Cambridge Assessment International Education

Cambridge O Level

COMBINED SCIENCE **5129/11**

Paper 1 Multiple Choice **October/November 2024**

1 hour

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

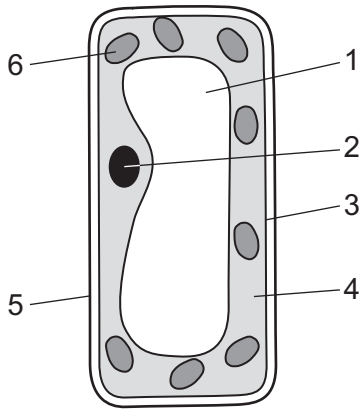
- There are **forty** questions on this paper. Answer **all** questions.
- For each question there are four possible answers **A**, **B**, **C** and **D**. Choose the **one** you consider correct and record your choice in soft pencil on the multiple choice answer sheet.
- Follow the instructions on the 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 The diagram shows a plant cell.



Which cell structures are also present in animal cells?

A 1, 2 and 3 **B** 2, 3 and 4 **C** 3, 4 and 5 **D** 4, 5 and 6

2 What is an enzyme?

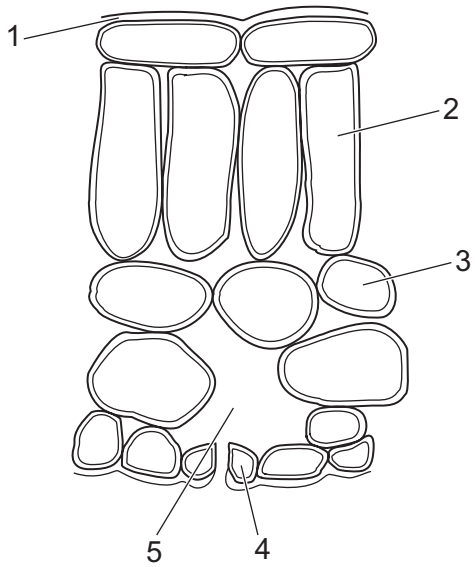
A a protein killed by high temperatures

B a protein found only in the digestive system

C a protein that is only active in living cells

D a protein that can increase the rate of a chemical reaction

3 The diagram shows a cross-section of a dicotyledonous leaf.



Which labelled parts contain chloroplasts?

A 1, 2 and 3 **B** 1, 4 and 5 **C** 2, 3 and 4 **D** 3, 4 and 5

4 Which statement about translocation is correct?

A It is the movement of amino acids in the xylem.

B It is the movement of mineral ions in the phloem.

C It is the movement of sucrose in the phloem.

D It is the movement of water in the xylem.

5 In which part of the digestive system is maltose broken down to glucose?

A mouth

B ileum

C pancreas

D stomach

6 Carbon dioxide moves from the blood into the alveoli.

Which row explains why this movement occurs?

	concentration of carbon dioxide in the blood	concentration of carbon dioxide in the alveoli
A	high	high
B	high	low
C	low	high
D	low	low

7 Which statement about respiration is correct?

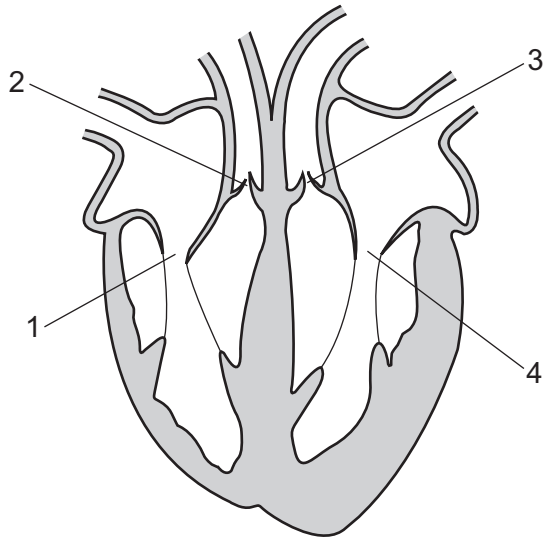
A Aerobic respiration produces carbon dioxide and water and releases more energy than anaerobic respiration.

B Aerobic respiration produces lactic acid and releases less energy than anaerobic respiration.

C Anaerobic respiration produces carbon dioxide and water and releases less energy than aerobic respiration.

D Anaerobic respiration produces lactic acid and releases more energy than aerobic respiration.

8 Which valves open when the ventricles of the heart contract?



A 1, 2, 3 and 4 **B** 1 and 2 only **C** 1 and 4 only **D** 2 and 3 only

9 Which statement about alcohol is correct?

A It improves self-control.

B It is a depressant.

C It is broken down by the kidneys.

D It is not addictive.

10 A person picks up a very hot plate and immediately drops it. This is a simple reflex action.

What is the effector?

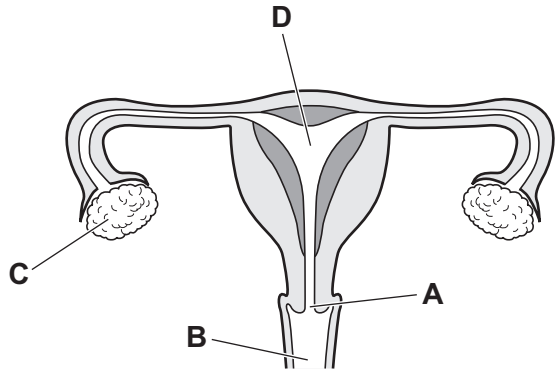
A the hand

B the hot plate

C the muscle in the arm

D the spinal cord

11 In which area of the female reproductive system does the embryo develop?



12 During the carbon cycle, which process causes living organisms to release carbon-containing compounds from their bodies?

A combustion

B feeding

C photosynthesis

D respiration

13 Why is it more energy efficient for humans to eat crop plants than to eat livestock?

A All the energy transfers in a food chain are very efficient.

B The food chain is shorter when humans eat livestock.

C Less energy is transferred to the environment when humans eat crop plants.

D The Sun is the principal source of energy input into most biological systems.

14 Which statement about the particles in a gas is correct?

A They are the closest together and have the greatest average kinetic energy of all three possible states of matter.

B They are the closest together of all three possible states of matter and move randomly.

C They are the furthest apart and have the greatest average kinetic energy of all three possible states of matter.

D They are the furthest apart and move the most slowly of all three possible states of matter.

15 Which statement about atoms is correct?

A Most of the mass of an atom is contained in the nucleus.

B The neutrons are found in shells orbiting the nucleus.

C The number of neutrons is called the nucleon number.

D The outer shell always contains 8 protons.

16 Which electronic diagram for calcium oxide is correct?

A

B

C

D

17 Compound P conducts electricity when molten but compound Q does not.

Compound R is a gas at room temperature. Compound S melts at 1566 °C.

Which compounds are covalent?

A P and R **B** P and S **C** Q and R **D** Q and S

18 When iron(II) chloride reacts with sodium hydroxide, iron(II) hydroxide and sodium chloride are produced.

What is the balanced equation for this reaction?

A $2FeCl_2 + NaOH \rightarrow 2Fe(OH)_2 + NaCl$

B $FeCl_2 + 2NaOH \rightarrow Fe(OH)_2 + 2NaCl$

C $FeCl_2 + 2NaOH \rightarrow 2Fe(OH)_2 + NaCl$

D $2FeCl_2 + NaOH \rightarrow Fe(OH)_2 + 2NaCl$

19 Which statement describes an exothermic reaction?

A a reaction taking in thermal energy from the surroundings

B a reaction losing thermal energy to the surroundings

C a reaction showing a decrease in the temperature of the surroundings

D a reaction involving an increase in the total energy of the reactant mixture

20 Which gas is tested for by using a glowing splint?

A carbon dioxide

B chlorine

C hydrogen

D oxygen

21 Which statements about acids are correct?

1 Acids react with carbonates to produce hydrogen.

2 Acids react with reactive metals to produce carbon dioxide.

3 Acids turn damp blue litmus paper red.

4 Aqueous solutions of acids contain H^+ ions.

A 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 3 and 4

22 Potassium reacts with water to produce potassium hydroxide and hydrogen.

Rubidium and caesium are below potassium in Group I of the Periodic Table.

Which statements are correct?

1 Caesium has a higher melting point than potassium.

2 Rubidium is less reactive than potassium.

3 Rubidium is a soft metal.

4 Caesium reacts with water to produce an alkaline solution.

A 1 and 2 **B** 1 and 3 **C** 2 and 4 **D** 3 and 4

23 What is observed when excess aqueous sodium hydroxide is added to aqueous iron(II) ions, Fe^{2+}?

A green precipitate, insoluble in excess

B green precipitate, soluble in excess

C red-brown precipitate, insoluble in excess

D red-brown precipitate, soluble in excess

24 Which property of aluminium makes it suitable for making food containers?

A good heat conductivity

B good resistance to corrosion

C high density

D low melting point

25 Four metals W, X, Y and Z are tested to determine the order of reactivity.

The results of the tests are shown.

Metal W does not react with acids.

Metal X does not react with water but does react with dilute acids.

Metal Z reacts rapidly with cold water.

Metal Y reacts slowly with cold water but rapidly with steam.

What is the order of reactivity?

	most reactive →			least reactive
A	W	X	Y	Z
B	W	Y	X	Z
C	Z	Y	X	W
D	Z	X	Y	W

26 Why is chlorination used to make water suitable for drinking?

A to kill microbes

B to improve taste

C to remove odours

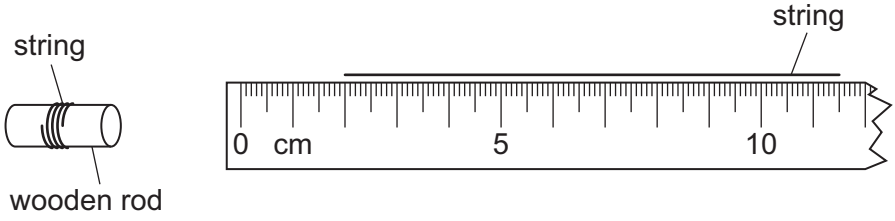
D to remove insoluble impurities

27 Which molecular formula represents an alkane?

A C_3H_6 **B** C_4H_{10} **C** C_6H_{12} **D** C_7H_{18}

28 The circumference of a wooden rod of circular cross-section is found by winding string around it 4 times and then measuring the length of the string.

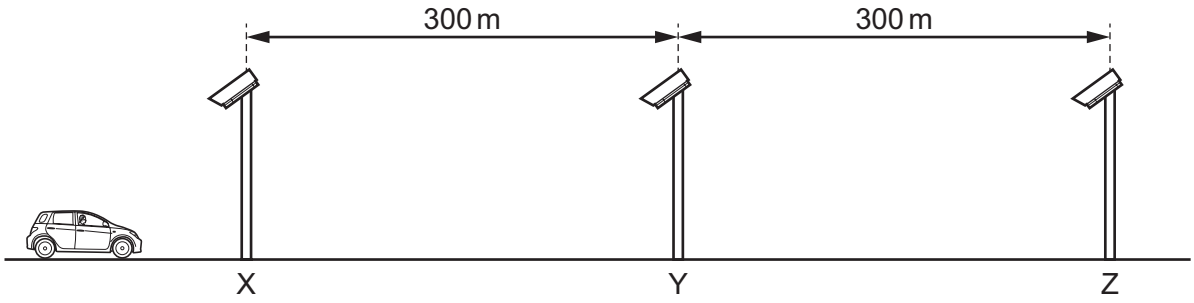
The diagram shows the string positioned next to the ruler.



What is the circumference of the wooden rod?

A 2.4 cm **B** 2.9 cm **C** 9.5 cm **D** 11.5 cm

29 Three speed cameras X, Y and Z are used to check the average speed of cars driving along a stretch of road.



NOT TO SCALE

The distance between each speed camera is 300 m.

The time taken for a car to travel from camera X to camera Z is 30 s.

What is the average speed of the car?

A 5 m / s **B** 10 m / s **C** 20 m / s **D** 40 m / s

30 Which expression can be used to calculate density?

A mass × volume

B $\frac{\text{mass}}{\text{volume}}$

C weight × volume

D $\frac{\text{weight}}{\text{volume}}$

31 The equation used to calculate the spring constant k of a spring can be written as shown.

$$k = \frac{Y}{Z}$$

What are Y and Z?

	Y	Z
A	extension of spring	force used to stretch spring
B	force used to stretch spring	extension of spring
C	force used to stretch spring	length of spring
D	length of spring	force used to stretch spring

32 A force of 60 N moves a box a distance of 15 m in the direction of the force.

What is the work done on the box?

A 0.25 J **B** 4.0 J **C** 75 J **D** 900 J

33 It is sometimes difficult to unscrew the metal lid on a glass jar.

If the glass jar is turned upside down and the metal lid placed in hot water, the metal lid will then unscrew easily.

Why is this?

A The air inside the glass jar contracts and pushes the metal lid off.

B The glass jar expands more than the metal lid for the same rise in temperature.

C The metal lid expands and the glass jar contracts when the temperature rises.

D The temperature of the metal lid rises and it expands more than the glass jar.

34 The speed of light is 3.0×10^8 m / s.

A radio wave has a wavelength of 1.5 km.

What is the frequency of the radio wave?

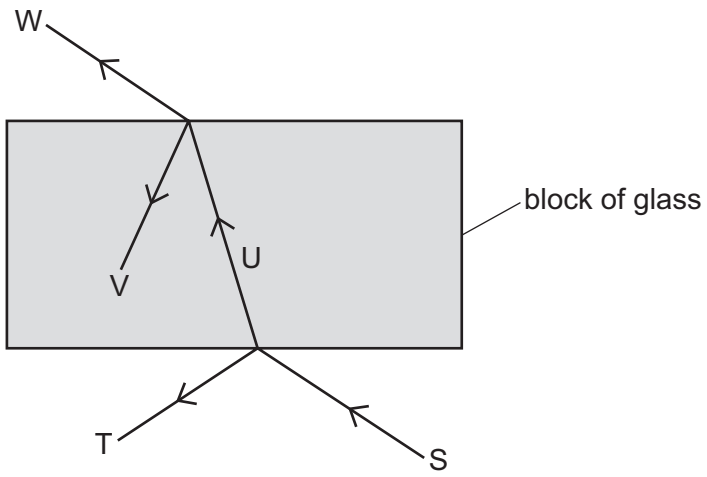
A 2.0×10^5 Hz

B 2.0×10^8 Hz

C 4.5×10^8 Hz

D 4.5×10^{11} Hz

35 The diagram shows a ray of light S incident on a block of glass.



Which rays are refracted rays?

A T and V **B** U and V **C** U and W **D** V and W

36 The diagram shows the main regions of the electromagnetic spectrum.

P	X-rays	Q	visible light	infrared	R	radio waves

What are the regions P, Q and R?

	P	Q	R
A	gamma rays	microwaves	ultraviolet
B	gamma rays	ultraviolet	microwaves
C	microwaves	gamma rays	ultraviolet
D	microwaves	ultraviolet	gamma rays

37 A battery requires 720 C of charge to be fully charged.

Which combination of current and time provides this amount of charge?

	current / mA	time / s
A	10	72
B	20	36 000
C	40	29 000
D	60	120 000

38 What is the circuit symbol for a fixed resistor?

A **B** **C** **D**

39 An atom consists of 82 electrons, 126 neutrons and 82 protons.

What is the mass number of this atom?

A 82 **B** 126 **C** 208 **D** 290

40 Which row is correct for a beta particle?

	the nature of a beta particle	a beta particle is stopped by
A	electromagnetic wave	a thin piece of paper
B	electromagnetic wave	twenty centimetres of aluminium
C	high-speed electron	a thin piece of paper
D	high-speed electron	twenty centimetres of aluminium

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The Periodic Table of Elements

Group																	
I	II											III	IV	V	VI	VII	VIII
							1 H hydrogen 1										2 He helium 4
3 Li lithium 7	4 Be beryllium 9											5 B boron 11	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	10 Ne neon 20
11 Na sodium 23	12 Mg magnesium 24											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
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 –	113 Nh nihonium –	114 Fl flerovium –	115 Mc moscovium –	116 Lv livermorium –	117 Ts tennessine –	118 Og oganesson –

Key

atomic number
atomic symbol
name
relative atomic mass

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 dm^3 at room temperature and pressure (r.t.p.).