



Cambridge IGCSE™

COMBINED SCIENCE

0653/11

Paper 1 Multiple Choice (Core)

October/November 2021

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)

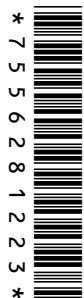
INSTRUCTIONS

- 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.

This document has **16** pages.



1 Movement is a characteristic of all living organisms.

Which two other characteristics of living organisms provide the energy for movement?

- A excretion and nutrition
- B growth and sensitivity
- C nutrition and respiration
- D respiration and growth

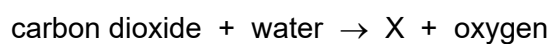
2 What are all living organisms made of?

- A cells
- B chloroplasts
- C muscles
- D organs

3 Which statement about enzymes is correct?

- A They are denatured at high temperatures.
- B They all have an optimum pH of 7.
- C They all have an optimum temperature of 10 °C.
- D They are made of carbohydrates.

4 The equation for photosynthesis is shown.



What does X represent?

- A chlorophyll
- B glucose
- C light
- D magnesium

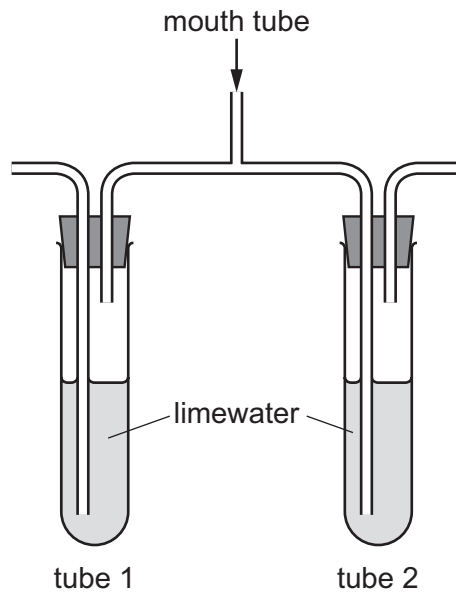
5 What happens during digestion?

	large pieces of food are broken down into small pieces	large molecules are broken down into small molecules
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

6 Which vessel does oxygenated blood enter the heart through?

- A** aorta
- B** pulmonary artery
- C** pulmonary vein
- D** vena cava

- 7 The diagram shows apparatus that is used to investigate the differences in composition between inspired and expired air.



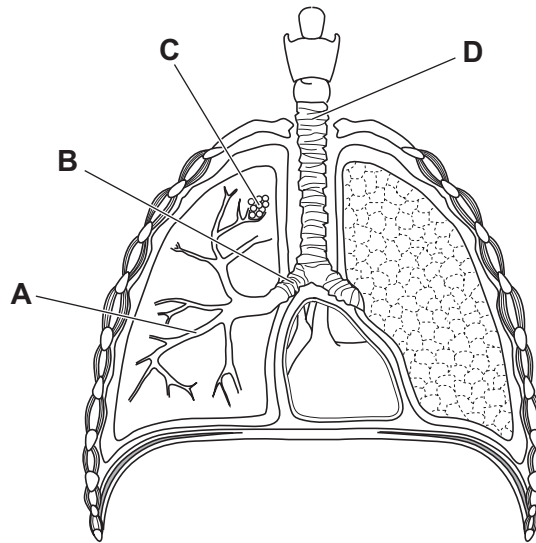
A person breathes in and out through the mouth tube.

Which row describes the conditions for tube 2 after several breaths?

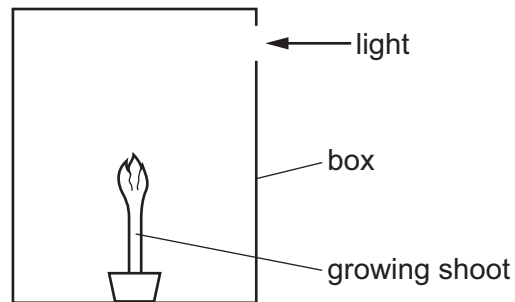
	type of air passed through limewater	appearance of limewater
A	expired	clear
B	expired	cloudy
C	inspired	clear
D	inspired	cloudy

8 The diagram shows some of the structures associated with the gas exchange system in humans.

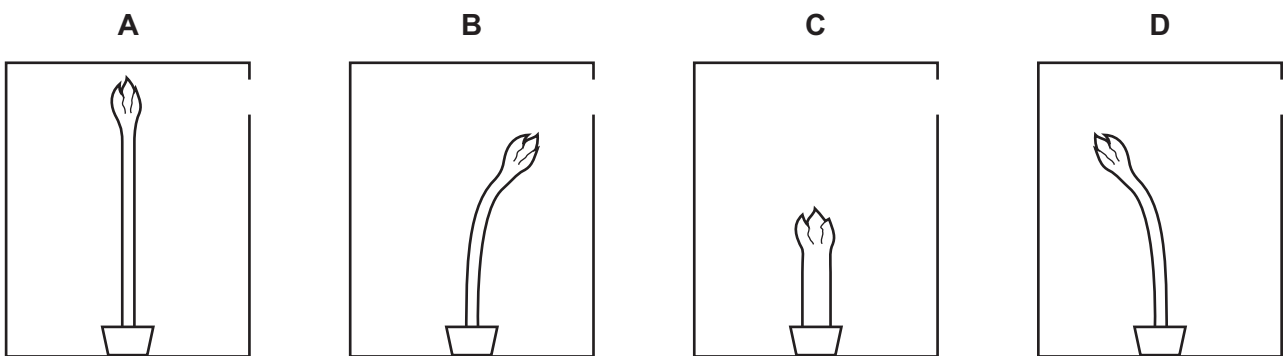
Which labelled structure is the trachea?



9 A student sets up an experiment to investigate phototropism in a shoot.



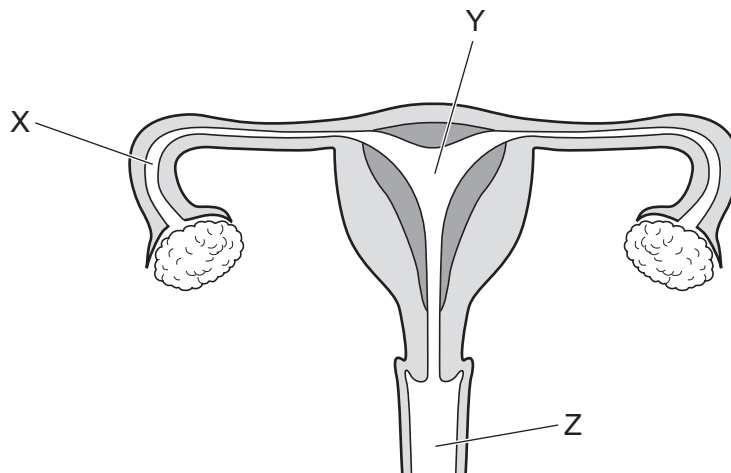
Which diagram shows the growth of the shoot after five days?



10 Which part of a flower is **not** required for pollination?

- A anther
- B sepal
- C stamen
- D stigma

11 The diagram shows the female reproductive system.



What are the correct functions of the labelled areas?

	X	Y	Z
A	development of fetus	receives penis during sexual intercourse	site of fertilisation
B	receives penis during sexual intercourse	site of fertilisation	development of fetus
C	site of fertilisation	development of fetus	receives penis during sexual intercourse
D	site of fertilisation	receives penis during sexual intercourse	development of fetus

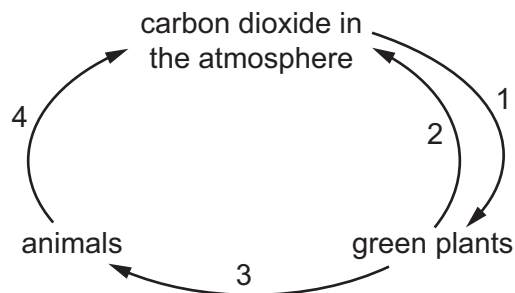
12 The diagram represents four organisms in a food chain.

T → U → V → 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

13 The diagram shows part of the carbon cycle.

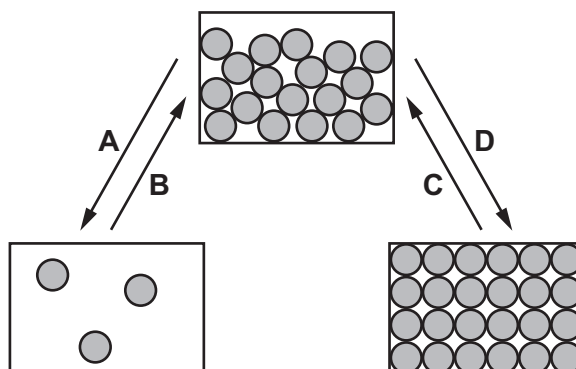


Which row identifies the numbered processes?

	process 1	process 2	process 3	process 4
A	respiration	photosynthesis	movement	photosynthesis
B	respiration	photosynthesis	feeding	respiration
C	photosynthesis	respiration	movement	decomposition
D	photosynthesis	respiration	feeding	respiration

14 The diagram represents the arrangements of particles in different physical states.

Which arrow represents evaporation?



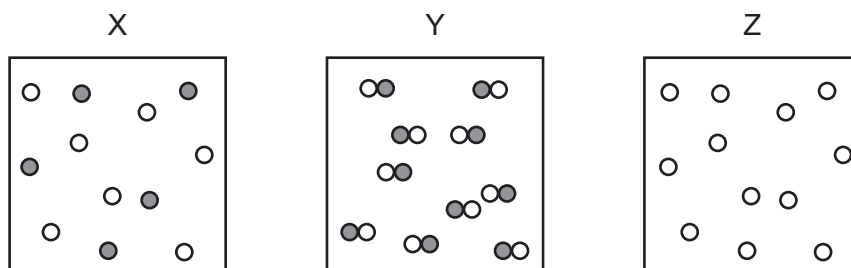
15 Which piece of apparatus is used to measure exactly 23.6 cm^3 of dilute hydrochloric acid?

- A** beaker
- B** burette
- C** conical flask
- D** measuring cylinder

16 Which process is **not** a chemical change?

- A electrolysis of molten lead bromide
- B fractional distillation of petroleum
- C oxidation of copper
- D rusting of iron

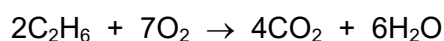
17 The diagrams represent the particles in substances X, Y and Z.



Which row identifies the element, the compound and the mixture?

	element	compound	mixture
A	X	Y	Z
B	X	Z	Y
C	Y	X	Z
D	Z	Y	X

18 The equation for the complete combustion of ethane, C_2H_6 , is shown.



What is the total number of product molecules formed per molecule of ethane in this reaction?

- A 2
- B 5
- C 6
- D 10

19 Dilute sulfuric acid is electrolysed using inert electrodes.

Which row describes the electrode products?

	anode	cathode
A	hydrogen	sulfur dioxide
B	hydrogen	oxygen
C	oxygen	hydrogen
D	sulfur dioxide	hydrogen

20 A salt is added to water.

The temperature of the water is measured before the salt is added and after it has dissolved completely.

initial temperature /°C	final temperature /°C
22	15

What is this process?

- A condensation
- B crystallisation
- C an endothermic change
- D an exothermic change

21 Hydrogen peroxide decomposes to form water and oxygen.

Which changes in temperature and in concentration **both** reduce the rate of this reaction?

	temperature of hydrogen peroxide	concentration of hydrogen peroxide
A	decrease	decrease
B	decrease	increase
C	increase	decrease
D	increase	increase

22 Which word equation correctly describes a reaction of dilute sulfuric acid?

- A sulfuric acid + zinc → zinc sulfate + water
- B sulfuric acid + zinc carbonate → zinc sulfate + carbon dioxide
- C sulfuric acid + zinc hydroxide → zinc sulfate + water
- D sulfuric acid + zinc oxide → zinc sulfate + hydrogen

23 A piece of damp blue litmus paper is placed in a gas.

The litmus paper turns red and then turns white.

What is the gas?

- A** carbon dioxide
- B** chlorine
- C** hydrogen
- D** oxygen

24 Which part of the Periodic Table contains elements that are used as catalysts?

- A** Group I
- B** Group VII
- C** noble gases
- D** transition metals

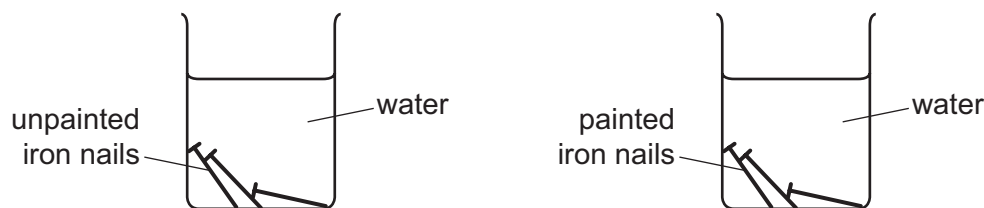
25 Brass is an alloy.

What is brass?

- A** a compound containing two metallic elements
- B** a compound containing two non-metallic elements
- C** a mixture containing two metallic elements
- D** a mixture containing two non-metallic elements

26 A student measures the masses of three unpainted and three painted iron nails.

The student places the nails into separate beakers of water.



After one week, the student removes the nails from the beakers, dries them and measures the masses again.

Which row about the masses of the iron nails is correct?

	mass of unpainted iron nails	mass of painted iron nails
A	decreased	decreased
B	decreased	unchanged
C	increased	increased
D	increased	unchanged

27 Which statements about methane are correct?

- 1 It is the main constituent of natural gas.
- 2 It is generally unreactive.
- 3 It turns aqueous bromine colourless.
- 4 It contains a double covalent bond.

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

28 A student wants to find the period of a pendulum. He measures the time taken for the pendulum to make one complete oscillation. He repeats the measurement several times.

His results are shown in the table.

measurement	1	2	3	4	5	6
time taken/s	1.6	1.4	1.4	1.5	1.4	1.7

What is the most accurate value for the period of the pendulum?

A 1.4 s **B** 1.5 s **C** 1.7 s **D** 9.0 s

29 What is the unit for force and what is the unit for weight?

	force	weight
A	kg	kg
B	kg	N
C	N	kg
D	N	N

30 A cube is made of material of density 2.0 g/cm^3 .

The mass of the cube is 16 g.

What is the length of a side of the cube?

- A** 2.0 cm **B** 2.8 cm **C** 8.0 cm **D** 32 cm

31 A power supply is connected to an electric motor. The motor is used to raise a load vertically.

Which energy transfer takes place during this process?

- A** electrical energy into gravitational potential energy of the load
B gravitational potential energy into kinetic energy of the load
C kinetic energy of the motor into electrical energy
D thermal energy in the motor into electrical energy

32 Which method of generating electricity uses a non-renewable energy source?

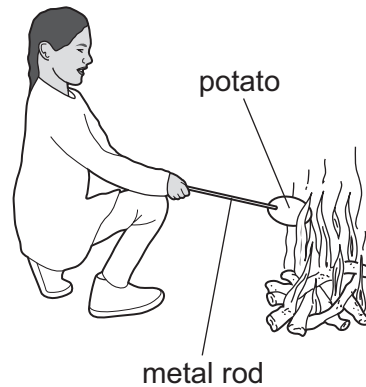
- A** nuclear power station
B solar panel
C hydroelectric power station
D wind turbine

33 The most energetic molecules of a liquid escape from its surface and the temperature of the liquid decreases.

Which process is occurring?

- A** boiling
B condensation
C evaporation
D melting

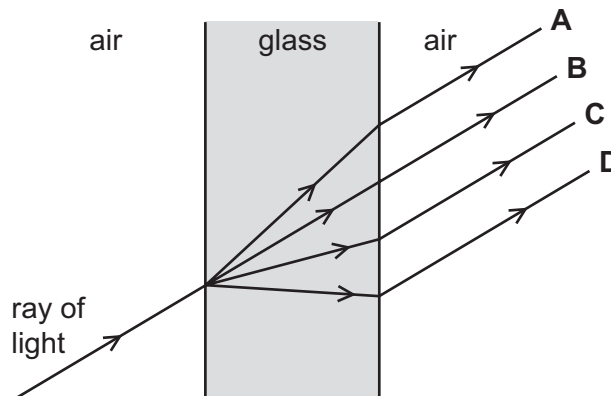
- 34 A student cooks a potato in a fire. The student holds the potato using a metal rod.



Which transfer of thermal energy is caused mainly by radiation?

- A from the fire to the air above the fire
 - B from the fire to the student's face
 - C from the inside of the potato to the student's hand
 - D from the outside of the potato to the inside of the potato
- 35 A ray of light passes through a glass window.

Which path does it take?



- 36 An astronaut wearing a spacesuit is outside a space station in the vacuum of space.

A second astronaut inside the space station makes a knocking sound against the metal walls of the space station.

Why can the astronaut outside the space station **not** hear this sound?

- A Sound cannot travel through the air inside the space station.
- B Sound cannot travel through the metal walls of the space station.
- C Sound cannot travel through the spacesuit of the astronaut.
- D Sound cannot travel through the vacuum outside the space station.

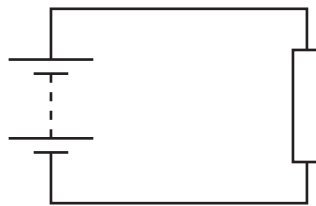
37 A plastic rod becomes negatively charged when rubbed with a cloth.

The cloth becomes positively charged.

Which statement describes the charging process?

- A The rod and the cloth both gain electrons.
- B The rod and the cloth both lose electrons.
- C The rod gains electrons and the cloth loses electrons.
- D The rod loses electrons and the cloth gains electrons.

38 A circuit contains a battery connected to a resistor.

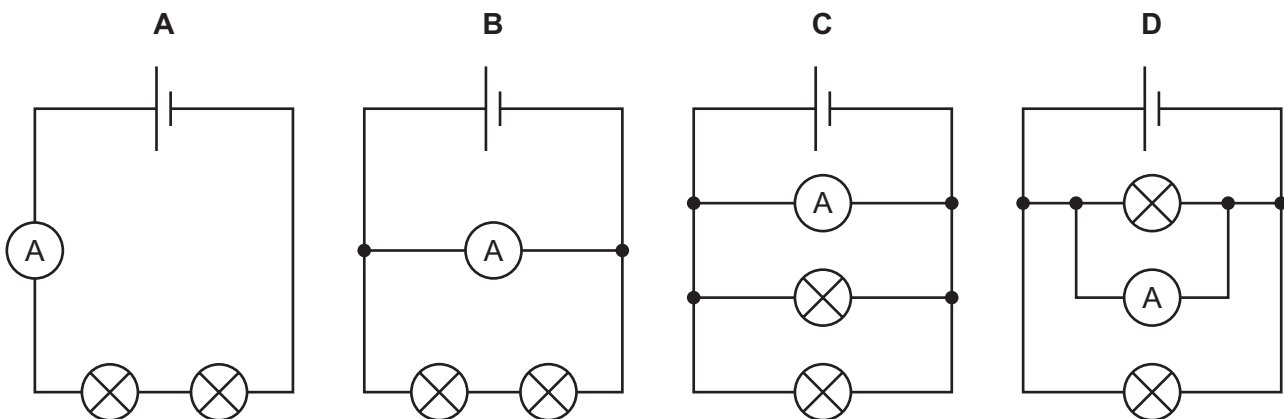


Which values of electromotive force (e.m.f.) and resistance produce the smallest current in the circuit?

	e.m.f./V	resistance/ Ω
A	6.0	10
B	6.0	20
C	24	80
D	24	160

39 The diagrams show four circuits, each containing an ammeter and two lamps with different resistances.

Which circuit shows an ammeter with a reading equal to the current in each lamp?



- 40 What is the purpose of a fuse in an electric circuit?
- A It acts as an extra resistor in the circuit.
 - B It keeps the current at a steady value.
 - C It keeps the voltage at a steady value.
 - D It protects the circuit from a current that is too large.

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The Periodic Table of Elements

Group																																																																																																				
I	II											III	IV	V	VI	VII	VIII																																																																																			
3 Li lithium 7	4 Be beryllium 9	<table border="1"> <thead> <tr> <th colspan="3">Key</th> </tr> <tr> <th>atomic number</th> <th>atomic symbol</th> <th>name</th> </tr> <tr> <th>relative atomic mass</th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>1</td> <td>H</td> <td>hydrogen</td> </tr> </tbody> </table>										Key			atomic number	atomic symbol	name	relative atomic mass			1	H	hydrogen	5 B boron 11	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	10 Ne neon 20	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	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																																																																																																				
1	H	hydrogen																																																																																																		

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 dm³ at room temperature and pressure (r.t.p.).