



Cambridge IGCSE™

COMBINED SCIENCE

0653/12

Paper 1 Multiple Choice (Core)

February/March 2020

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. A mark will not be deducted for a wrong answer.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

This document has **16** pages. Blank pages are indicated.



1 Four biological processes are listed.

- 1 egestion
- 2 excretion
- 3 nutrition
- 4 respiration

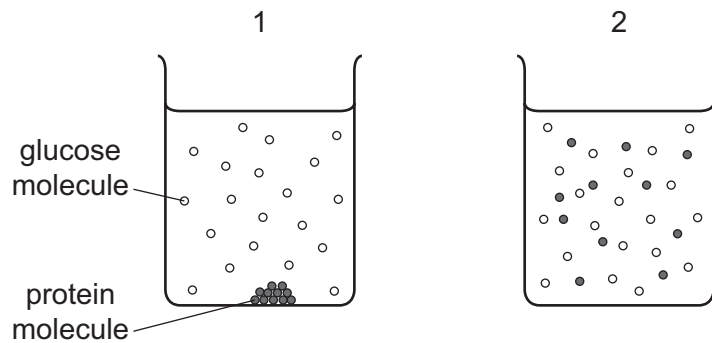
Which processes are characteristics of all living organisms?

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

2 Which row shows the features of a plant cell?

	cell membrane surrounding the cell wall	cell wall surrounding the cell membrane	vacuole present
A	✓	x	✓
B	x	✓	✓
C	✓	x	x
D	x	✓	x

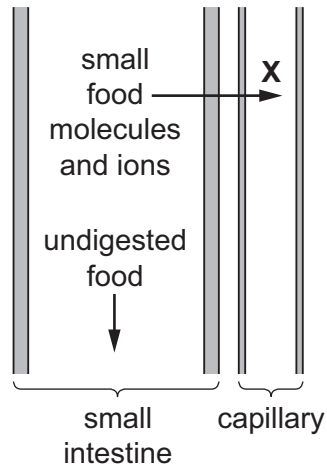
- 3 Diagram 1 represents a solution of glucose which has had some protein molecules added. Diagram 2 represents the result after four hours.



Which process is responsible for this result?

- A absorption
 - B diffusion
 - C digestion
 - D osmosis
- 4 Which smaller molecule is used to make proteins?
- A amino acid
 - B fatty acid
 - C glucose
 - D glycerol
- 5 When an apple is cut, the cut surface quickly turns brown. This is due to enzyme action. Which action destroys the enzyme?
- A brushing the cut surface with a strong sugar solution
 - B cutting the apple into smaller pieces
 - C placing the cut apple in boiling water
 - D placing the cut apple in cold water

- 6 The diagram shows the arrangement of part of the small intestine and a capillary.



What does arrow **X** represent?

- A** absorption
 - B** digestion
 - C** ingestion
 - D** osmosis
- 7 Which chemical can be identified using limewater?
- A** carbon dioxide
 - B** glucose
 - C** oxygen
 - D** water
- 8 What is the equation for aerobic respiration?
- A** carbon dioxide + water → glucose + oxygen
 - B** glucose + oxygen → carbon dioxide + water
 - C** glucose + water → carbon dioxide + oxygen
 - D** oxygen + water → carbon dioxide + glucose

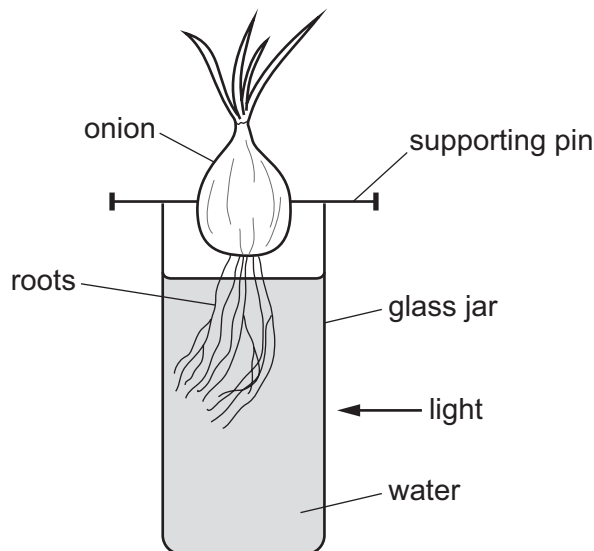
- 9 When an athlete prepares for the start of a sprint race, excitement causes the concentration of adrenaline in the blood to increase.

What effects does adrenaline have on the blood glucose concentration and the heart rate of the athlete?

	blood glucose concentration	heart rate
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

- 10 The diagram shows an onion bulb supported above water in a glass jar.

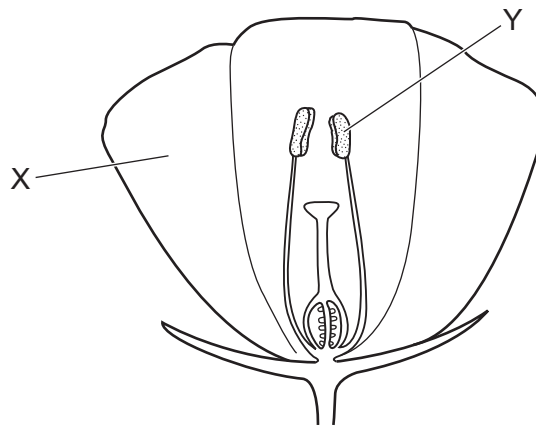
Light is shone onto one side of the jar only. The bulb has been left for a few days in a laboratory.



Which tropic responses have caused the roots to grow as they now appear?

	gravitropism causes the roots to grow	phototropism causes the roots to grow
A	away from gravity	away from light
B	away from gravity	towards light
C	towards gravity	away from light
D	towards gravity	towards light

11 The diagram shows a section through a flower.

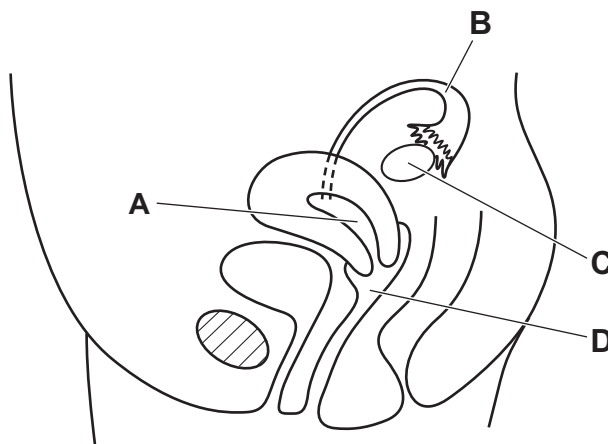


What are the correct labels and functions for parts X and Y of the flower?

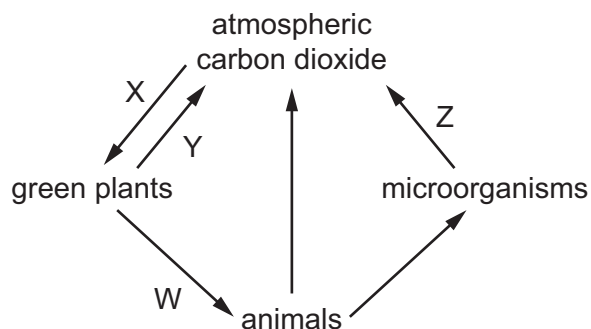
	X		Y	
	label	function	label	function
A	petal	attracts insects	anther	produces pollen grains
B	petal	protects flower	ovary	produces pollen grains
C	sepal	attracts insects	anther	contains egg cells
D	sepal	protects flower	ovary	contains egg cells

12 The diagram shows the female reproductive system.

In which structure does fertilisation normally happen?



13 The diagram shows part of the carbon cycle.



Which two labelled arrows represent respiration?

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

14 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

15 Some information about a sodium ion is shown.

particle	proton number	nucleon number	number of protons	number of neutrons	number of electrons
Na^+	11	23	11	X	Y

What are the values of X and Y?

	X	Y
A	11	10
B	11	11
C	12	10
D	12	11

16 Potassium carbonate reacts with dilute hydrochloric acid.

What are the products of this reaction?

- A potassium chloride and hydrogen
- B potassium chloride, water and carbon dioxide
- C potassium oxide, carbon dioxide and chlorine
- D potassium oxide, hydrogen and chlorine

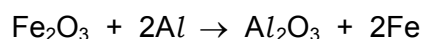
17 During electrolysis, which electrode does **not** produce a gas?

- A the anode during the electrolysis of concentrated aqueous sodium chloride
- B the anode during the electrolysis of molten lead(II) bromide
- C the cathode during the electrolysis of concentrated aqueous sodium chloride
- D the cathode during the electrolysis of molten lead bromide

18 What happens during **all** endothermic changes?

- A A gas is produced.
- B Solids melt.
- C The temperature decreases.
- D There is a colour change.

19 The equation for the reaction of iron(III) oxide with aluminium is shown.



What is oxidised during this reaction?

- A aluminium
- B aluminium oxide
- C iron
- D iron(III) oxide

- 20** Universal indicator is placed into a colourless liquid. The colour change of the universal indicator shows that the pH of the liquid is 6.

Which statement about the colourless liquid is correct?

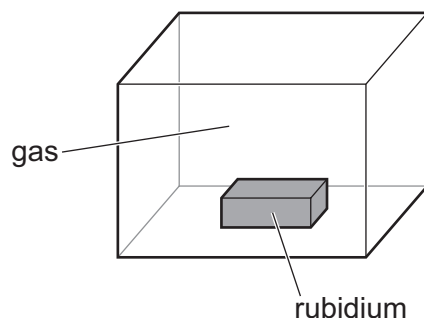
- A** It is an acid which turned the universal indicator red.
 - B** It is an acid which turned the universal indicator yellow.
 - C** It is an alkali which turned the universal indicator blue.
 - D** It is neutral liquid which turned the universal indicator green.
- 21** A solution of compound X produces a dark green precipitate when aqueous sodium hydroxide is added.

What is X?

- A** copper(II) chloride
 - B** copper(II) sulfate
 - C** iron(II) sulfate
 - D** iron(III) chloride
- 22** Which statement about the Periodic Table is correct?
- A** Elements change from metals to non-metals across a period.
 - B** Elements in Group II are non-metals.
 - C** Elements in the same period have similar chemical properties.
 - D** Lithium, sodium and potassium are soft metals in the same period.

23 Rubidium is a very reactive Group I metal.

It is kept in a sealed box surrounded by a gas.



Which gas does **not** react with rubidium?

- A chlorine
- B neon
- C oxygen
- D water vapour

24 Why is carbon used to extract some metals from their oxide ores?

- A It oxidises the ore by removing oxygen.
- B It prevents the oxygen of the air reacting with the ore.
- C It reacts with impurities in the ore.
- D It reduces the ore by removing oxygen.

25 A water supply contains small insoluble impurities. It also contains bacteria.

Which statement describes how the insoluble impurities are removed and how the bacteria are killed?

- A The water supply is filtered.
- B The water supply is filtered and treated with chloride ions.
- C The water supply is filtered and treated with chlorine.
- D The water supply is treated with chlorine and chloride ions.

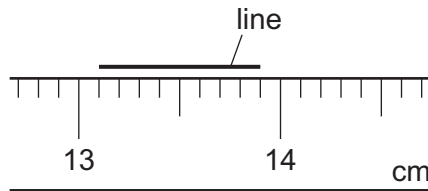
26 Which gases damage buildings?

- A carbon dioxide and carbon monoxide
- B carbon dioxide and sulfur dioxide
- C carbon monoxide and nitrogen dioxide
- D nitrogen dioxide and sulfur dioxide

27 What is formed during the complete combustion of a hydrocarbon?

- A carbon dioxide and water
- B carbon dioxide and hydrogen
- C carbon monoxide and carbon dioxide
- D carbon monoxide and water

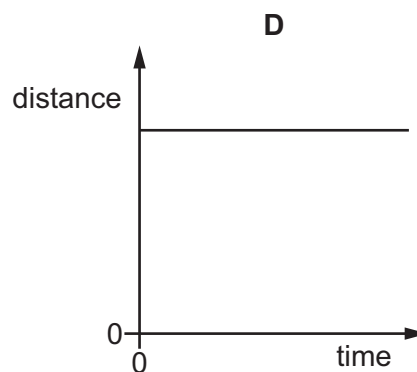
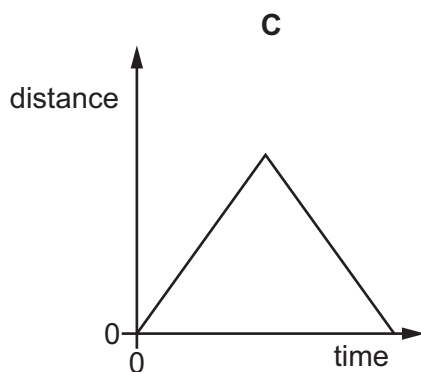
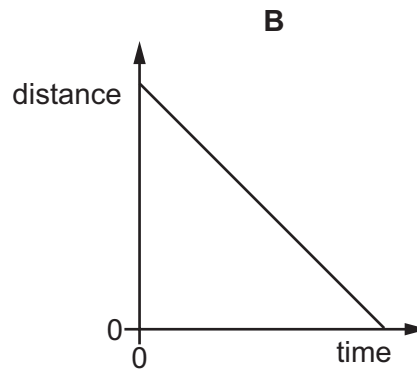
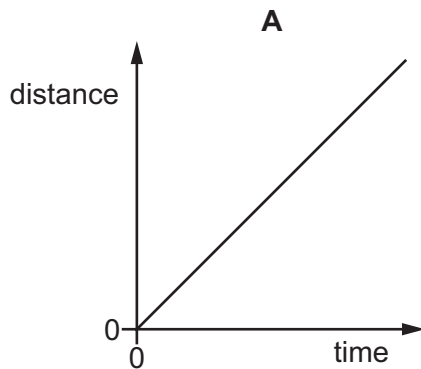
28 A student measures the length of a line using a rule.



What is the length of the line?

- A 0.8 cm B 0.9 cm C 1.0 cm D 1.2 cm

29 Which distance–time graph represents an object at rest?



- 30 The weight W and mass m of an object are related by the equation shown.

$$W = m \times g$$

What is the meaning of the quantity g and in which unit is it measured?

	meaning of g	unit
A	gravitational force on 1.0 kg	N/kg
B	gravitational force on the object	N
C	gravitational force on 1.0 kg	N
D	gravitational force on the object	N/kg

- 31 A solid cube has sides of length 2.0 cm.

The mass of the cube is 16 g.

What is the density of the cube?

- A** 0.50 g/cm³ **B** 2.0 g/cm³ **C** 4.0 g/cm³ **D** 32 g/cm³

- 32 A toy car rolls from rest down a slope and on to a horizontal bench.

The car stops before it reaches the end of the bench.

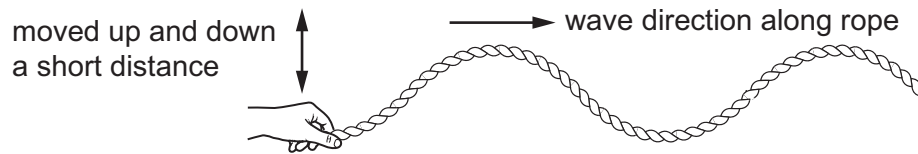
What energy changes take place during this journey?

- A** gravitational potential → kinetic → elastic potential
B gravitational potential → kinetic → thermal and sound
C kinetic → gravitational potential → elastic potential
D kinetic → gravitational potential → thermal and sound

- 33 Which row gives the melting point and the boiling point of water?

	melting point/°C	boiling point/°C
A	-10	100
B	-10	110
C	0	100
D	0	110

- 34** A student moves one end of a long rope up and down through a short distance. A wave travels along the rope in the direction shown.



The student now moves the rope up and down through a larger distance. He also moves it up and down more times in each minute.

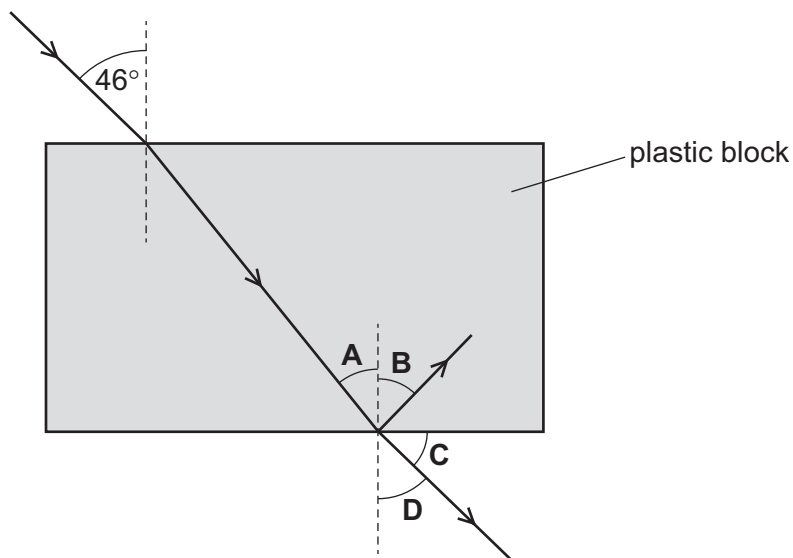
Which row shows the effects of these two changes?

	amplitude of the wave	frequency of the wave
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

- 35** A ray of light strikes one face of a parallel-sided plastic block. The angle of incidence is 46° .

At the opposite face, part of the ray is reflected and part is refracted into the air.

Which other labelled angle has a value of 46° ?



- 36** A student determines the speed of sound in air. She measures the time between making a sound and hearing the echo from a cliff.



She uses the equation: $\text{speed} = \frac{\text{distance}}{\text{time}}$.

Which type of sound does she make and which distance does she use in her calculation?

	type of sound	distance used
A	continuous sound	$2 \times \text{distance to cliff}$
B	continuous sound	$\frac{1}{2} \times \text{distance to cliff}$
C	short, sharp sound	$2 \times \text{distance to cliff}$
D	short, sharp sound	$\frac{1}{2} \times \text{distance to cliff}$

- 37** A polythene rod is rubbed with a cloth. The rod becomes positively charged.

What has happened to the rod?

- A** It has gained electrons.
- B** It has gained protons.
- C** It has lost electrons.
- D** It has lost protons.

- 38** A student records a current of 12 A in a resistor and a potential difference (p.d.) of 6.0 V across it.

What is the resistance of the resistor?

- A** 0.50Ω **B** 2.0Ω **C** 18Ω **D** 72Ω

- 39** A $3.0\ \Omega$ resistor and a $6.0\ \Omega$ resistor are connected in series.

What is their combined resistance?

- A** less than $3.0\ \Omega$
 - B** between $3.0\ \Omega$ and $6.0\ \Omega$
 - C** exactly $9.0\ \Omega$
 - D** exactly $18\ \Omega$
- 40** An electric oven is connected to the mains supply using insulated copper wires. The wires become very warm.

Which change reduces the amount of heat produced in the connecting wires?

- A** Use thicker copper wires.
- B** Use thinner copper wires.
- C** Use thicker insulation.
- D** Use thinner insulation.

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Group																	
I	II							III	IV	V	VI	VII	VIII				
		Key atomic number atomic symbol name relative atomic mass							1Hhydrogen1								
3Li lithium	4Be beryllium									5B boron	6C carbon	7N nitrogen	8O oxygen	9F fluorine	10Ne neon		
11Na sodium	12Mg magnesium									13Al aluminium	14Si silicon	15P phosphorus	16S sulfur	17Cl chlorine	18Ar argon		
19K potassium	20Ca calcium	21Sc scandium	22Ti titanium	23V vanadium	24Cr chromium	25Mn manganese	26Fe iron	27Co cobalt	28Ni nickel	29Cu copper	30Zn zinc	31Ga gallium	32Ge germanium	33As arsenic	34Se selenium	35Br bromine	36Kr krypton
37Rb rubidium	38Sr strontium	39Y yttrium	40Zr zirconium	41Nb niobium	42Mo molybdenum	43Tc technetium	44Ru ruthenium	45Rh rhodium	46Pd palladium	47Ag silver	48Cd cadmium	49In indium	50Sn tin	51Sb antimony	52Te tellurium	53I iodine	54Xe xenon
55Cs caesium	56Ba barium	57–71lanthanoids	72Hf hafnium	73Ta tantalum	74W tungsten	75Re rhenium	76Os osmium	77Ir iridium	78Pt platinum	79Au gold	80Hg mercury	81Tl thallium	82Pb lead	83Bi bismuth	84Po polonium	85At astatine	86Rn radon
87Fr francium	88Ra radium	89–103actinoids	104Rf rutherfordium	105Db dubnium	106Sg seaborgium	107Bh bohrium	108Hs hassium	109Mt meitnerium	110Ds darmstadtium	111Rg roentgenium	112Cn copernicium	113Nh nihonium	114Fl flerovium	115Lv livermorium	116Ts tennessine	117Uue unbinilium	118Og oganesson

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	europlum	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	femium	—	101	Md	mendelevium	—	102	No	nobelium	—	103	Lr	lawrencium	—