Cambridge Assessment International Education

Cambridge IGCSE™

COMBINED SCIENCE **0653/11**

Paper 1 Multiple Choice (Core) **May/June 2022**

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. Any blank pages are indicated.

1 What is the outermost layer of an animal cell and a plant cell?

	animal cell	plant cell
A	cell membrane	cell membrane
B	cell membrane	cell wall
C	cell wall	cell membrane
D	cell wall	cell wall

2 Most cars burn fossil fuels to release energy for their movement.

Which characteristic of living organisms is similar to this?

A excretion

B growth

C nutrition

D respiration

3 The table shows the results of tests carried out on a food sample.

test carried out	final colour
Benedict's	orange
biuret	blue
ethanol emulsion	milky white
iodine	brown

What is present in the food sample?

A oil and protein

B oil and reducing sugar

C protein and starch

D reducing sugar and starch

4 Which statement about enzymes is correct?

A Enzymes are biological catalysts.

B Enzymes are made of glycerol.

C Enzymes are not affected by changes in pH.

D Enzymes are not affected by changes in temperature.

5 A plant that lives in water is exposed to sunlight. After a short period of time, bubbles of gas are given off from the plant.

Which gas do the bubbles contain, and which process produces this gas?

	gas	process
A	carbon dioxide	photosynthesis
B	carbon dioxide	respiration
C	oxygen	photosynthesis
D	oxygen	respiration

6 Which foods are rich in carbohydrate?

1 eggs

2 meat

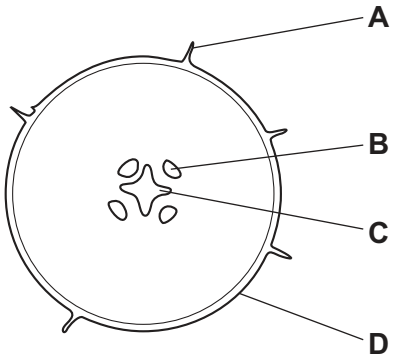
3 potatoes

4 rice

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

7 The diagram shows a cross-section of a dicotyledonous root.

Which label correctly identifies the xylem?



8 Physical activity affects our rate and depth of breathing.

What happens during **increased** physical activity?

	rate of breathing	depth of breathing
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

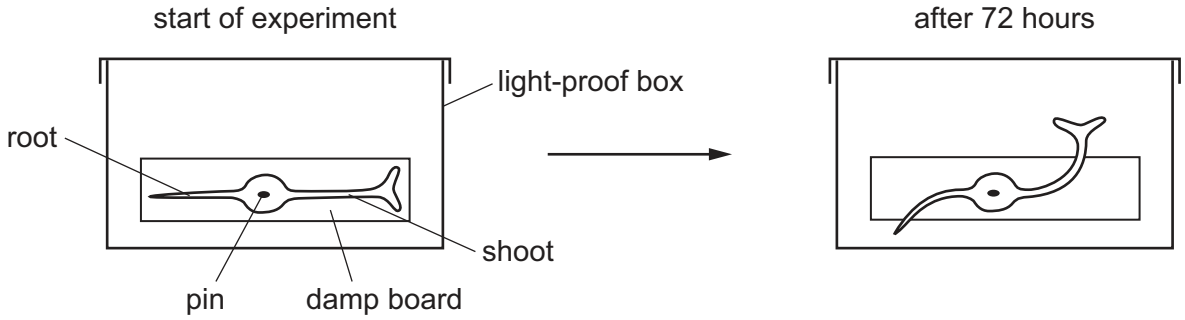
9 Which responses occur as a result of adrenaline secretion?

	increased breathing rate	decreased pupil diameter	increased pulse rate
A	✓	✗	✗
B	✓	✗	✓
C	✗	✓	✓
D	✗	✓	✗

key
✓ = does occur
✗ = does not occur

10 A plant seedling is pinned horizontally onto a damp board inside a light-proof box.

The diagrams show the seedling at the start of the experiment and after 72 hours.



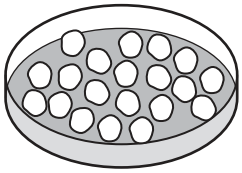
Which response is shown by the root and the shoot?

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

11 A student investigates germination in bean seeds.

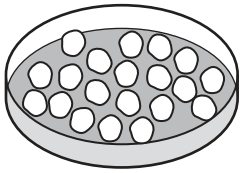
In which set of conditions will the seeds germinate?

A



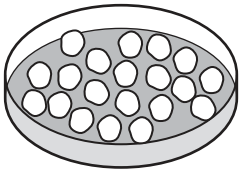
5 °C
water
carbon dioxide

B



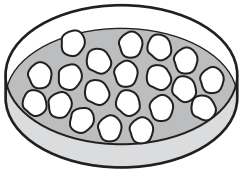
5 °C
no water
oxygen

C



20 °C
no water
carbon dioxide

D



20 °C
water
oxygen

12 Two food chains are shown.

wheat → vole → fox → tick

grass → rabbit → fox → flea

What are the vole and rabbit classified as in these food chains?

A primary consumers

B producers

C secondary consumers

D tertiary consumers

13 Which process in the carbon cycle releases carbon into the environment?

A feeding

B fossilisation

C photosynthesis

D respiration

14 What happens to water molecules when water freezes?

A They become arranged more regularly.

B They become smaller.

C They move much closer together.

D They move faster.

15 Which row describes a chemical change?

	test	result
A	one end of a piece of aluminium is heated	the other end gets hot
B	calcium carbonate is heated	carbon dioxide is made
C	a piece of iron is heated	it becomes more malleable
D	a beaker of water is heated	steam is made

16 What describes a solvent?

A a solid that dissolves in a liquid

B the amount of solid that dissolves in a liquid

C the liquid in which a solid dissolves

D the mixture formed when a solid dissolves in a liquid

17 Which groups of the Periodic Table form compounds containing covalent bonds?

A Group I and Group 0

B Group I and Group VII

C Group V and Group 0

D Group V and Group VII

18 What is the chemical formula of nitric acid?

A HCl **B** HNO_3 **C** H_2SO_4 **D** NH_3

19 Which type of substance undergoes electrolysis?

A molten covalent compounds

B solid ionic compounds

C gaseous covalent compounds

D aqueous solutions of ionic compounds

20 Which row shows what happens during an endothermic reaction?

	reaction mixture temperature	thermal energy transfer
A	decreases	from the surroundings
B	decreases	to the surroundings
C	increases	from the surroundings
D	increases	to the surroundings

21 Carbon reacts with carbon dioxide at high temperatures.

carbon + carbon dioxide $\rightarrow$ carbon monoxide

Which statement about the reaction is correct?

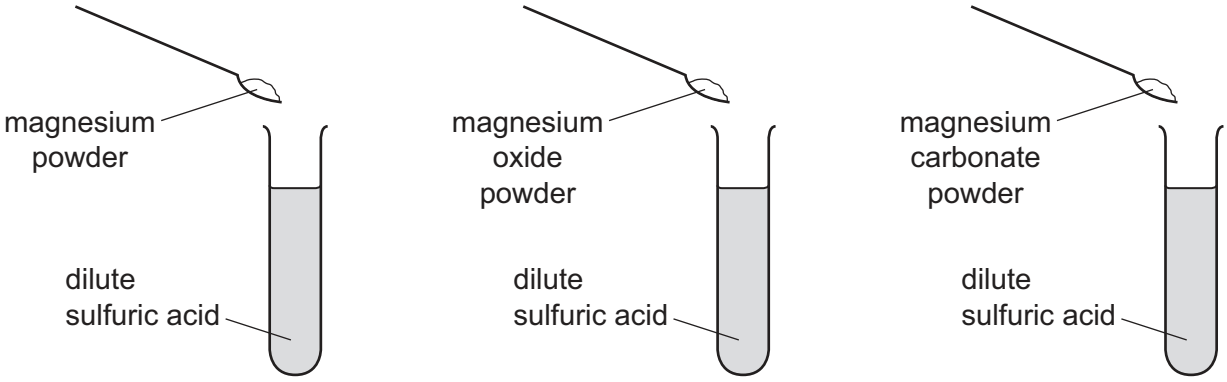
A Both carbon and carbon dioxide are oxidised.

B Both carbon and carbon dioxide are reduced.

C The carbon is oxidised and the carbon dioxide is reduced.

D The carbon is reduced and the carbon dioxide is oxidised.

22 Three powders are added to dilute sulfuric acid, as shown.



Which powders react to produce water?

	magnesium	magnesium oxide	magnesium carbonate
A	✓	✓	✗
B	✓	✗	✗
C	✗	✓	✓
D	✗	✗	✓

key

✓ = does produce water

✗ = does not produce water

23 The results of two tests on substance Q are shown.

test	result
add dilute hydrochloric acid to solid Q	bubbles of colourless gas, R, which turns limewater milky
add aqueous sodium hydroxide to a solution of Q	green precipitate

Which cation is present in Q and what is gas R?

	cation present in Q	gas R
A	iron(II)	carbon dioxide
B	iron(II)	chlorine
C	iron(III)	carbon dioxide
D	iron(III)	chlorine

[Turn over

24 Which row describes a transition element?

	density	coloured compounds	acts as a catalyst
A	high	no	no
B	high	yes	yes
C	low	no	yes
D	low	yes	no

25 Which substance does **not** react with chlorine?

A H_2 **B** Kr **C** Li **D** NaBr

26 Which statement about a chemical test for water is correct?

A Anhydrous cobalt(II) chloride turns blue.

B Anhydrous cobalt(II) chloride turns white.

C Anhydrous copper(II) sulfate turns blue.

D Anhydrous copper(II) sulfate turns white.

27 Methane, ethane and propane are all alkanes. Their formulae are shown.

methane, CH_4

ethane, C_2H_6

propane, C_3H_8

Which statement is **not** correct?

A All three compounds are hydrocarbons.

B All three compounds burn.

C Methane is the main constituent of natural gas.

D Propane burns completely to form carbon dioxide and hydrogen.

28 The mass of a solid object is 1.6 kg and the volume of the object is 80 cm^3.

What is the density of the object?

A 0.020 kg/cm^3

B 0.20 kg/cm^3

C 5.0 kg/cm^3

D 50 kg/cm^3

29 Which statement about forces is always correct?

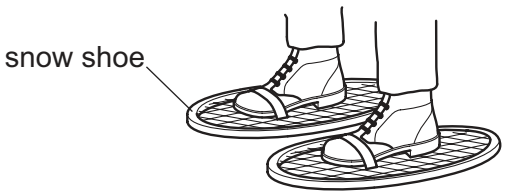
A A resultant force is needed to keep an object moving at constant speed in a straight line.

B Air resistance acting on an object falling in still air causes its speed to increase.

C Friction on an object sliding along rough ground acts in the opposite direction to its motion.

D No forces act on any object that is at rest.

30 A man walking on snow in normal shoes sinks into the snow. The man puts on snow shoes and does not sink into the snow.



Which row explains why this happens?

	area of contact with snow	weight of man
A	decreased	decreased
B	decreased	unchanged
C	increased	decreased
D	increased	unchanged

31 Which two energy sources are both renewable?

A coal and waves

B geothermal and nuclear

C oil and tides

D wind and solar

32 Which process is the escape of more-energetic molecules from the surface of a liquid?

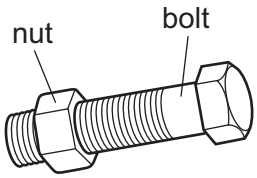
A condensation

B convection

C evaporation

D radiation

33 A mechanic cannot remove a large steel nut from a steel bolt because it is too tight.



What does the mechanic do to help remove the nut?

A cool the nut and heat the bolt

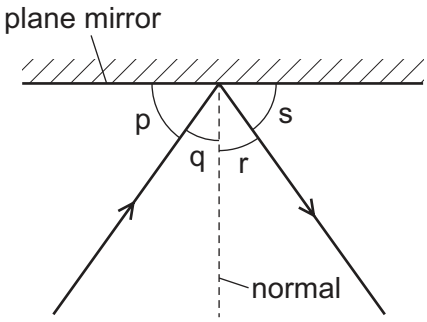
B heat the bolt only

C heat the nut and the bolt through the same temperature rise

D heat the nut only

34 The diagram shows a ray of light being reflected from a plane mirror.

Four angles are labelled p, q, r and s.



Which angles are the angle of incidence and the angle of reflection?

	angle of incidence	angle of reflection
A	p	r
B	p	s
C	q	r
D	q	s

35 Which region of the electromagnetic spectrum is used in remote controllers to control a television?

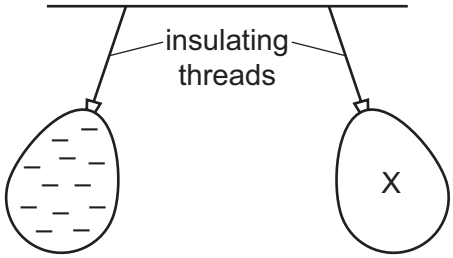
A microwaves

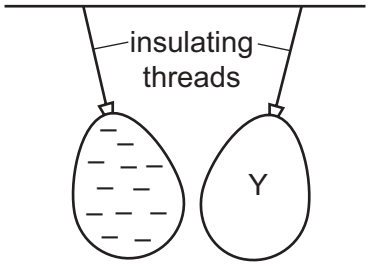
B infrared

C ultraviolet

D visible light

36 Two balloons X and Y are suspended by insulating threads. They are each held near a negatively charged balloon. The balloons hang as shown.





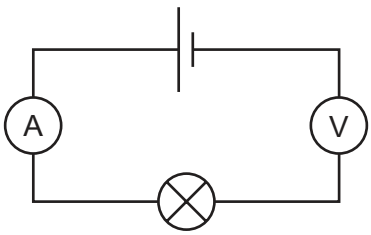
What is the charge on balloon X and what is the charge on balloon Y?

	balloon X	balloon Y
A	negative	negative
B	negative	positive
C	positive	negative
D	positive	positive

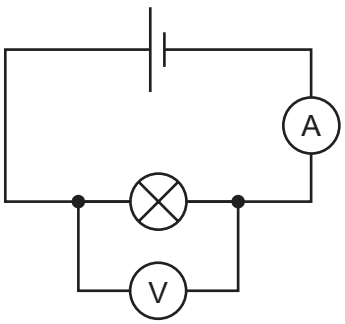
37 A student sets up a circuit to measure the current in a lamp and the potential difference (p.d.) across it.

Which circuit shows the correct connection of the ammeter and the voltmeter?

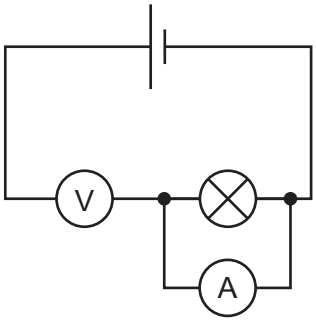
A



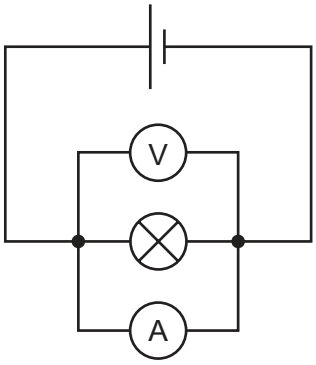
B



C



D



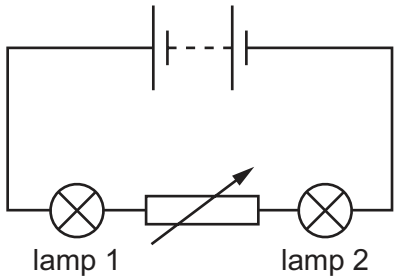
38 The diagram shows a label on the side of a lamp.

12 V
3.0 A
36 W

What is the resistance of the lamp when it is operating normally?

A 0.25 Ω **B** 0.33 Ω **C** 3.0 Ω **D** 4.0 Ω

39 A circuit contains two lamps and a variable resistor.



The resistance of the variable resistor is increased.

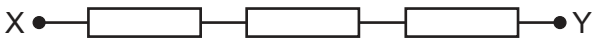
What happens to the brightness of lamp 1 and what happens to the brightness of lamp 2?

	brightness of lamp 1	brightness of lamp 2
A	decreases	decreases
B	decreases	increases
C	no change	decreases
D	no change	increases

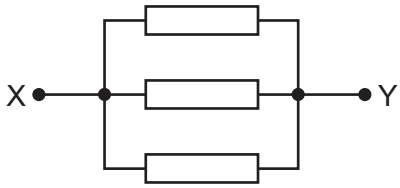
40 Identical resistors are connected together in different arrangements.

Which arrangement has the greatest resistance between points X and Y?

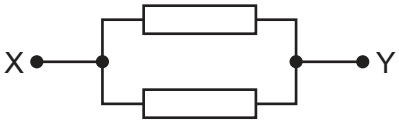
A



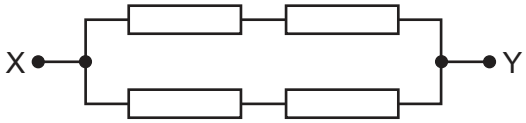
B



C



D



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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 –		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 dm^3 at room temperature and pressure (r.t.p.).