Cambridge
O Level

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.

Cambridge Assessment International Education

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

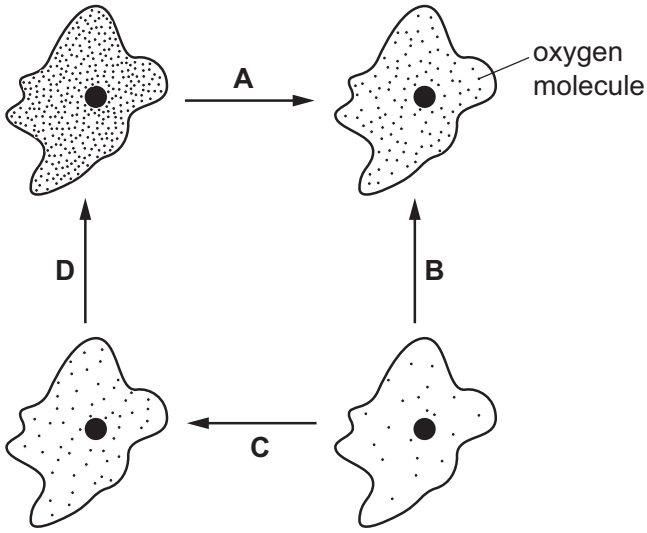
C a sperm cell

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

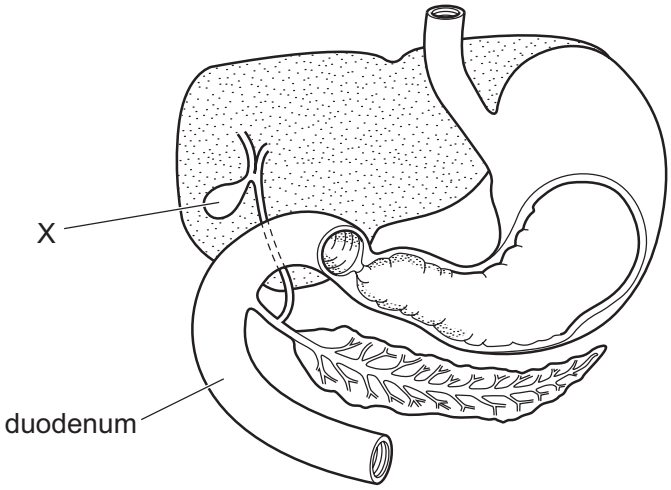
D hormones

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

[Turn over

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.

[Turn over

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

	^{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

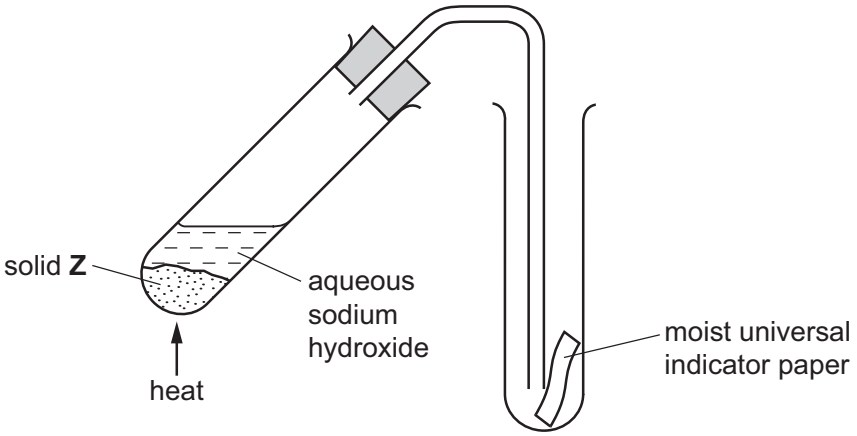
18 The equation shows the reaction between sodium and water.

$$x\text{Na} + y\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{H}_2$$

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.

[Turn over

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?

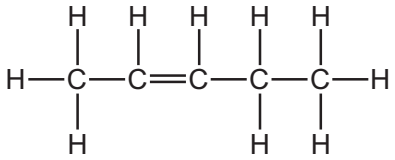
A W and Y have the same general formula.

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?

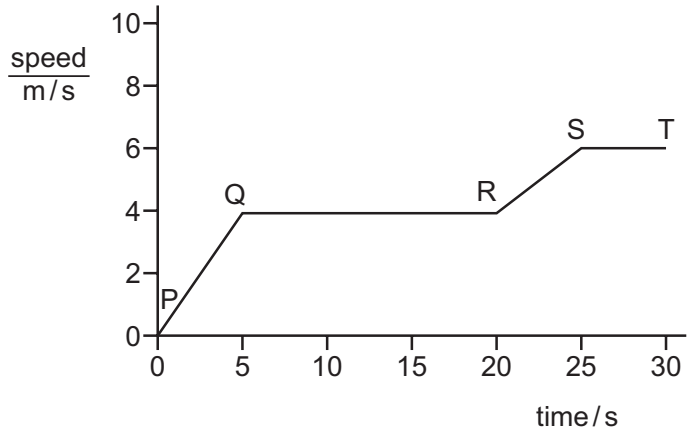
A a micrometer cannot read to 0.001 mm

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

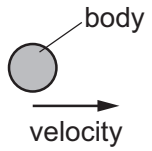
29 The speed–time graph shows the motion of an object over a period of 30 s.



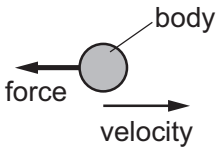
Which section of the graph shows the object with an acceleration of 0.4 m/s^2?

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?

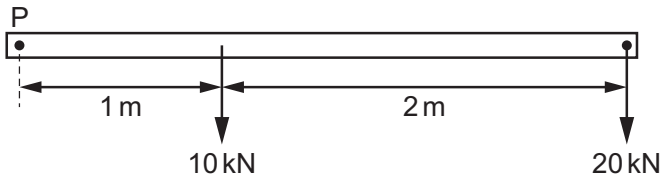
A travels left and accelerates

B travels left and decelerates

C travels right and accelerates

D travels right and decelerates

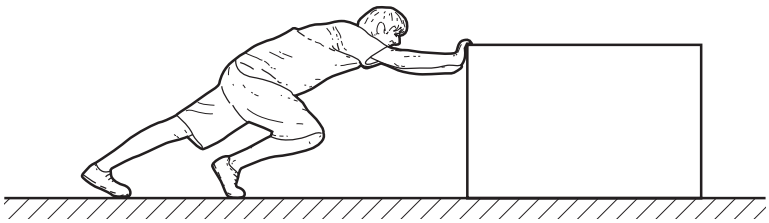
31 A beam is pivoted at P and has two forces of 20 kN and 10 kN acting on it in the positions shown.



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?

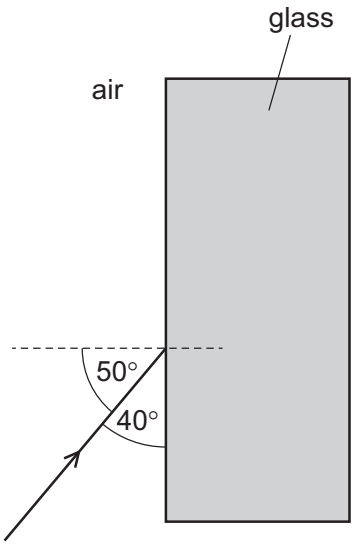
A The liquid can be coloured.

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°

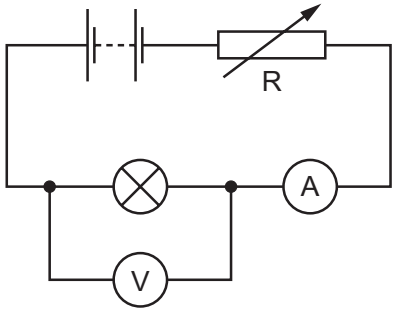
35 Radio waves, visible light and X-rays are all components of the electromagnetic spectrum.

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

[Turn over

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



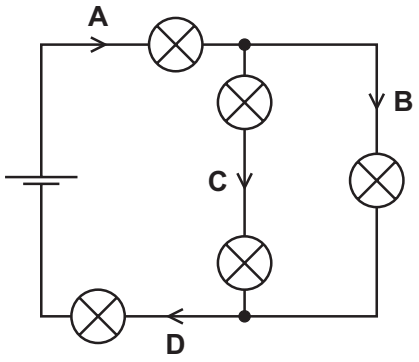
The resistance of R is increased.

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

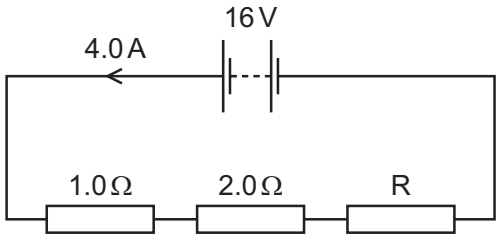
	ammeter reading	voltmeter reading
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

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?

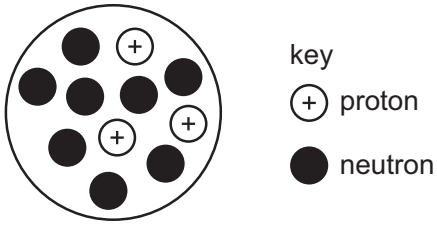
A A nucleus contains electrons, neutrons and protons.

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 $^{10}_{3}Y$ **B** $^{7}_{4}Y$ **C** $^{10}_{4}Y$ **D** $^{11}_{4}Y$

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The Periodic Table of Elements

Group I	Group II											Group III	Group IV	Group V	Group VI	Group VII	Group 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 –		114 Fl flerovium –		116 Lv livermorium –		

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.).