



Cambridge IGCSE™

COMBINED SCIENCE

Paper 1 Multiple Choice (Core)

0653/11

May/June 2021

45 minutes

You must answer on the multiple choice answer sheet.

You will need: Multiple choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

INSTRUCTIONS

- 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 multiple choice answer sheet.
- Follow the instructions on the multiple choice answer sheet.
- Write in soft pencil.
- Write your name, centre number and candidate number on the multiple choice answer sheet in the spaces provided unless this has been done for you.
- Do **not** use correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.

INFORMATION

- The total mark for this paper is 40.
- Each correct answer will score one mark.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

This document has **16** pages. Any blank pages are indicated.



- 1 A drawing of a cell is 80 mm in length and the magnification is $\times 200$.

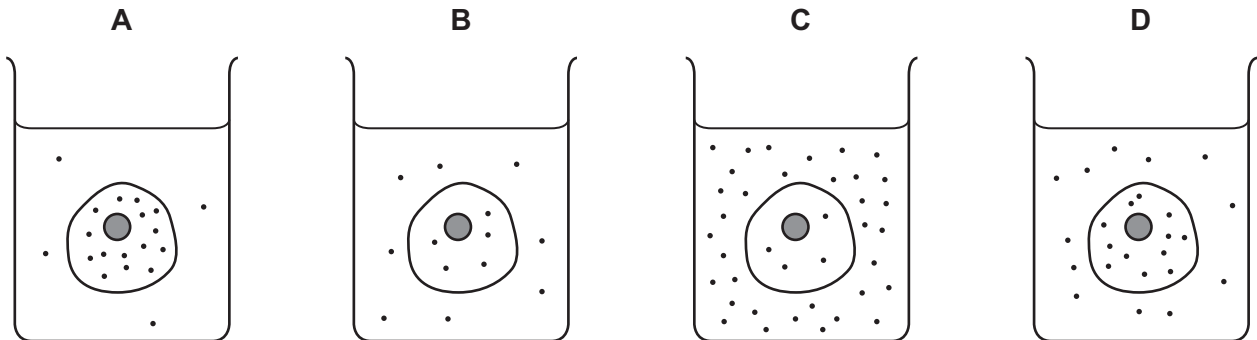
What is the actual size of the cell?

- A** 0.4 mm **B** 4.0 mm **C** 1.6 mm **D** 16.0 mm

- 2 The diagrams represent four similar animal cells immersed in blood plasma.

The black dots represent molecules of dissolved oxygen.

Which cell will have oxygen molecules diffusing into it most rapidly?

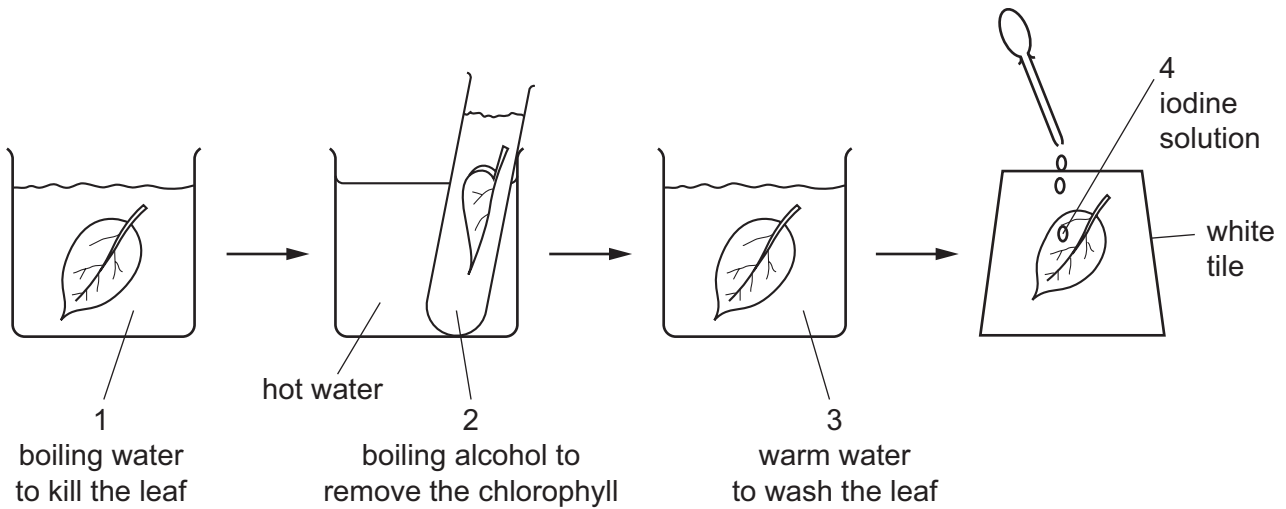


- 3 Which row shows the elements that occur in all proteins?

| | carbon | hydrogen | nitrogen | oxygen |
|----------|--------|----------|----------|--------|
| A | yes | yes | yes | no |
| B | yes | yes | no | yes |
| C | yes | no | yes | yes |
| D | yes | yes | yes | yes |

4 The flow diagram shows the stages in testing a green leaf for starch.

1, 2, 3 and 4 are all liquids.



What are the colours of liquids 2 and 4 for a leaf that contains starch?

| | 2 | 4 |
|----------|------------|--------------|
| A | green | blue / black |
| B | colourless | brown |
| C | colourless | blue / black |
| D | green | brown |

5 A person is diagnosed with scurvy.

The table shows the content of vitamin C, vitamin D, calcium and iron in four different foods.

Which food should the person eat to help reduce scurvy?

| | vitamin C / % | vitamin D / % | calcium / % | iron / % |
|----------|------------------|------------------|----------------|-------------|
| A | 0 | 6 | 72 | 3 |
| B | 88 | 0 | 4 | 0 |
| C | 3 | 0 | 5 | 10 |
| D | 0 | 54 | 12 | 15 |

- 6 This statement is about chemical digestion.

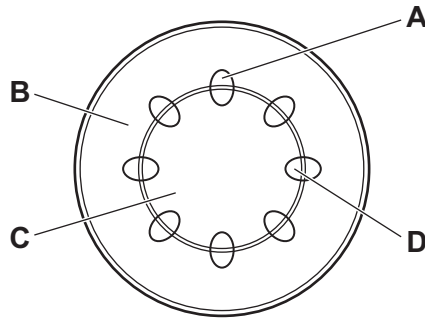
In the alimentary canal chemical digestion takes place in order to produce1..... ,2..... molecules so that they can be3..... .

Which words correctly complete gaps 1, 2 and 3?

| | 1 | 2 | 3 |
|----------|-------|-----------|----------|
| A | large | insoluble | ingested |
| B | small | soluble | absorbed |
| C | large | soluble | egested |
| D | small | insoluble | absorbed |

- 7 The diagram shows a cross-section of a plant stem.

Which label indicates the tissue responsible for the transport of water through the plant?



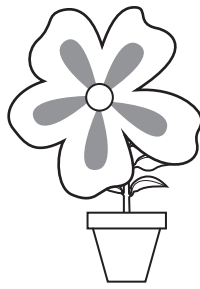
- 8 Which equation represents aerobic respiration?

- A** carbon dioxide + glucose \rightarrow oxygen + water
B carbon dioxide + water \rightarrow glucose + oxygen
C glucose + oxygen \rightarrow carbon dioxide + water
D glucose + water \rightarrow carbon dioxide + oxygen

- 9 What are effects of increased adrenaline production in humans?

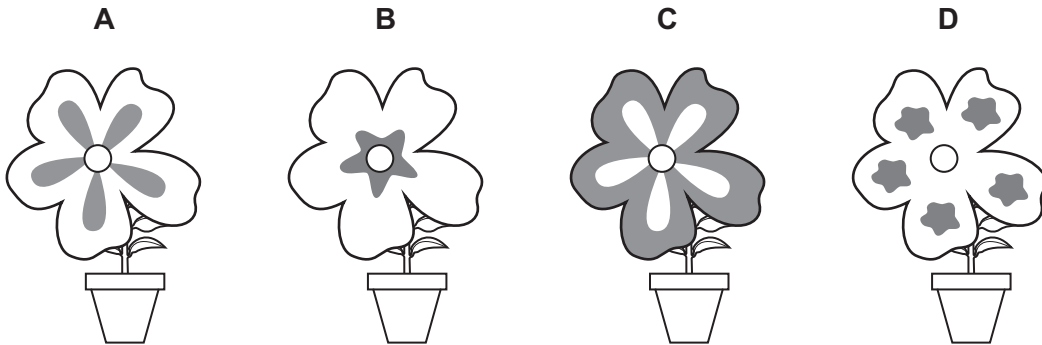
- A** increased rate of breathing and increased pulse rate
B increased rate of breathing and narrower pupils
C slower pulse rate and narrower pupils
D slower pulse rate and wider pupils

10 The diagram shows a parent plant.

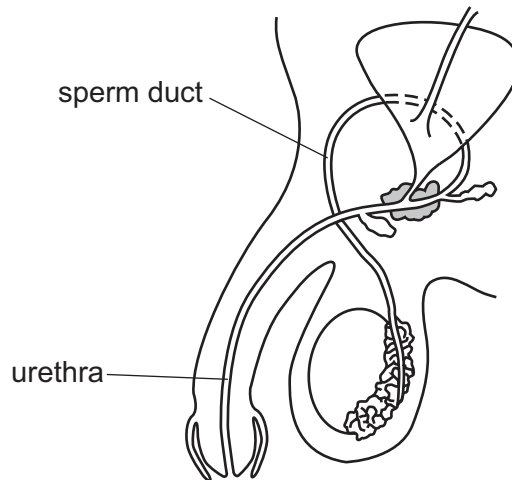


parent plant

Which offspring has been produced by asexual reproduction from this plant?



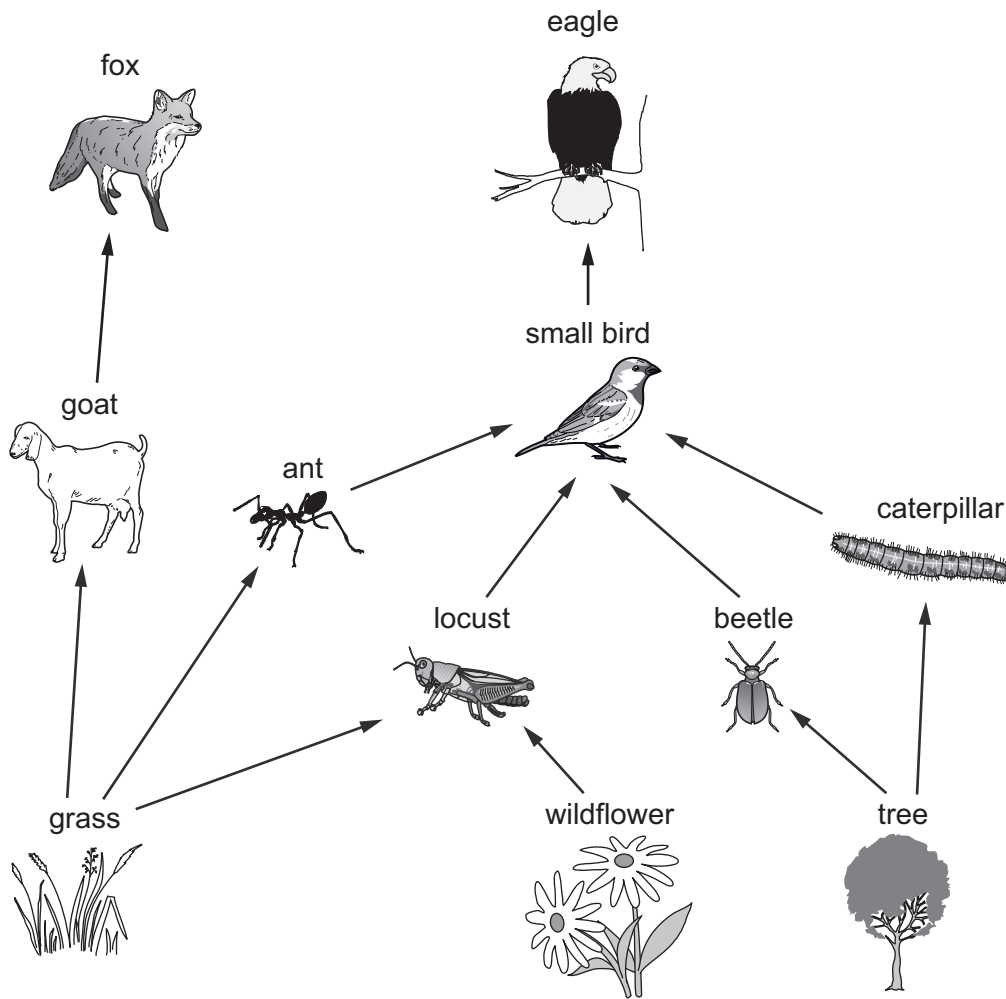
11 The diagram shows the male reproductive organs.



What is transported by the sperm duct and the urethra?

| | sperm duct | urethra |
|----------|------------|-----------------|
| A | sperm | semen and urine |
| B | sperm | urine only |
| C | urine | semen and urine |
| D | urine | semen only |

12 The diagram shows a food web.



How many species are primary consumers in this food web?

- A** 2 **B** 3 **C** 4 **D** 5

13 Which process takes carbon dioxide out of the air?

- A** combustion
B decomposition
C photosynthesis
D plant respiration

14 A fixed mass of argon gas in a sealed container is heated.

The pressure inside the container increases.

Which statement explains why the pressure increases?

- A There is an increase in the number of gaseous particles inside the container.
- B There is an increase in the number of collisions per second between the particles of gas and the walls of the container.
- C The particles of gas have less energy and collide with the wall of the container more frequently.
- D There is a decrease in the space that the particles have to move in.

15 What is an example of a physical change?

- A carbon dioxide turning limewater milky
- B the crystallisation of copper(II) sulfate from solution
- C the electrolysis of molten lead(II) bromide
- D the thermal decomposition of calcium carbonate

16 Which row about elements and compounds is correct?

| | elements | compounds |
|---|--------------------------|---------------------------------|
| A | are metals only | contain ionic or covalent bonds |
| B | are non-metals only | contain covalent bonds only |
| C | are metals or non-metals | contain ionic bonds only |
| D | are metals or non-metals | contain ionic or covalent bonds |

17 Dilute sulfuric acid is electrolysed using inert electrodes.

Which statement is correct?

- A Hydrogen is produced at the anode.
- B Both hydrogen and oxygen are produced at the negative electrode.
- C Sulfur dioxide is produced at the cathode.
- D Oxygen is produced at the positive electrode.

- 18 Some calcium carbonate and dilute hydrochloric acid start to react. Water is then added to the reaction mixture.

What happens to the rate of the reaction?

- A It decreases.
 - B It increases.
 - C It stays the same.
 - D It stops.
- 19 Barium hydroxide is an alkali.
- Which statement about barium hydroxide is correct?
- A It has a pH greater than 7 in aqueous solution.
 - B It reacts with aqueous sodium hydroxide.
 - C It reacts with metal carbonates.
 - D It turns Universal Indicator red.
- 20 Which two substances form a white precipitate when they are mixed?
- A barium chloride and hydrochloric acid
 - B barium chloride and nitric acid
 - C silver nitrate and hydrochloric acid
 - D silver nitrate and nitric acid

- 21 There are eight elements in Period 3 of the Periodic Table.

| | | | | | | | |
|----|----|----|----|---|---|----|----|
| Na | Mg | Al | Si | P | S | Cl | Ar |
|----|----|----|----|---|---|----|----|

Which statement about the elements in this period is correct?

- A The elements become less metallic across the period.
- B The most metallic elements are at both ends of the period.
- C The most metallic elements are in the middle of the period.
- D There is no pattern in metallic character across the period.

22 What are properties of transition elements?

- 1 They can act as catalysts.
- 2 They only form white compounds.
- 3 They have high densities.

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

23 Which words describe a noble gas?

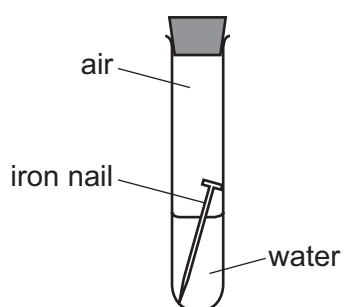
- A** compound, colourless, does not burn in air
B element, colourless, burns in air
C element, colourless, does not burn in air
D element, green, does not burn in air

24 Which substances conduct electricity when molten?

- 1 sodium chloride
- 2 naphtha
- 3 brass

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

25 An iron nail is left for a few days in a sealed test-tube containing air and water.



Which change in the air in the test-tube occurs as the iron nail rusts?

- A** The amount of carbon dioxide decreases.
B The amount of carbon dioxide increases.
C The amount of nitrogen increases.
D The amount of oxygen decreases.

26 Which type of compound contains only carbon and hydrogen?

- A carbohydrate
- B carbonate
- C hydrocarbon
- D hydroxide

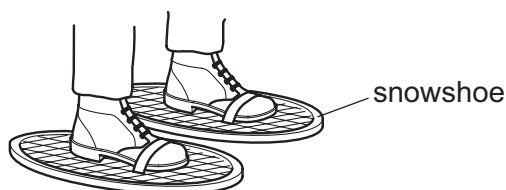
27 Which statement about ethene is **not** correct?

- A It is used to make an addition polymer.
- B It decolourises aqueous bromine.
- C It is a saturated hydrocarbon.
- D It is formed by cracking larger alkanes.

28 Which row shows apparatus used to measure length, time and volume?

| | length | time | volume |
|----------|--------------------|--------------------|--------------------|
| A | measuring cylinder | metre rule | stop-clock |
| B | measuring cylinder | stop-clock | metre rule |
| C | metre rule | measuring cylinder | stop-clock |
| D | metre rule | stop-clock | measuring cylinder |

29 Snowshoes make walking over snow easier than when wearing normal shoes.



Why do the snowshoes make it easier to walk over snow?

- A They decrease the pressure acting on the snow.
- B They decrease the weight acting on the snow.
- C They increase the pressure acting on the snow.
- D They increase the weight acting on the snow.

30 A boy runs up some stairs.

Which two physical quantities are used to calculate the power he develops?

- A his mass and his acceleration
- B his mass and the time taken
- C the work done and the time taken
- D the work done and the vertical distance moved

31 Which row contains a renewable and a non-renewable energy resource in the correct column?

| | renewable | non-renewable |
|----------|------------|---------------|
| A | geothermal | wind |
| B | geothermal | coal |
| C | oil | wind |
| D | oil | coal |

32 Cold water evaporates as molecules leave it.

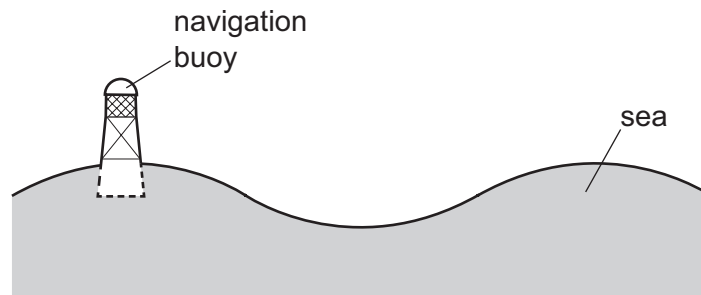
Which molecules leave the water and from which part of the water do they leave?

| | 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 |

33 What is a property of infra-red radiation?

- A It can only travel in a gas.
- B It can only travel in a metal.
- C It can only travel in liquids and gases.
- D It can travel through a vacuum.

- 34 A navigation buoy floating on the sea oscillates up and down as a wave passes.



In 2.0 minutes, 6.0 wavelengths pass the buoy.

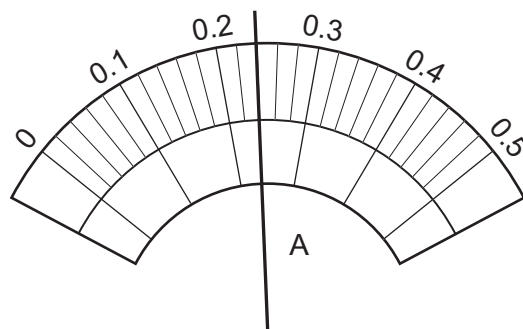
What is the frequency of the waves?

- A** 0.050 Hz **B** 0.33 Hz **C** 3.0 Hz **D** 20 Hz
- 35 Radio waves and gamma rays are travelling in a vacuum.

How do the frequency and speed of the radio waves compare with the frequency and speed of the gamma rays?

| | frequency of radio waves | speed of radio waves |
|----------|--------------------------|----------------------|
| A | higher than gamma | greater than gamma |
| B | higher than gamma | same as gamma |
| C | lower than gamma | greater than gamma |
| D | lower than gamma | same as gamma |

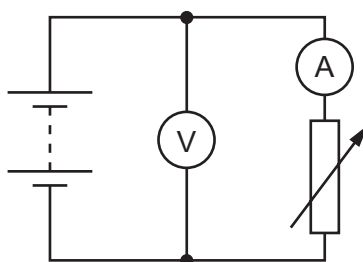
- 36 The diagram shows the scale of an analogue ammeter.



What is the reading on the ammeter?

- A** 0.22 A **B** 0.24 A **C** 0.27 A **D** 0.36 A

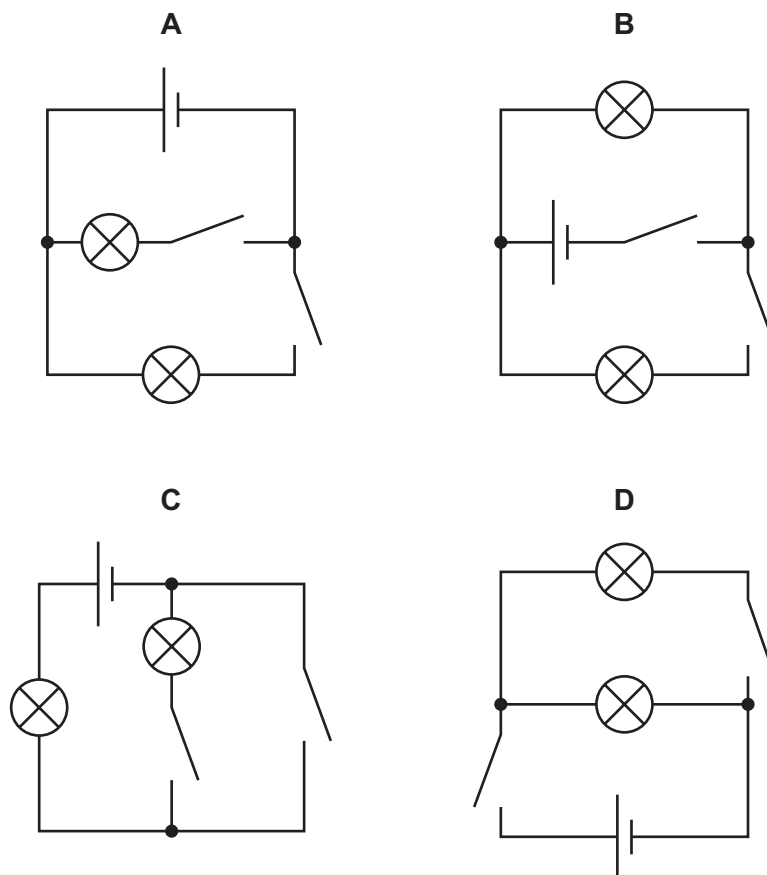
- 37 The diagram represents a circuit that includes a battery, an ammeter, a voltmeter and a variable resistor.



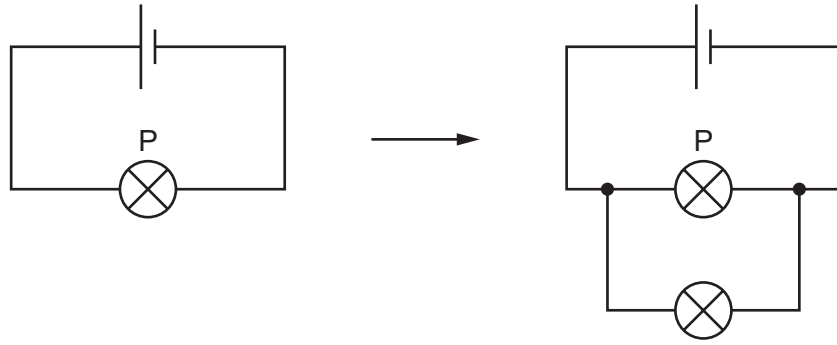
What happens to the readings on the meters as the resistance of the variable resistor is increased?

| | ammeter reading | voltmeter reading |
|----------|-----------------|-------------------|
| A | decreases | decreases |
| B | decreases | stays constant |
| C | increases | decreases |
| D | increases | stays constant |

- 38 Which circuit allows each lamp to be switched on and off independently of the other lamp?



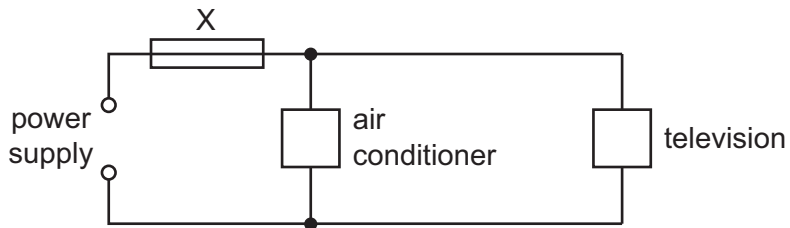
- 39 Lamp P is connected to a cell. A second lamp is then connected in parallel with lamp P.



How does this change affect the brightness of lamp P and how does it affect the current in the cell?

| | brightness of lamp P | current in cell |
|----------|----------------------|-----------------|
| A | less bright | greater |
| B | less bright | unchanged |
| C | unchanged | greater |
| D | unchanged | unchanged |

- 40 An air conditioner and a television are both connected to the same electrical circuit.



The current in the air conditioner is 9.0 A and the current in the television is 2.0 A.

Several different fuses are available.

Which fuse should be connected at X?

- A** 1 A **B** 3 A **C** 7 A **D** 13 A

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The Periodic Table of Elements

| | | Group | | | | | | | | | | | | | | | | | |
|----------------------------|-----------------------------|---|---------------------------------|-----------------------------|------------------------------|------------------------------|------------------------------|------------------------------|--------------------------------|-------------------------------|-------------------------------|-----------------------------|-------------------------------|-----------------------------|------------------------------|---------------------------|--------------------------|--|--|
| I | II | III | IV | V | VI | VII | VIII | | | | | | | | | | | | |
| 3 Li lithium 7 | 4 Be beryllium 9 | <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> Key atomic number atomic symbol name relative atomic mass </div> | | | | | | | | 2 He helium 4 | | | | | | | | | |
| 11 Na sodium 23 | 12 Mg magnesium 24 | | | | | | | | | 5 B boron 11 | 6 C carbon 12 | 7 N nitrogen 14 | 8 O oxygen 16 | 9 F fluorine 19 | 10 Ne neon 20 | | | | |
| 19 K potassium 39 | 20 Ca calcium 40 | 13 Al aluminium 27 | 14 Si silicon 28 | 15 P phosphorus 31 | 16 S sulfur 32 | 17 Cl chlorine 35.5 | 18 Ar argon 40 | | | | | | | | | | | | |
| 37 Rb rubidium 85 | 38 Sr strontium 88 | 31 Ga gallium 70 | 32 Ge germanium 73 | 33 As arsenic 75 | 34 Se selenium 79 | 35 Br bromine 80 | 36 Kr krypton 84 | | | | | | | | | | | | |
| 55 Cs caesium 133 | 56 Ba barium 137 | 39 Y yttrium 89 | 40 Zr zirconium 91 | 41 Nb niobium 93 | 42 Mo molybdenum 96 | 43 Tc technetium — | 44 Ru ruthenium 101 | 45 Rh rhodium 103 | 46 Pd palladium 106 | 47 Ag silver 108 | 48 Cd cadmium 112 | 49 In indium 115 | 50 Sn tin 119 | 51 Sb antimony 122 | 52 Te tellurium 128 | 53 I iodine 127 | 54 Xe xenon 131 | | |
| 87 Fr francium — | 88 Ra radium — | 57–71 lanthanoids | 72 Hf hafnium 178 | 73 Ta tantalum 181 | 74 W tungsten 184 | 75 Re rhenium 186 | 76 Os osmium 190 | 77 Ir iridium 192 | 78 Pt platinum 195 | 79 Au gold 197 | 80 Hg mercury 201 | 81 Tl thallium 204 | 82 Pb lead 207 | 83 Bi bismuth 209 | 84 Po polonium — | 85 At astatine — | 86 Rn radon — | | |
| | | 89–103 actinoids | 104 Rf rutherfordium — | 105 Db dubnium — | 106 Sg seaborgium — | 107 Bh bohrium — | 108 Hs hassium — | 109 Mt meitnerium — | 110 Ds darmstadtium — | 111 Rg roentgenium — | 112 Cn copernicium — | 114 Fl flerovium — | 116 Lv livermorium — | | | | | | |

| | | | | | | | | | | | | | | | |
|-------------|------------------------------|----------------------------|---------------------------------|------------------------------|-----------------------------|-----------------------------|-----------------------------|-------------------------------|----------------------------|-------------------------------|------------------------------|---------------------------|-------------------------------|------------------------------|------------------------------|
| lanthanoids | 57 La lanthanum 139 | 58 Ce cerium 140 | 59 Pr praseodymium 141 | 60 Nd neodymium 144 | 61 Pm promethium — | 62 Sm samarium 150 | 63 Eu europium 152 | 64 Gd gadolinium 157 | 65 Tb terbium 159 | 66 Dy dysprosium 163 | 67 Ho holmium 165 | 68 Er erbium 167 | 69 Tm thulium 169 | 70 Yb ytterbium 173 | 71 Lu lutetium 175 |
| actinoids | 89 Ac actinium — | 90 Th thorium 232 | 91 Pa protactinium 231 | 92 U uranium 238 | 93 Np neptunium — | 94 Pu plutonium — | 95 Am americium — | 96 Cm curium — | 97 Bk berkelium — | 98 Cf californium — | 99 Es einsteinium — | 100 Fm fermium — | 101 Md mendelevium — | 102 No nobelium — | 103 Lr lawrencium — |

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