



Cambridge Assessment International Education
Cambridge Ordinary Level

COMBINED SCIENCE

5129/11

Paper 1 Multiple Choice

October/November 2019

1 hour

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 16.

Electronic calculators may be used.

This document consists of **14** printed pages and **2** blank pages.

- 1 A pupil looks at a cell using a microscope.

The cell has chloroplasts and a cell wall.

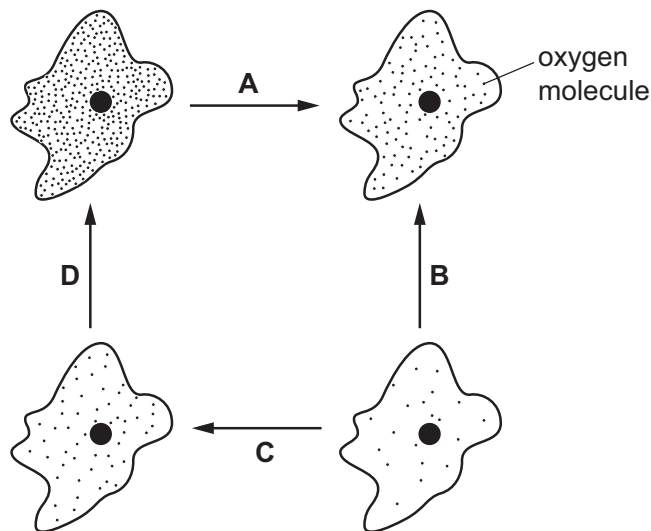
Which type of cell is it?

- A a liver cell
- B a mesophyll cell
- C a sperm cell
- D a white blood cell

- 2 The diagram shows four cells that contain oxygen molecules.

The concentration of oxygen in each cell is different.

In which direction do the oxygen molecules diffuse?



- 3 What is the name of the group of proteins which act as catalysts in biological reactions?

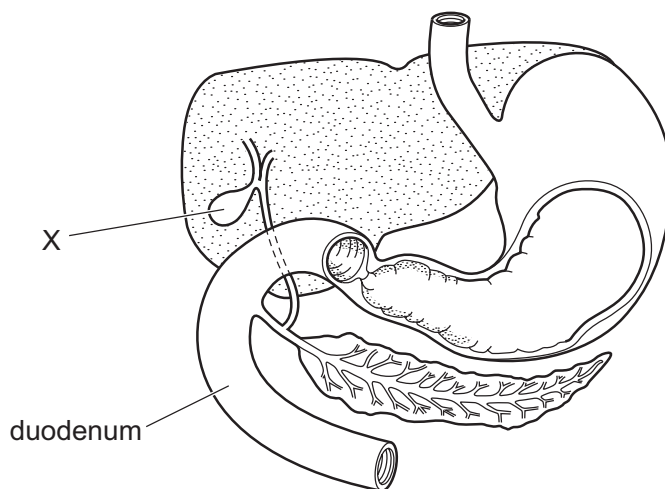
- A amino acids
- B carbohydrates
- C enzymes
- D hormones

- 4 A plant is grown in a pot. The nitrogen content of the soil is insufficient.

Which row about this plant is correct?

| | colour of leaves | condition of plant |
|----------|------------------|--------------------|
| A | dark green | poor plant growth |
| B | dark green | wilted leaves |
| C | pale yellow | poor plant growth |
| D | pale yellow | wilted leaves |

- 5 The diagram shows some organs in the human alimentary canal.



What is the function of X?

- A** to digest fats
 - B** to make enzymes
 - C** to store bile
 - D** to store urine
- 6 Which statement gives the advantage of a large surface area of root hairs?
- A** increases absorption of ions
 - B** increases absorption of sugars
 - C** increases permeability of cell membrane
 - D** protects roots from attack by pests

- 7 Which row shows lifestyle changes that all reduce the risk of a blockage in coronary arteries?

| | exercise | salt intake | saturated fat intake | smoking |
|----------|----------|-------------|----------------------|----------|
| A | decrease | decrease | increase | increase |
| B | decrease | increase | decrease | decrease |
| C | increase | decrease | decrease | decrease |
| D | increase | increase | increase | increase |

- 8 What are the products of anaerobic respiration in muscle cells?

- A** carbon dioxide and a relatively large amount of energy
- B** carbon dioxide and a relatively small amount of energy
- C** lactic acid and a relatively large amount of energy
- D** lactic acid and a relatively small amount of energy

- 9 The blood leaving the kidney has a different composition to the blood flowing into the kidney.

Which row describes the composition of the blood leaving the kidney compared to the blood entering the kidney?

| | carbon dioxide | glucose | urea |
|----------|----------------|---------|--------|
| A | higher | higher | lower |
| B | higher | lower | lower |
| C | lower | higher | higher |
| D | lower | lower | higher |

- 10 A substance called adrenaline is released into the blood when a person is frightened. This causes the heart to beat faster.

What is the substance?

- A** enzyme
- B** hormone
- C** plasma
- D** urea

11 Which row about heroin is correct?

| | heroin is addictive | heroin causes withdrawal symptoms |
|----------|---------------------|-----------------------------------|
| A | no | no |
| B | no | yes |
| C | yes | no |
| D | yes | yes |

12 Why is energy flow in biological systems described as *non-cyclical*?

- A** Energy always passes to larger organisms.
- B** Energy cannot pass from living things to the environment.
- C** Energy is lost as heat by living organisms.
- D** The source of the energy is usually the Sun.

13 Which combination of factors is least likely to stop menstruation?

| | diet | stress |
|----------|------------|--------|
| A | balanced | high |
| B | balanced | low |
| C | unbalanced | high |
| D | unbalanced | low |

14 Which method is used to separate ethanol from an aqueous solution of ethanol?

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

15 Which statement describes a liquid?

- A** Closely spaced particles are able to move freely.
- B** Closely spaced particles vibrate about a fixed point.
- C** Particles are far apart and unable to move freely.
- D** Particles are far apart with large amounts of kinetic energy.

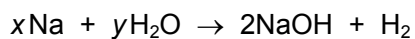
- 16 Which row shows the number of protons and the number of neutrons in the two isotopes of chlorine, $^{35}_{17}\text{Cl}$ and $^{37}_{17}\text{Cl}$?

| | ^{35}Cl | | ^{37}Cl | |
|----------|------------------|----------|------------------|----------|
| | protons | neutrons | protons | neutrons |
| A | 35 | 17 | 37 | 17 |
| B | 18 | 35 | 20 | 37 |
| C | 17 | 35 | 17 | 37 |
| D | 17 | 18 | 17 | 20 |

- 17 Which row describes a covalent compound?

| | melting point /°C | solubility in water | conductivity of solid |
|----------|----------------------|------------------------|--------------------------|
| A | –182 | insoluble | no |
| B | 800 | soluble | yes |
| C | 987 | soluble | no |
| D | 3800 | insoluble | yes |

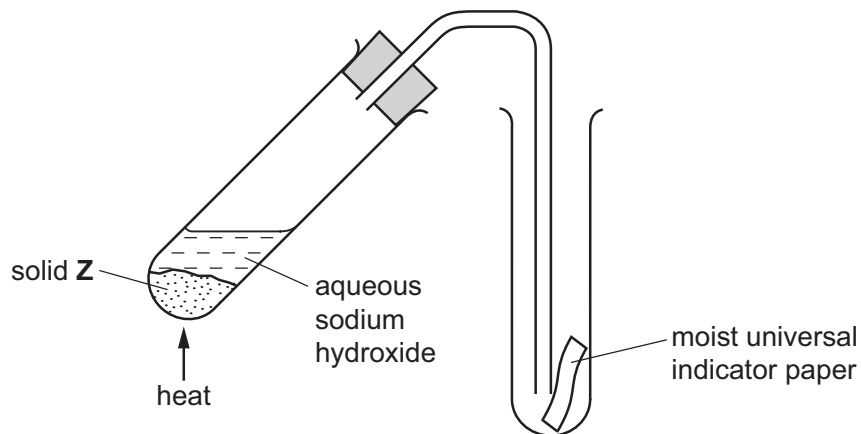
- 18 The equation shows the reaction between sodium and water.



What are the values of x and y for the equation to be balanced?

| | x | y |
|----------|-----|-----|
| A | 1 | 1 |
| B | 1 | 2 |
| C | 2 | 1 |
| D | 2 | 2 |

19 Apparatus is set up as shown.



When the test-tube is heated, the indicator paper turns blue.

What is solid **Z**?

- A aluminium oxide
 - B ammonium sulfate
 - C calcium hydroxide
 - D copper(II) sulfate
- 20 Which oxide dissolves in water to form an acid?
- A aluminium oxide
 - B magnesium oxide
 - C nitrogen dioxide
 - D sodium oxide
- 21 Which group of the Periodic Table contains only elements that conduct electricity?
- A I B IV C VII D VIII
- 22 Which statement about zinc is **not** correct?
- A It forms an alloy called brass with copper.
 - B It is used in electrical wiring.
 - C It is used to prevent the rusting of iron and steel.
 - D It reacts with sulfuric acid to form a salt.

23 Clean air consists of a mixture of nitrogen and oxygen with small amounts of other gases.

Which other gas has the largest percentage by volume in air?

- A** argon
- B** helium
- C** hydrogen
- D** neon

24 Which statement about hydrogen is correct?

- A** It is produced when an acid reacts with a metal carbonate.
- B** It is produced when an acid reacts with a reactive metal.
- C** It is produced when an alkali reacts with an ammonium salt.
- D** It is produced when oxygen reacts with a hydrocarbon.

25 Which row shows the conditions used in the Haber process for the manufacture of ammonia?

| | temperature / °C | pressure / atm | catalyst |
|----------|------------------|----------------|----------|
| A | 200 | 200 | yeast |
| B | 200 | 450 | iron |
| C | 450 | 200 | iron |
| D | 450 | 450 | yeast |

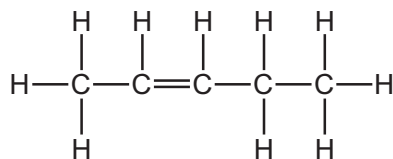
26 The molecular formulas of four organic compounds, W, X, Y and Z, are shown.

| W | X | Y | Z |
|----------|----------|----------|-------------|
| C_4H_8 | C_3H_8 | C_3H_6 | C_4H_{10} |

Which statement is correct?

- A** W and Y have the same general formula.
- B** W and Z have the same general formula.
- C** X and Y belong to the same homologous series.
- D** Y and Z belong to the same homologous series.

27 The structure of a hydrocarbon is shown.



The hydrocarbon is tested with bromine water.

Which row describes the type of hydrocarbon and the result of the test with bromine water?

| | hydrocarbon | result of test with bromine water |
|----------|-------------|-----------------------------------|
| A | saturated | bromine water becomes colourless |
| B | saturated | bromine water remains orange |
| C | unsaturated | bromine water becomes colourless |
| D | unsaturated | bromine water remains orange |

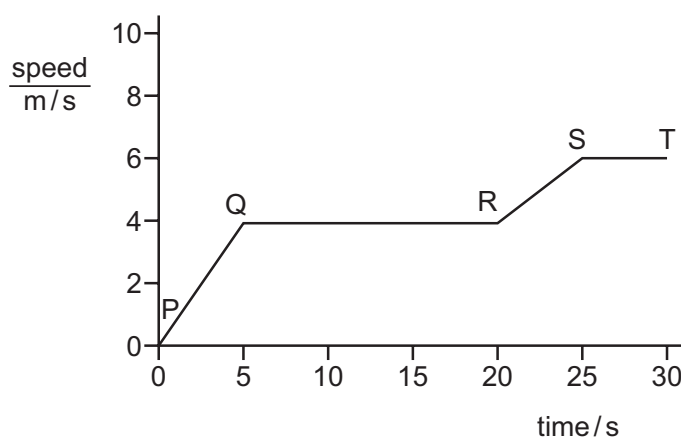
28 A micrometer is used to measure the diameter of a wire. The measured value is 0.26 mm.

The manufacturer states that the diameter of the wire is 0.274 mm.

What is **not** a possible reason for the difference between the reading and the stated value?

- A** a micrometer cannot read to 0.001 mm
- B** a mis-read in the position of the thimble on the barrel (sleeve) scale
- C** a zero error of -0.01 mm
- D** a zero error of $+0.01$ mm

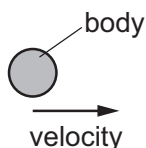
29 The speed–time graph shows the motion of an object over a period of 30 s.



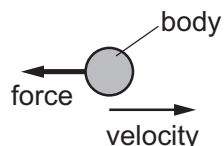
Which section of the graph shows the object with an acceleration of 0.4 m/s^2 ?

- A** PQ
- B** QR
- C** RS
- D** ST

- 30 A body travels to the right with a constant velocity as shown.



A force is then applied to the left.



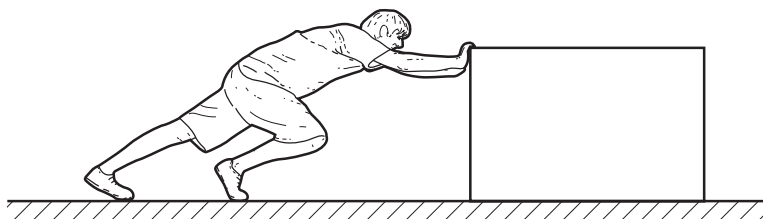
Which statement correctly describes the motion of the body immediately after the force has been applied?

- A travels left and accelerates
 - B travels left and decelerates
 - C travels right and accelerates
 - D travels right and decelerates
- 31 A beam is pivoted at P and has two forces of 20 kN and 10 kN acting on it in the positions shown.



What is the total moment of the two forces about P?

- A 50 kN m
 - B 50 kN/m
 - C 70 kN m
 - D 70 kN/m
- 32 A man pushes a heavy box across a floor. He exerts a force of 80 N and the box moves 4.0 m in 5.0 seconds.



What useful power does the man develop?

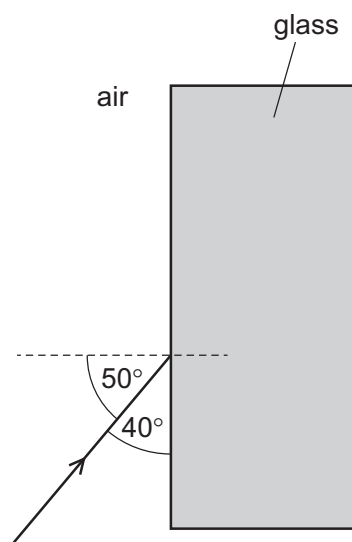
- A 4.0 W
- B 64 W
- C 100 W
- D 1600 W

- 33** The volume of a fixed mass of liquid can be used to measure temperature.

Why is this?

- A** The liquid can be coloured.
- B** The liquid expands when it is heated.
- C** The liquid is a poor conductor of heat.
- D** The liquid is cheap.

- 34** A ray of light is incident on the surface of a block of glass.



The refractive index of the glass is 1.5.

What is the angle of refraction of the ray in the glass?

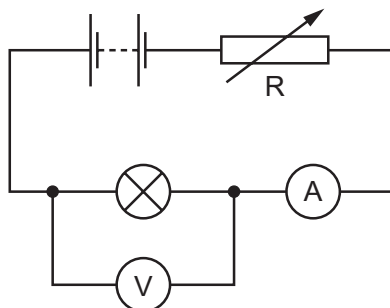
- A** 25°
- B** 27°
- C** 31°
- D** 33°

- 35** Radio waves, visible light and X-rays are all components of the electromagnetic spectrum.

What is the correct order of increasing wavelength?

| | shortest wavelength | → | longest wavelength |
|----------|---------------------|---------------|--------------------|
| A | visible light | radio waves | X-rays |
| B | visible light | X-rays | radio waves |
| C | X-rays | radio waves | visible light |
| D | X-rays | visible light | radio waves |

- 36 The diagram shows a circuit containing a variable resistor R.



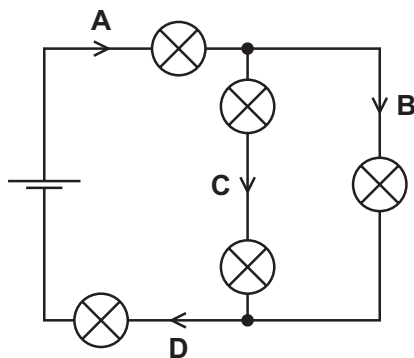
The resistance of R is increased.

Which row correctly describes the changes to the ammeter and voltmeter readings?

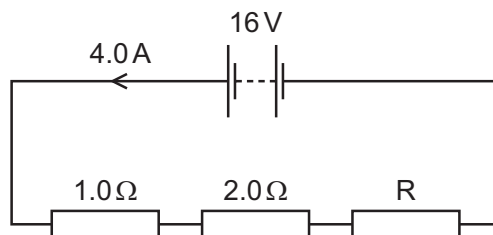
| | ammeter reading | voltmeter reading |
|----------|-----------------|-------------------|
| A | decreases | decreases |
| B | decreases | increases |
| C | increases | decreases |
| D | increases | increases |

- 37 The circuit shows five identical lamps connected to an electrical power supply.

Which current is the smallest?

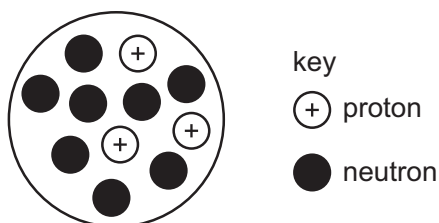


- 38 The diagram shows a 16 V battery connected to three resistors in series.



What is the value of resistor R?

- A 1.0 Ω B 3.0 Ω C 4.0 Ω D 7.0 Ω
- 39 Which statement about the atom is **not** correct?
- A A nucleus contains electrons, neutrons and protons.
 B A nucleus contains most of the mass of the atom.
 C Protons have positive charge.
 D Neutrons have no charge.
- 40 The diagram represents the nucleus of a radioactive isotope of element X.



The nucleus decays by emitting a beta-particle to become the nucleus of an isotope of element Y.

Which notation represents the nuclide of element Y?

- A $^{10}_3\text{Y}$ B ^7_4Y C $^{10}_4\text{Y}$ D $^{11}_4\text{Y}$

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The Periodic Table of Elements

| Group | | | | | | | | | | | | | | | | | | |
|----------------------------|-----------------------------|--|---------------------------------|-----------------------------|------------------------------|-----------------------------|------------------------------|------------------------------|--------------------------------|-------------------------------|-------------------------------|-----------------------------|-----------------------------|-----------------------------|-------------------------------|---------------------------|---------------------------|--|
| I | II | Key | | | | | | | | | | III | IV | V | VI | VII | VIII | |
| | | <div>1 H hydrogen 1</div> | | | | | | | | | | | | | | | | |
| | | <div>atomic number atomic symbol name relative atomic mass</div> | | | | | | | | | | | | | | | | |
| 3 Li lithium 7 | 4 Be beryllium 9 | | | | | | | | | | | | | | | | | |
| 11 Na sodium 23 | 12 Mg magnesium 24 | | | | | | | | | | | | | | | | | |
| 19 K potassium 39 | 20 Ca calcium 40 | 21 Sc scandium 45 | 22 Ti titanium 48 | 23 V vanadium 51 | 24 Cr chromium 52 | 25 Mn manganese 55 | 26 Fe iron 56 | 27 Co cobalt 59 | 28 Ni nickel 59 | 29 Cu copper 64 | 30 Zn zinc 65 | 31 Ga gallium 70 | 32 Ge germanium 73 | 33 As arsenic 75 | 34 Se selenium 79 | 35 Br bromine 80 | 36 Kr krypton 84 | |
| 37 Rb rubidium 85 | 38 Sr strontium 88 | 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 | |
| 55 Cs caesium 133 | 56 Ba barium 137 | 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 — | |
| 87 Fr francium — | 88 Ra radium — | 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 |
| 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 — |

actinoids

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