

Cambridge IGCSE™

COMBINED SCIENCE

0653/12

Paper 1 Multiple Choice (Core)

October/November 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

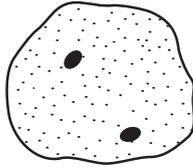
- The total mark for this paper is 40.
- Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

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

- 1 A plant is placed next to a window. After a few days, its leaves face the light.

Which characteristic is this displaying?

- A excretion
 - B nutrition
 - C respiration
 - D sensitivity
- 2 The diagram shows a cell from an animal's liver.



In what way does this cell differ from a typical animal cell?

- A It contains a central vacuole.
 - B It contains cytoplasm.
 - C It contains two nuclei.
 - D It has a cell wall.
- 3 Particles move from one area to another by diffusion.

Which row is correct about this movement?

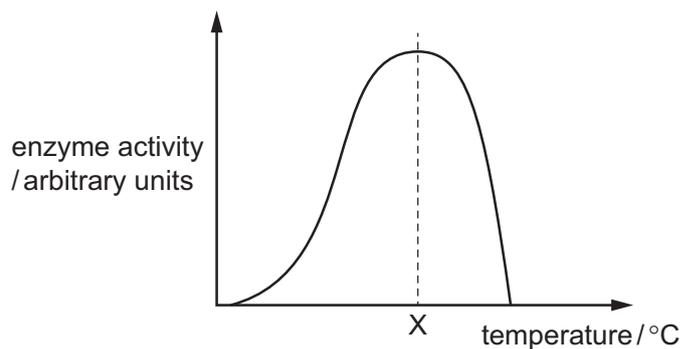
	concentration of particles in area from which they move	concentration of particles in area to which they move	movement of molecules
A	high	high	in a pattern
B	high	low	random
C	low	high	random
D	low	low	in a pattern

- 4 A student has samples of food and wants to test them for starch.

What should the student use to do this?

- A Benedict's solution
- B iodine solution
- C limewater
- D water and ethanol

- 5 The diagram shows how the activity of an enzyme changes with temperature.



This enzyme works in the human body.

What is the most likely value of temperature X?

- A 10°C
 - B 40°C
 - C 70°C
 - D 100°C
- 6 Corals are animals found in the sea. They can only survive if they live in a close relationship with algae. Algae can photosynthesise.

What do the algae produce that corals can use to survive?

	carbon dioxide	chlorophyll	glucose	oxygen
A	✓	✓	x	x
B	✓	x	x	✓
C	x	✓	✓	x
D	x	x	✓	✓

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 Which breakdown processes occur inside cells, and which occur outside cells?

	large molecules to small molecules for absorption	breakdown of glucose to release energy
A	inside	inside
B	inside	outside
C	outside	inside
D	outside	outside

9 Which blood vessel carries blood from the heart to the lungs?

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

10 What are the effects of adrenaline on the human body?

	breathing rate	pulse rate
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

11 Which row describes asexual reproduction?

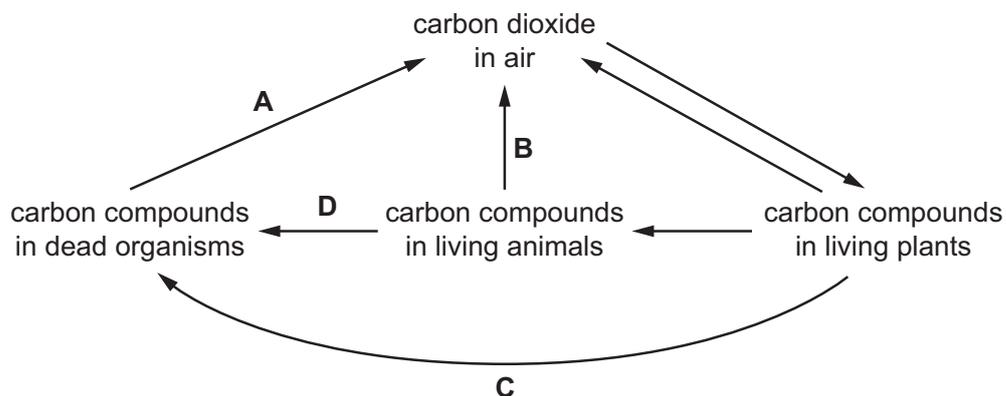
	number of parents	a zygote is produced	offspring identical to the parent
A	1	no	yes
B	1	yes	no
C	2	no	yes
D	2	yes	no

12 On which part of a flower is pollen deposited during pollination?

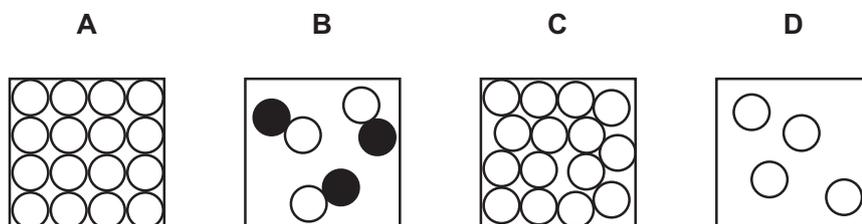
- A** ovary
- B** stamen
- C** stigma
- D** style

13 The diagram shows part of the carbon cycle.

Which arrow represents respiration by decomposers?

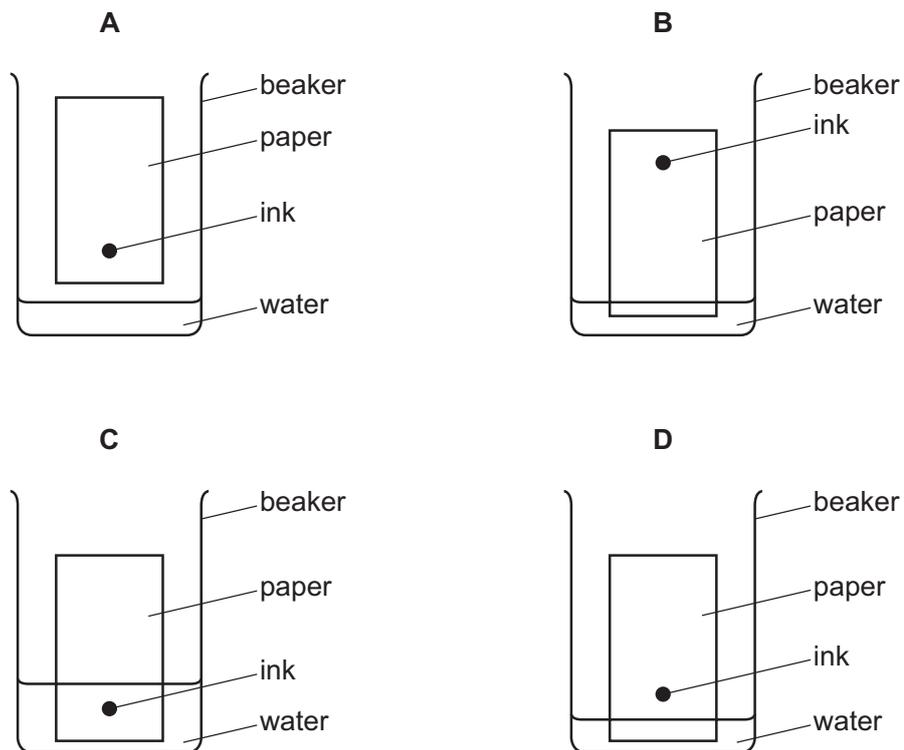


14 Which diagram represents particles in a gaseous element?



15 Chromatography separates ink into different colours.

Which diagram shows how the apparatus is set up?



16 Which processes are physical changes?

- 1 burning methane gas
- 2 dissolving sugar in water
- 3 evaporating ethanol
- 4 melting an ice cube
- 5 rusting of iron

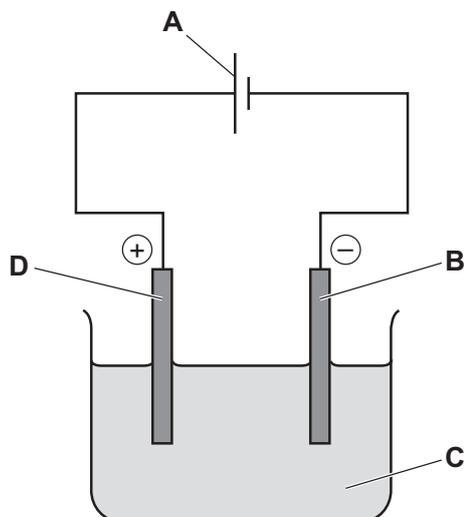
A 1, 3 and 4 **B** 1, 4 and 5 **C** 2, 3 and 4 **D** 2, 3 and 5

17 Which equation for the complete combustion of propane, C_3H_8 , is correct?

- A** $C_3H_8 + 2O_2 \rightarrow 3C + 4H_2O$
- B** $2C_3H_8 + 3O_2 \rightarrow 6CO + 8H_2$
- C** $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$
- D** $C_3H_8 + 3O_2 \rightarrow 3CO_2 + 4H_2$

18 The diagram shows the electrolysis of molten lead(II) bromide.

Which label shows the cathode?



19 Which temperature changes occur during exothermic and endothermic reactions?

	exothermic	endothermic
A	decreases	increases
B	decreases	no change
C	increases	decreases
D	increases	no change

20 Magnesium reacts with zinc oxide to form magnesium oxide and zinc.

Which substance is reduced in this reaction?

- A** magnesium
- B** magnesium oxide
- C** zinc
- D** zinc oxide

21 Dilute hydrochloric acid is tested with universal indicator and with calcium carbonate.

Which row shows the results?

	pH	reaction with calcium carbonate
A	2	a colourless gas is given off
B	2	no reaction
C	10	a colourless gas is given off
D	10	no reaction

22 Acid X reacts with metal Y.

A colourless gas is given off and a pale green solution is produced.

Two tests are carried out on the solution.

test	reagent(s) added	result
1	aqueous silver nitrate and nitric acid	white precipitate
2	aqueous sodium hydroxide	green precipitate

What are acid X and metal Y?

	acid	metal
A	hydrochloric	iron
B	hydrochloric	zinc
C	sulfuric	iron
D	sulfuric	zinc

23 Which row describes a Group I element?

	metal or non-metal	reaction with water
A	metal	fast reaction
B	metal	no reaction
C	non-metal	fast reaction
D	non-metal	no reaction

24 Substance X is a coloured solid.

Substance X acts as a catalyst for the reaction between zinc and dilute sulfuric acid.

Molten X can be electrolysed.

What is X?

- A** a Group I compound
- B** a Group I metal
- C** a transition metal compound
- D** a transition metal

25 Which method is used to extract copper from copper(II) oxide?

- A** dissolving copper(II) oxide in hydrochloric acid and then filtering
- B** dissolving copper(II) oxide in water and then filtering
- C** heating the copper(II) oxide
- D** heating the copper(II) oxide mixed with carbon

26 Which processes are used in water treatment?

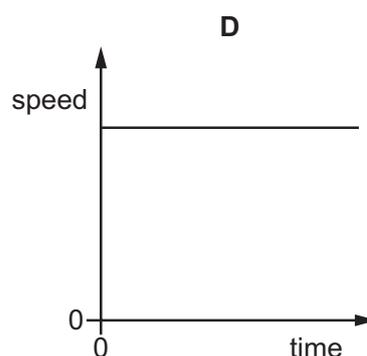
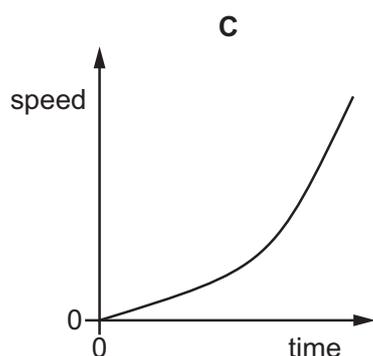
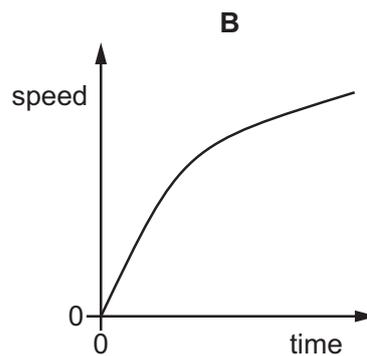
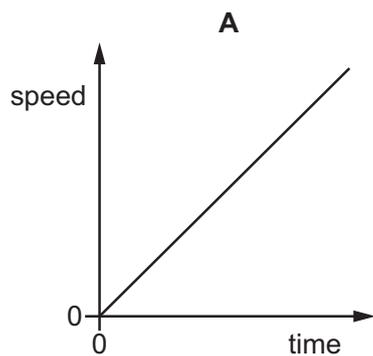
- 1 chlorination
- 2 cracking
- 3 filtration

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

27 Which statement describes a hydrocarbon?

- A** a compound that burns to form carbon dioxide and hydrogen
- B** a compound that contains carbon and hydrogen only
- C** a compound that only contains ionic bonds
- D** a compound that reacts easily with metals

28 Which speed–time graph represents motion for which the acceleration is constant but **not** zero?



29 A solid metal cube of side 5.0 cm has a mass of 250 g.

What is the density of the metal?

- A** 0.50 g/cm³ **B** 2.0 g/cm³ **C** 10 g/cm³ **D** 50 g/cm³

30 A car powered by a petrol (gasoline) engine is driven along a horizontal road.

How is energy stored in the petrol and what form of energy does the car have because it is moving?

	energy in petrol	energy of moving car
A	chemical potential	gravitational potential
B	chemical potential	kinetic
C	electrical	gravitational potential
D	electrical	kinetic

31 The molecules of a liquid are close together.

What are other features of the molecules in a liquid?

- A They are arranged in a regular pattern but change positions with each other.
- B They are arranged in a regular pattern and vibrate about fixed positions.
- C They are arranged randomly and change positions with each other.
- D They are arranged randomly and vibrate about fixed positions.

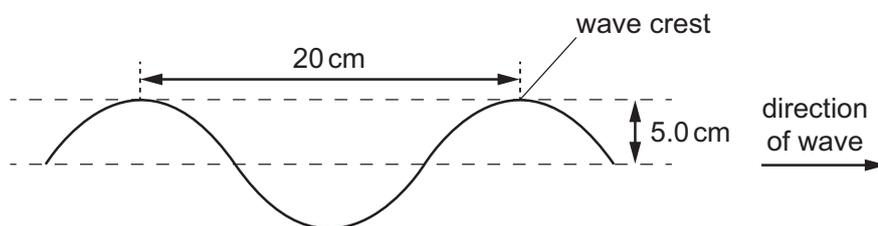
32 In which states of matter can convection occur?

	in a solid	in a liquid	in a gas
A	no	no	yes
B	no	yes	yes
C	yes	no	no
D	yes	yes	no

33 The diagram shows a section of a rope.

Four wave crests pass a point on the rope every second.

Each wave crest travels 80 cm in one second.

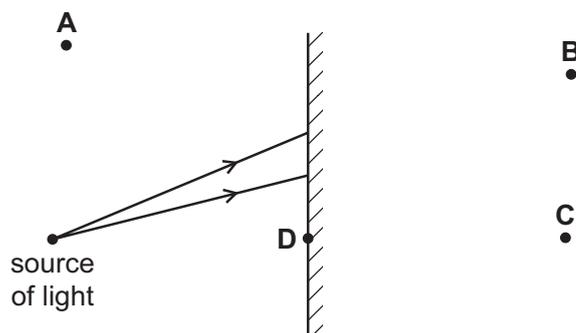


What is the speed of the wave?

- A 4.0 cm/s
- B 5.0 cm/s
- C 20 cm/s
- D 80 cm/s

- 34 A source of light is placed in front of a plane mirror.

Which labelled point shows the position of the image of the source?



- 35 Radio waves, visible light and X-rays all travel in a vacuum.

Which wave travels at the greatest speed?

- A radio waves
 - B visible light
 - C X-rays
 - D they all travel at the same speed
- 36 Which is **not** able to transmit sound waves?
- A a gas
 - B a liquid
 - C a solid
 - D a vacuum
- 37 A positively charged sphere hangs from an insulating thread.

A student brings a rod close to the sphere.

The sphere moves away from the rod.

Which conclusion can the student draw about the rod?

- A It is charged but it is not possible to know whether it is negatively or positively charged.
- B It is negatively charged.
- C It is not charged.
- D It is positively charged.

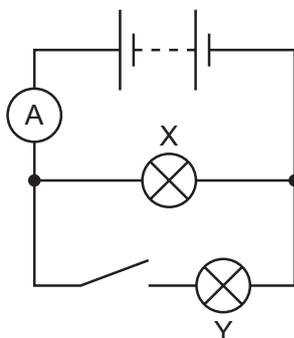
38 A power supply causes a current in a circuit.

The electromotive force (e.m.f.) of the power supply and the resistance of the circuit are both changed.

Which pair of changes **must** result in a smaller current in the circuit?

	e.m.f.	resistance
A	decreased	decreased
B	decreased	increased
C	increased	decreased
D	increased	increased

39 The diagram shows an electric circuit. The switch is closed and both lamps are lit.



Lamp Y is now switched off. Lamp X remains lit.

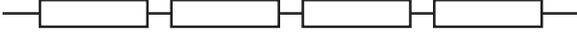
What happens to the reading on the ammeter?

- A** It decreases to zero.
- B** It decreases but to a value greater than zero.
- C** It stays the same.
- D** It increases.

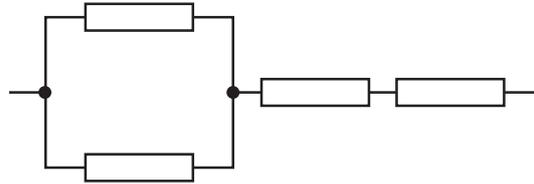
40 The diagrams show four identical resistors connected in different combinations.

Which combination has the greatest combined resistance?

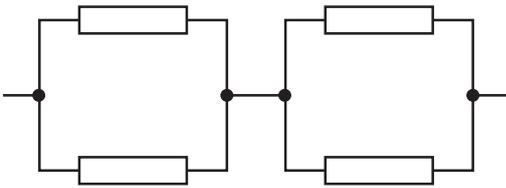
A



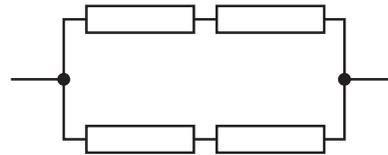
B



C



D



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The Periodic Table of Elements

		Group															
I	II	III	IV	V	VI	VII	VIII					VIII					
3 Li lithium 7	4 Be beryllium 9	1 H hydrogen 1	5 B boron 11	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	10 Ne neon 20					18 Ar argon 40				
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					36 Kr krypton 84						
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 dm³ at room temperature and pressure (r.t.p.).