Cambridge Assessment International Education

Cambridge IGCSE™

COMBINED SCIENCE **0653/13**

Paper 1 Multiple Choice (Core) **May/June 2024**

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.

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1 A plant bends towards the light.

Which characteristics of living organisms does this show?

A movement and nutrition

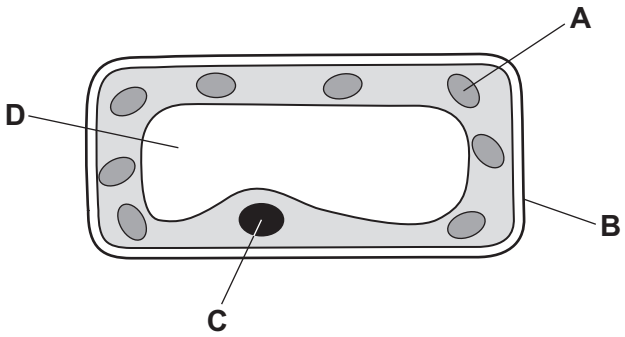
B movement and respiration

C movement and sensitivity

D sensitivity and respiration

2 The diagram shows a plant cell as seen under a light microscope.

Which labelled structure is a chloroplast?



3 What are features of diffusion?

	net movement of particles from a higher to a lower concentration	requires a partially permeable membrane
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key

✓ = yes

✗ = no

4 A student tests a biological molecule using biuret solution. The solution turns purple.

Which elements make up the biological molecule?

A carbon, hydrogen, oxygen and nitrogen

B carbon and hydrogen only

C carbon, hydrogen and oxygen only

D carbon, hydrogen and nitrogen only

5 What is the word equation for photosynthesis?

A carbon dioxide + oxygen → glucose + water

B carbon dioxide + water → glucose + oxygen

C glucose + oxygen → carbon dioxide + water

D glucose + water → carbon dioxide + oxygen

6 Which statement about a balanced diet in humans is correct?

A It does **not** contain fibre.

B It has a variety of food types to provide all the necessary nutrients.

C It includes high amounts of fats and sugars to provide energy.

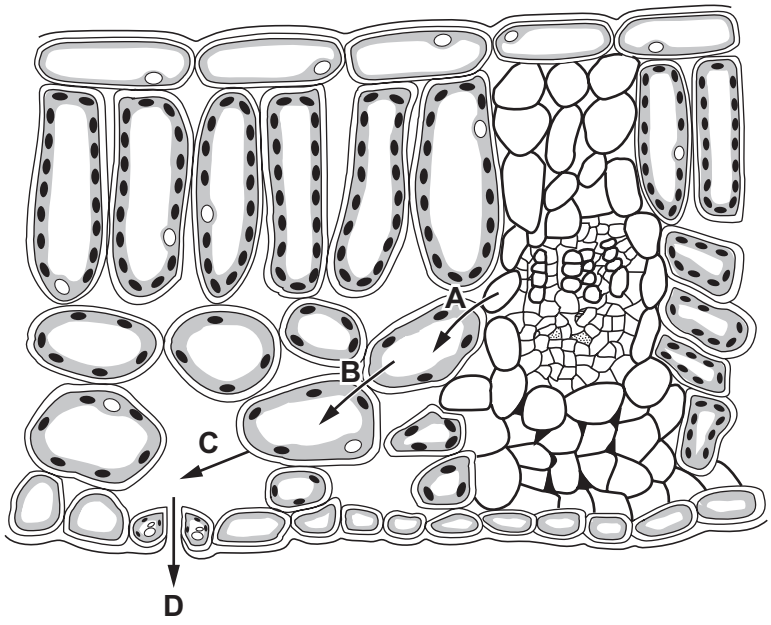
D It means eating the same foods each day.

7 Which row shows the type of digestion and describes the change needed to allow the absorption of food molecules into the blood?

	type of digestion	change
A	chemical	large molecules to small, insoluble molecules
B	chemical	large molecules to small, soluble molecules
C	mechanical	large molecules to small, soluble molecules
D	mechanical	large molecules to small, insoluble molecules

8 The diagram shows a section through a leaf.

Which arrow represents the evaporation of water during transpiration?



9 The table shows differences in composition between some of the gases in inspired and expired air.

Which row shows the correct composition for these gases?

	inspired air	expired air
A	more carbon dioxide	more water vapour
B	more oxygen	less water vapour
C	less carbon dioxide	more water vapour
D	less oxygen	less water vapour

10 Which row is correct for the hormone adrenaline?

	effect on blood glucose concentration	effect on the pulse rate
A	lowered	decreased
B	lowered	increased
C	raised	decreased
D	raised	increased

11 A plant is grown without light.

Which tropic responses are shown by the roots and shoots of the plant?

	root response	shoot response
A	gravitropism	gravitropism
B	gravitropism	phototropism
C	phototropism	gravitropism
D	phototropism	phototropism

12 What describes the transfer of pollen grains from the anther to the stigma?

A asexual reproduction

B fertilisation

C germination

D pollination

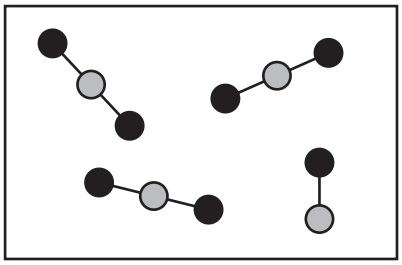
13 The diagram represents four organisms in a food chain.

$$T \rightarrow U \rightarrow V \rightarrow W$$

Which organisms are consumers?

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

14 The diagram represents a mixture of carbon dioxide, CO_2, and carbon monoxide, CO.



Which statement is correct?

A The mixture contains 4 elements.

B The mixture contains 4 molecules.

C The mixture contains 11 elements.

D The mixture contains 11 molecules.

15 Which method is used to separate an insoluble salt from a mixture of the salt and water?

A crystallisation

B distillation

C filtration

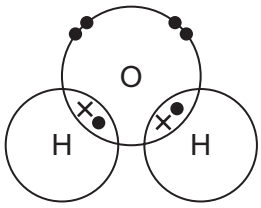
D fractional distillation

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 Which dot-and-cross diagram represents the outer shell electrons in a water molecule?

A



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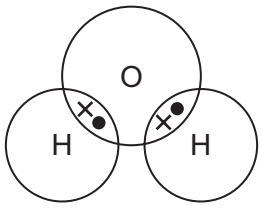

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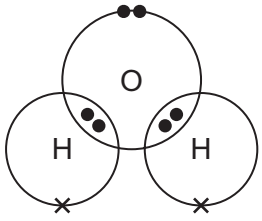
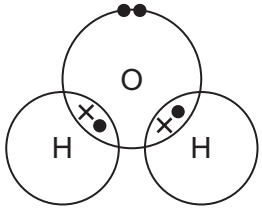


D



18 Urea, $(NH_2)_2CO$, is used as a fertiliser.

How many atoms or molecules are represented by the formula for urea?

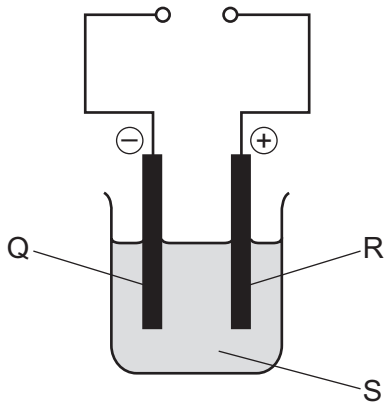
A atoms: nitrogen, 1; hydrogen, 2; carbon, 2; oxygen, 2

B atoms: nitrogen, 2; hydrogen, 4; carbon, 1; oxygen, 1

C molecules: ammonia, 1; carbon monoxide, 2

D molecules: ammonia, 2; carbon monoxide, 1

19 The apparatus used in an electrolysis experiment is shown.



Which row identifies Q, R and S?

	Q	R	S
A	cathode	anode	electrolyte
B	cathode	anode	electrode
C	anode	cathode	electrolyte
D	anode	cathode	electrode

20 Magnesium reacts with dilute hydrochloric acid forming hydrogen gas.

Which measurements are needed to determine the rate of the reaction?

1 the temperature of the acid

2 the volume of the acid

3 the time taken for the magnesium to react

4 the total volume of hydrogen made

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

21 When iron rusts, iron(III) oxide is formed.

What is the meaning of (III) in iron(III) oxide?

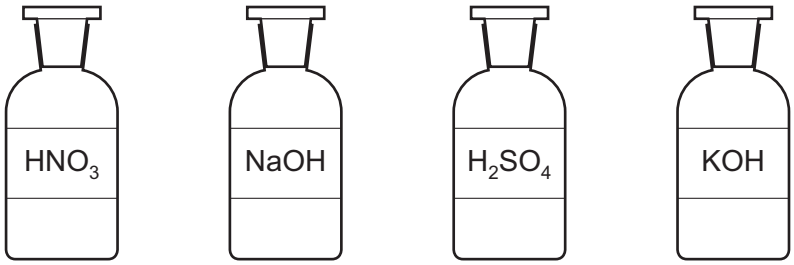
A It is the number of iron ions in the formula for iron(III) oxide.

B It is the ratio of iron ions to oxygen ions.

C It is the oxidation state of iron ions in iron(III) oxide.

D It is the pH of iron ions in iron(III) oxide.

22 A student mixes a dilute acid with separate samples from the four bottles shown.



Which samples react with the dilute acid?

	HNO_3	NaOH	H_2SO_4	KOH
A	✓	✗	✗	✗
B	✓	✗	✓	✗
C	✗	✓	✗	✗
D	✗	✓	✗	✓

key
✓ = reacts
✗ = does **not** react

23 Which row identifies the correct test and test result for the named gases?

	chlorine	ammonia	oxygen
A	turns damp litmus paper blue	turns damp litmus paper red	'pops' with a lighted splint
B	turns damp litmus paper red	turns damp litmus paper blue	'pops' with a lighted splint
C	bleaches damp litmus paper	turns damp litmus paper blue	relights a glowing splint
D	bleaches damp litmus paper	turns damp litmus paper red	relights a glowing splint

24 Which statement about transition elements is correct?

A Their compounds are generally colourless.

B Their compounds often act as catalysts.

C They are metals with low densities.

D They are non-metals with high melting points.

25 Which statement about the noble gases is correct?

A They form diatomic molecules.

B They all have the same number of electron shells.

C They are reactive so they are stored under oil.

D They have full outer shells of electrons.

26 Information about metals P, Q and R is shown.

When P is added to cold water, a violent reaction occurs producing lilac flames.

Q does **not** react with dilute hydrochloric acid.

R reacts with cold water to produce hydrogen.

Which row identifies these metals?

	P	Q	R
A	potassium	copper	calcium
B	potassium	aluminium	magnesium
C	sodium	aluminium	calcium
D	sodium	copper	magnesium

27 Which statements about alkanes are correct?

1 They are generally unreactive.

2 They are unsaturated because they contain only single covalent bonds.

3 They contain carbon, hydrogen and oxygen.

4 They form carbon dioxide and water during complete combustion.

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

28 A student measures the length of five different pencils.

The longest pencil has length 16.0 cm and the shortest pencil has length 8.0 cm.

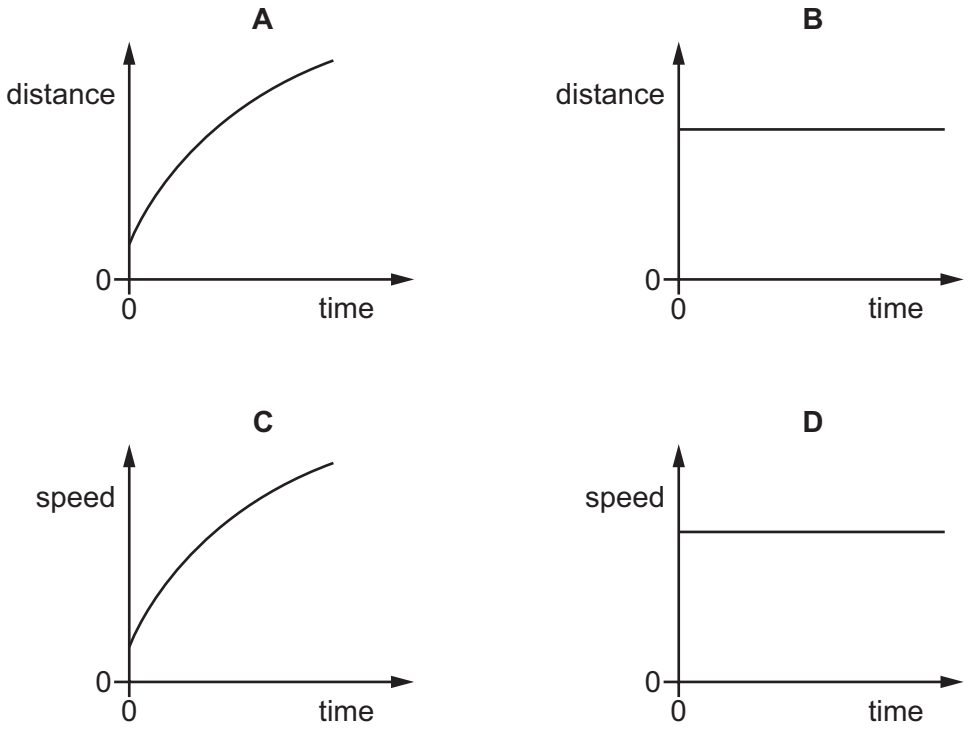
The lengths of the other pencils are 12.5 cm, 12.5 cm and 13.1 cm.

What is the average length of the pencils?

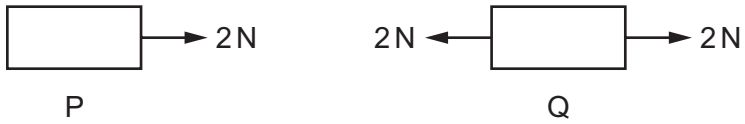
A 12.0 cm **B** 12.4 cm **C** 12.5 cm **D** 12.7 cm

29 The diagrams show two distance–time graphs and two speed–time graphs.

Which graph represents the motion of an object that is moving with constant speed?



30 P and Q are objects that are travelling in a straight line. The diagram shows the only forces acting on P and Q.



Which row describes the motion of P and the motion of Q?

	P	Q
A	accelerating	accelerating
B	accelerating	constant speed
C	constant speed	accelerating
D	constant speed	constant speed

31 A box is lifted at a constant speed.

Which quantities affect the amount of work done in lifting the box?

	time taken to lift the box	height lifted
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key

✓ = affects work done

✗ = does **not** affect work done

32 A car is driven to the top of a hill.

Which single change would **decrease** the power needed by the car?

A increasing the height of the hill

B increasing the mass of the car

C increasing the time taken to go up the hill

D increasing the weight of the car

33 Which method of generating electricity uses a non-renewable energy resource?

A nuclear power station

B solar panel

C hydroelectric power station

D wind turbine

34 A solid is heated.

Which two properties of the solid **both** change?

A density and volume

B density and weight

C mass and volume

D mass and weight

35 Which statement explains why ice cubes floating at the top of warm water cause all of the water to cool?

A Convection causes cold water at the top to sink.

B Convection causes the water around the ice cubes to freeze.

C Ice cubes are good thermal insulators.

D Ice cubes are good emitters of thermal radiation.

36 An object is placed in front of a vertical plane mirror.

The object is then moved further away from the mirror.

What happens to the image?

A It becomes larger and moves further from the mirror.

B It becomes larger but stays the same distance from the mirror.

C It stays the same size but moves further from the mirror.

D It stays the same size and stays the same distance from the mirror.

37 Light in air hits the surface of a transparent glass block at an angle of incidence of 45°.

In which direction does the light then travel?

A along the surface of the glass

B in the opposite direction to its original direction

C into the glass in a different direction

D into the glass in its original direction

38 Which quantity is measured in volts?

A energy

B potential difference (p.d.)

C power

D resistance

39 The current in a resistor and the potential difference (p.d.) across it are recorded.

Which expression is used to calculate the resistance of the resistor?

A $\frac{\text{current}}{\text{p.d.}}$

B current $\times$ (p.d.)^2

C p.d. $\times$ current

D $\frac{\text{p.d.}}{\text{current}}$

40 A heater carries a current of 8.0 A when it is in normal use.

What is the rating of a suitable fuse to protect the heater circuit?

A 1 A **B** 5 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
							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.).