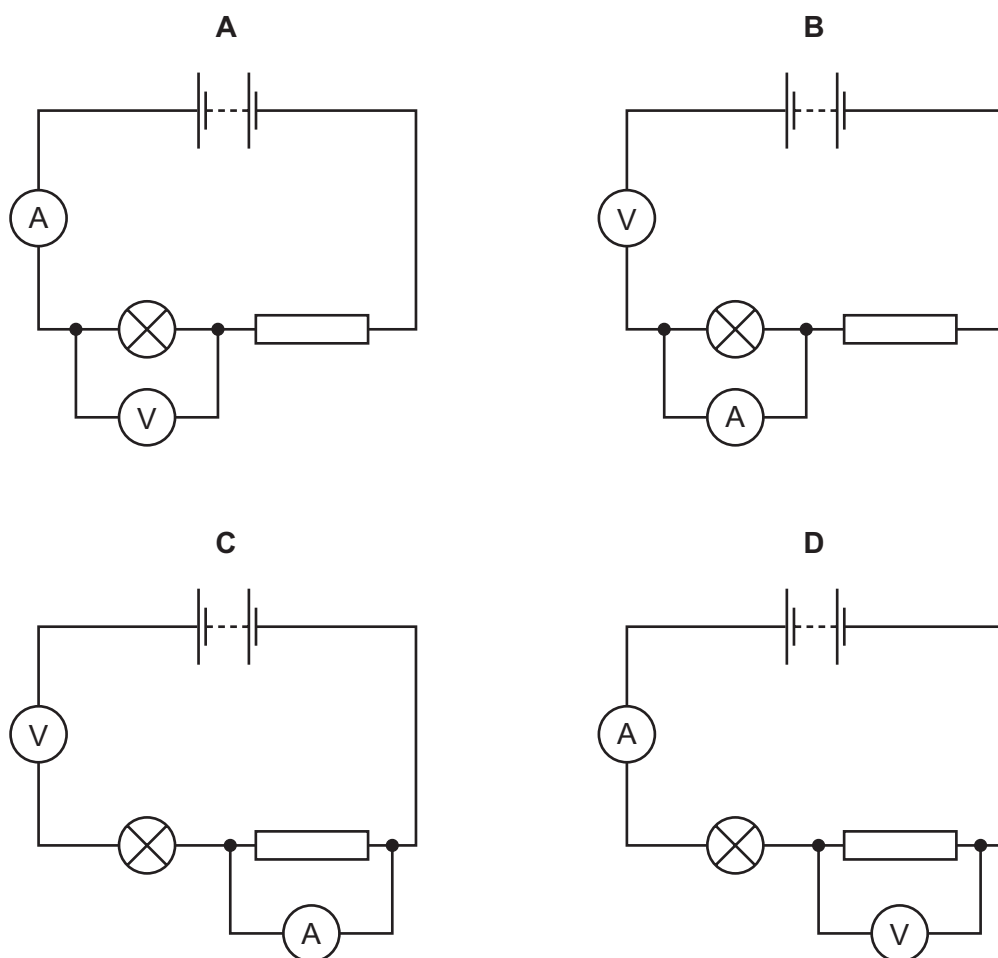
A hairdryer takes 2 A. It is connected to the circuit by a lead which can safely carry up to 5 A.

Which fuse should be used to protect the hairdryer?

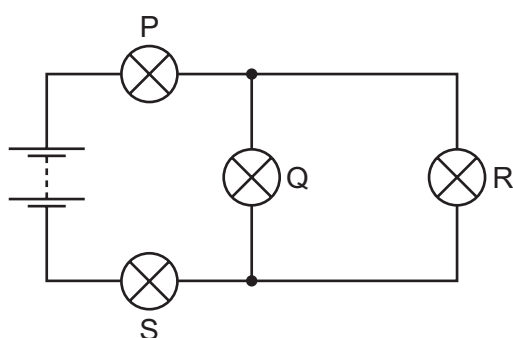
- A 1 A fuse B 3 A fuse C 10 A fuse D 50 A fuse

39 A voltmeter and an ammeter are used to determine the resistance of a lamp.

Which circuit shows the meters connected to take the necessary measurements?



40 The diagram shows a circuit with four identical bulbs P, Q, R and S.



Which statement about the brightness of the bulbs is correct?

- A P is the same brightness as Q.
- B P is the same brightness as S.
- C Q is brighter than S.
- D R is brighter than P.

DATA SHEET
The Periodic Table of the Elements

| | | Group | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|------------------------------------|-------------------------------------|-------------------------------------|------------------------------------|-----------------------------------|-------------------------------------|------------------------------------|------------------------------------|-----------------------------------|-------------------------------------|------------------------------------|----------------------------------|------------------------------------|--|-------------------------------------|------------------------------------|------------------------------------|--------------------------------------|--------------------------------------|-------------------------------------|-------------------------------------|-----------------------------------|-------------------------------------|---------------------------------------|---------------------------------------|------------------------------------|--|-------------------------------------|---------------------------------------|--|--|
| I | II | III | IV | V | VI | VII | 0 | | | | | 0 | | | | | | | | | | | | | | | | | | | |
| | | 1 H Hydrogen 1 | | | | | | | | | | | 4 He Helium 2 | | | | | | | | | | | | | | | | | | |
| 7 Li Lithium 3 | 9 Be Beryllium 4 | | | | | | | | | | | 20 Ne Neon 10 | | | | | | | | | | | | | | | | | | | |
| 23 Na Sodium 11 | 24 Mg Magnesium 12 | 27 Al Aluminium 13 | 28 Si Silicon 14 | 31 P Phosphorus 15 | 32 S Sulfur 16 | 35.5 Cl Chlorine 17 | 40 Ar Argon 18 | | | | | 84 Kr Krypton 36 | | | | | | | | | | | | | | | | | | | |
| 39 K Potassium 19 | 40 Ca Calcium 20 | 70 Ga Gallium 31 | 73 Ge Germanium 32 | 75 As Arsenic 33 | 79 Se Selenium 34 | 80 Br Bromine 35 | 84 Kr Krypton 36 | | | | | 131 Xe Xenon 54 | | | | | | | | | | | | | | | | | | | |
| 85 Rb Rubidium 37 | 88 Sr Strontium 38 | 101 Ru Ruthenium 44 | 106 Pd Palladium 46 | 108 Ag Silver 47 | 112 Cd Cadmium 48 | 115 In Indium 49 | 119 Sn Tin 50 | 122 Sb Antimony 51 | 127 I Iodine 53 | 128 Te Tellurium 52 | 131 Xe Xenon 54 | | | | | | | | | | | | | | | | | | | | |
| 133 Cs Caesium 55 | 137 Ba Barium 56 | 186 Os Osmium 76 | 190 Ir Iridium 77 | 192 Pt Platinum 78 | 195 Au Gold 79 | 201 Hg Mercury 80 | 204 Tl Thallium 81 | 207 Pb Lead 82 | 209 Bi Bismuth 83 | 210 Po Polonium 84 | 210 At Astatine 85 | 210 Rn Radon 86 | | | | | | | | | | | | | | | | | | | |
| 226 Fr Francium 87 | 226 Ra Radium 88 | 227 Ac Actinium 89 | | | | | | | | | | | 227 Ac Actinium 89 | | | | | | | | | | | | | | | | | | |
| <p>*58-71 Lanthanoid series †90-103 Actinoid series</p> | | | | | | | | | | | | | 140 Ce Cerium 58 | 141 Pr Praseodymium 59 | 144 Nd Neodymium 60 | 150 Sm Samarium 62 | 152 Eu Europium 63 | 157 Gd Gadolinium 64 | 162 Dy Dysprosium 66 | 165 Ho Holmium 67 | 167 Er Erbium 68 | 169 Tm Thulium 69 | 173 Yb Ytterbium 70 | 175 Lu Lutetium 71 | | | | | | | |
| <p>Key</p> <table style="display: inline-table; border: 1px solid black; padding: 5px;"> <tr> <td style="padding: 0 5px;">a</td> <td style="padding: 0 5px;">X</td> </tr> <tr> <td style="padding: 0 5px;">b</td> <td style="padding: 0 5px;"></td> </tr> </table> <p>a = relative atomic mass X = atomic symbol b = proton (atomic) number</p> | | | | | | | | | | | | | a | X | b | | 232 Th Thorium 90 | 238 U Uranium 92 | 238 Np Neptunium 93 | 238 Pu Plutonium 94 | 238 Am Americium 95 | 238 Cm Curium 96 | 238 Bk Berkelium 97 | 238 Cf Californium 98 | 238 Es Einsteinium 99 | 238 Fm Fermium 100 | 238 Md Mendelevium 101 | 238 No Nobelium 102 | 238 Lr Lawrencium 103 | | |
| a | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| b | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).