Cambridge Assessment International Education

Cambridge IGCSE™

COMBINED SCIENCE **0653/12**

Paper 1 Multiple Choice (Core) **February/March 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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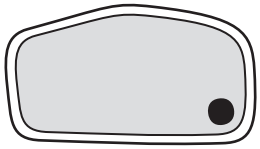
[Turn over

1 A car burns gasoline (petrol), providing energy to drive its wheels and releasing exhaust fumes.

To which characteristics of living things are these processes similar?

	excretion	sensitivity	movement	respiration
A	✓	✓	✓	✗
B	✓	✗	✓	✓
C	✗	✓	✓	✓
D	✓	✓	✗	✓

2 The diagram shows a student's attempt at drawing a plant cell.



What else should the student have included in the drawing?

A cell wall

B cytoplasm

C nucleus

D vacuole

3 What are the smaller molecules that make up fats, protein and starch?

	fats	protein	starch
A	glucose	glycogen	fatty acids and glycerol
B	glucose	amino acids	glycogen
C	fatty acids and glycerol	amino acids	glucose
D	fatty acids and glycerol	glycogen	amino acids

4 Enzymes are ..... that function as biological catalysts.

Which word completes this sentence?

A carbohydrates

B fats

C oils

D proteins

5 Which effects of magnesium deficiency on a plant are correct?

	amount of chlorophyll	rate of growth
A	decreases	decreases
B	decreases	does not change
C	does not change	decreases
D	does not change	does not change

6 What should be added to the diet of a person who has too few red blood cells?

A calcium

B iron

C fats

D glucose

7 Some undigested food passes out of the digestive system as faeces.

What is this process?

A absorption

B digestion

C egestion

D ingestion

8 Where does water enter a plant?

A cuticle

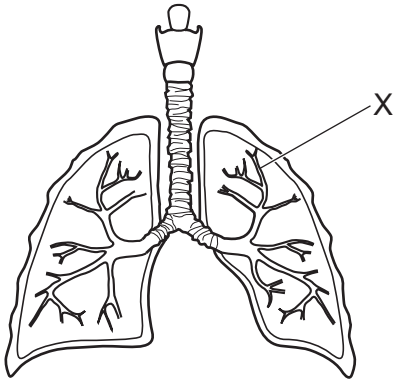
B root hair cells

C stomata

D phloem

[Turn over

9 The diagram shows the human gas exchange system.



What is the part labelled X?

A bronchiole

B bronchus

C larynx

D trachea

10 Which changes occur in an athlete just before the start of a race?

	adrenaline in the blood	glucose in the blood	pulse rate
A	decreases	decreases	increases
B	decreases	increases	decreases
C	increases	decreases	decreases
D	increases	increases	increases

11 Which process occurs during sexual reproduction?

A fusion of a female gamete and a male zygote

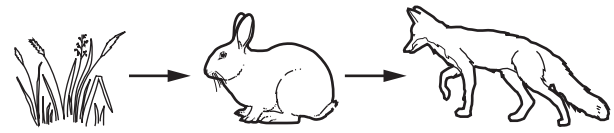
B fusion of a female zygote and a male gamete

C fusion of a female gamete and a male gamete

D fusion of a female zygote and a male zygote

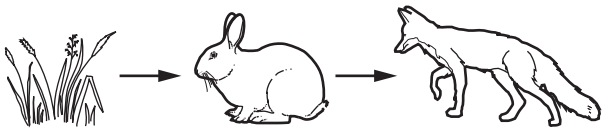
12 Which food chain is correctly labelled?

A



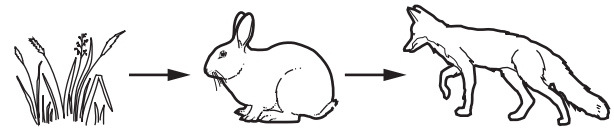
producer → primary consumer

B



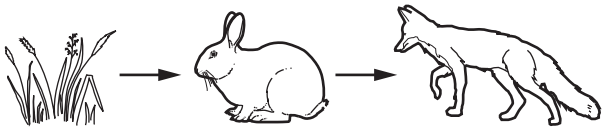
primary consumer → producer

C



primary consumer → producer

D



producer → primary consumer

13 Some processes in the carbon cycle are listed.

1 combustion

2 fossilisation

3 photosynthesis

4 respiration

Which processes release carbon dioxide into the atmosphere?

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

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

A The particles are vibrating back and forward with regular motion.

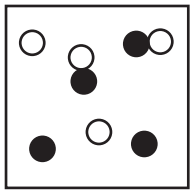
B At higher pressure, the particles move faster.

C At higher pressure, the spaces between the particles decreases.

D When the temperature is increased, the particles move closer together.

15 Which diagram represents a mixture of two elements?

A



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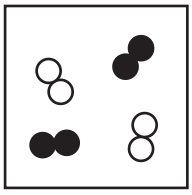

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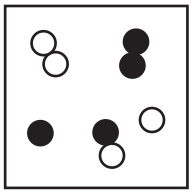
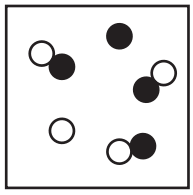


D



16 Which word describes molten lead bromide during its electrolysis?

A anode

B cathode

C electrolyte

D solution

17 Sodium chloride dissolves in water in an endothermic process.

When calcium chloride dissolves in water, the temperature of the solution increases.

Which statement is correct?

A The process of dissolving calcium chloride is neither exothermic nor endothermic.

B The temperature of the solution increases when sodium chloride dissolves.

C The temperature of the solution remains constant when sodium chloride dissolves.

D When calcium chloride dissolves in water, the process is exothermic.

18 Powdered calcium carbonate reacts with hydrochloric acid.

Which change in the reaction conditions increases the rate of this reaction?

A increasing the temperature of the acid

B increasing the volume of the acid

C decreasing the concentration of the acid

D using lumps of calcium carbonate

19 The equation for the reaction of sodium with oxygen is shown.

$$4Na + O_2 \rightarrow 2Na_2O$$

Which process is involved in this reaction?

A decomposition

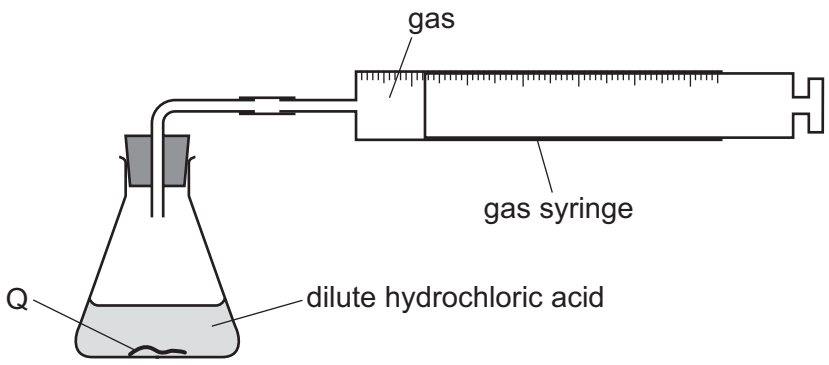
B oxidation

C neutralisation

D precipitation

20 When solid Q is added to dilute hydrochloric acid, a gas is collected.

This gas 'pops' when tested with a lighted splint.



What is Q?

A magnesium

B magnesium carbonate

C magnesium chloride

D magnesium oxide

21 Which row about the elements in a period of the Periodic Table is correct?

	elements on the left-hand side of the period	elements on the right-hand side of the period
A	tend to form ionic compounds	tend to form covalent compounds
B	have low boiling points	have high boiling points
C	are poor electrical conductors	are good electrical conductors
D	form compounds by gaining electrons	form compounds by losing electrons

22 What is a property of transition elements?

A form only white compounds

B high melting point

C low density

D poor conductor of heat

23 Which substances conduct electricity when molten?

1 sodium chloride

2 naphtha

3 brass

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

24 Which process is used in the treatment of the water supply?

A filtration

B evaporation

C crystallisation

D chromatography

25 Which pollutant gases result in damage to buildings?

A carbon dioxide and carbon monoxide

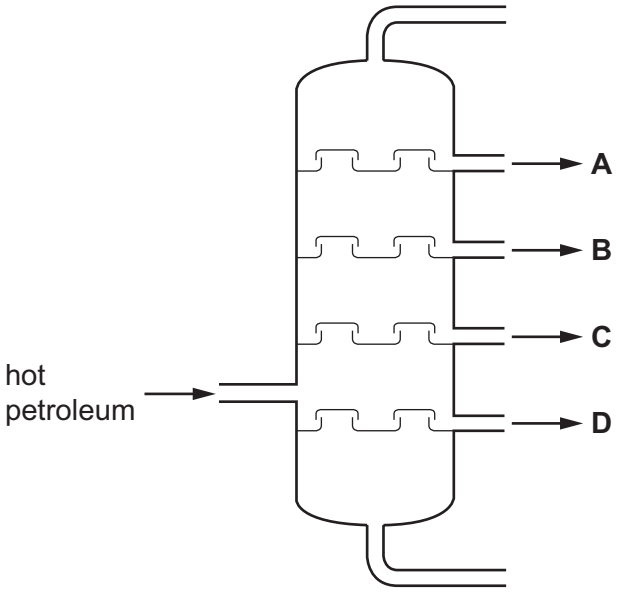
B carbon dioxide and sulfur dioxide

C carbon monoxide and nitrogen dioxide

D oxides of nitrogen and sulfur dioxide

26 Petroleum is separated into fractions by fractional distillation.

Which fraction has the highest boiling point?



27 Which statement about hydrocarbons is correct?

A Alkanes rapidly decolourise bromine water.

B Alkanes are unsaturated hydrocarbons.

C Alkenes have double covalent bonds.

D Alkenes are the main constituent of natural gas.

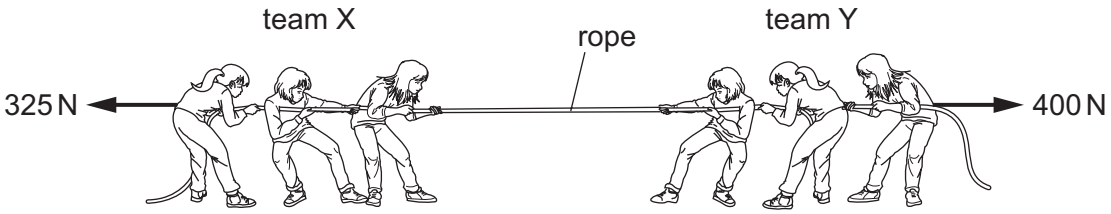
28 A meteorite travels through space and becomes closer to the Earth.

What happens to the mass and to the weight of the meteorite?

	mass of meteorite	weight of meteorite
A	increases	increases
B	increases	stays the same
C	stays the same	increases
D	stays the same	stays the same

29 The diagram shows a sports competition between team X and team Y pulling a rope.

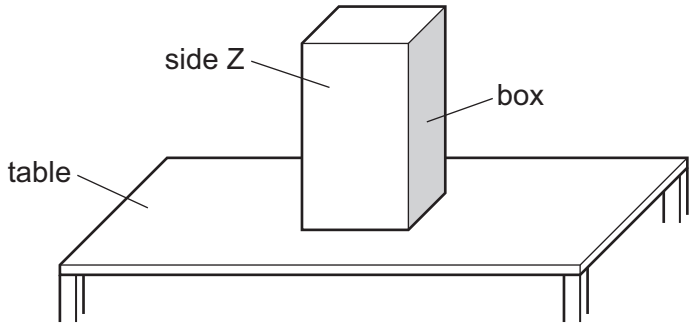
The arrows show the directions of the forces exerted by the teams on the rope.



What is the size of the resultant force on the rope and in which direction does the resultant force act?

	size of resultant force / N	direction of resultant force
A	75	to the left
B	75	to the right
C	725	to the left
D	725	to the right

30 The diagram shows a heavy rectangular box resting on a table. One side of the box is labelled Z.



What happens when the box rests with side Z on the table?

A The force exerted on the table decreases.

B The force exerted on the table increases.

C The pressure exerted on the table decreases.

D The pressure exerted on the table increases.

31 Work *W* is done when an object O is lifted vertically upwards.

Which change results in the same quantity of *W*?

A lifting a heavier object through a greater distance in the same time

B lifting a lighter object through the same distance in a smaller time

C lifting the same object through a greater distance in the same time

D lifting the same object through the same distance in a greater time

32 A solid is at a constant temperature.

How can the volume of the solid and the motion of its molecules be described?

	volume of solid	motion of molecules in solid
A	fixed	free movement
B	fixed	vibration only
C	variable	free movement
D	variable	vibration only

33 Thermal energy passes through a vacuum.

Which process is involved?

A conduction

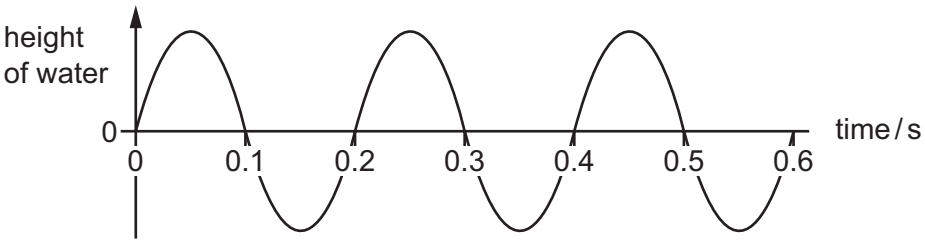
B convection

C evaporation

D radiation

34 A water wave travels across the surface of the water in a tank.

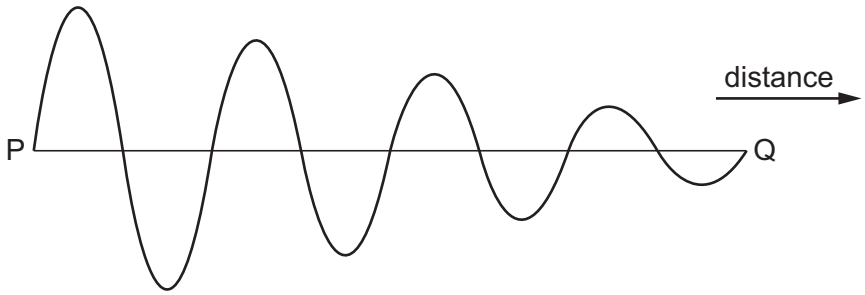
The graph shows how the height of the water varies with time at one point in the tank.



How many wavelengths pass the point in 1.0 s?

A 0.2 **B** 0.6 **C** 3 **D** 5

35 The diagram represents a wave that travels from P to Q.



The diagram shows that one property of the wave decreases as it travels.

Which property decreases?

A amplitude

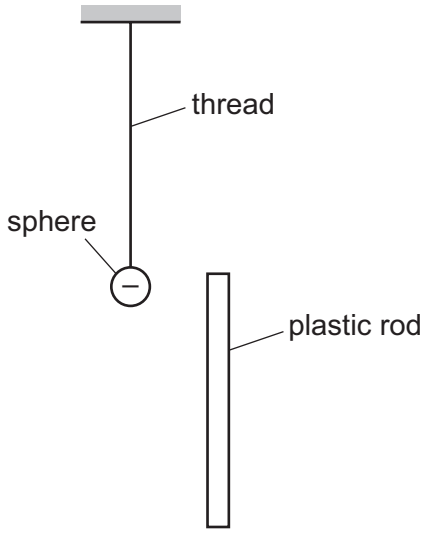
B frequency

C speed

D wavelength

36 A negatively charged sphere is suspended from an insulating thread.

A plastic rod is moved slowly towards the sphere.



The sphere moves away from the rod.

Which statement about the rod is correct?

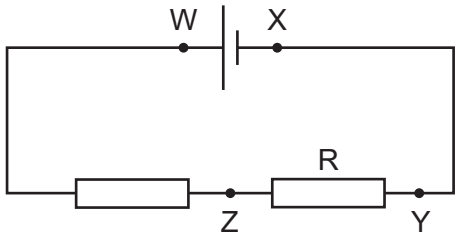
A It is not charged.

B It is charged but it is not possible to know if it is positive or negative.

C It is negatively charged.

D It is positively charged.

37 The diagram shows a cell connected to two resistors.

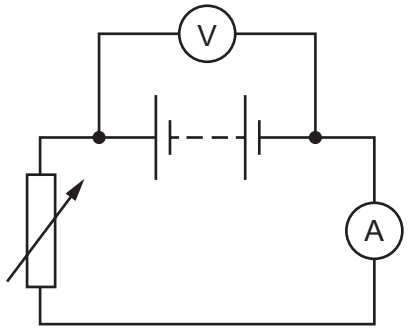


A voltmeter that measures the potential difference (p.d.) across resistor R is connected into the circuit.

Between which two labelled points is the voltmeter connected?

A W and X **B** W and Y **C** X and Y **D** Y and Z

38 The diagram shows a circuit that includes a variable resistor, a voltmeter and an ammeter.



The resistance of the variable resistor is increased.

What happens to the readings on the two meters?

	ammeter reading	voltmeter reading
A	decreases	increases
B	decreases	stays the same
C	increases	increases
D	increases	stays the same

39 Four identical lamps are connected in two different circuits.

Two of the lamps are connected in series to a suitable power supply so that they receive their correct working voltage.

The other two lamps are connected in parallel to a different power supply so that they also receive their correct working voltage.

What is an advantage of connecting the lamps in parallel rather than in series?

A A smaller length of wire is required.

B The lamps produce more light.

C The lamps use less energy.

D When one lamp fails, the other lamp stays on.

40 A fuse is rated at 10 A.

What does this indicate?

A The current in the fuse should always be equal to 10 A.

B The current in the fuse should always be more than 10 A.

C The current in the fuse should always be less than 10 A.

D The fuse supplies a current of 10 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.).