Cambridge Assessment International Education

Cambridge IGCSE™

COMBINED SCIENCE **0653/12**

Paper 1 Multiple Choice (Core) **February/March 2025**

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.
- Take the weight of 1.0 kg to be 9.8 N (acceleration of free fall = 9.8 m / s^2).

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 Process Q happens in cells.

glucose → process Q → energy released

What is process Q?

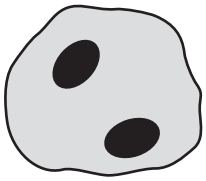
A growth

B nutrition

C respiration

D sensitivity

2 The diagram shows a cell from an animal's liver.



Which statement describes how this cell is different from a typical animal cell?

A It contains a vacuole.

B It contains a cell wall.

C It contains cytoplasm.

D It contains two nuclei.

3 Which statement about large molecules is correct?

A Fats are made from fatty acids and glucose.

B Glycogen forms part of a starch molecule.

C Proteins are made from amino acids.

D Starch contains glycerol.

4 Which food test gives a positive result when testing an enzyme solution?

A Benedict's solution

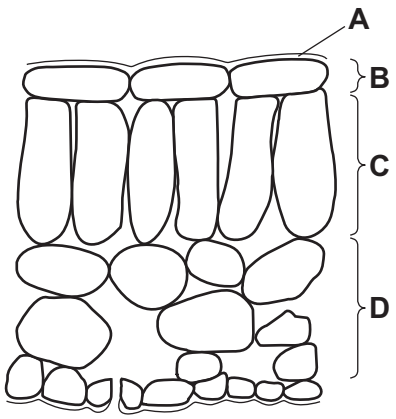
B biuret

C ethanol emulsion

D iodine solution

5 The diagram shows a section through a leaf.

Which letter identifies the epidermis?



6 Which substance must be present in the diet to maintain strong bones and teeth?

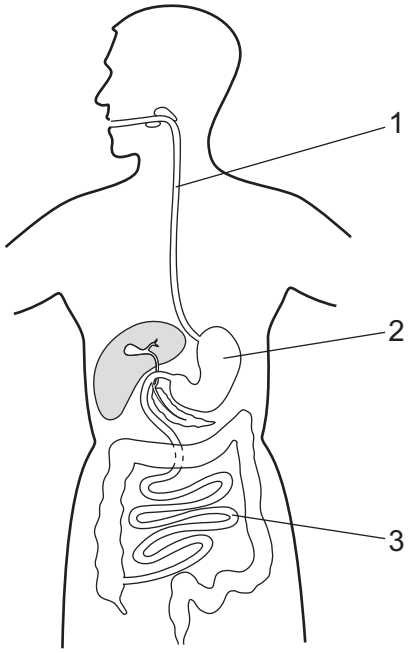
A calcium

B carbohydrate

C fat

D fibre

7 The diagram shows the human digestive system.



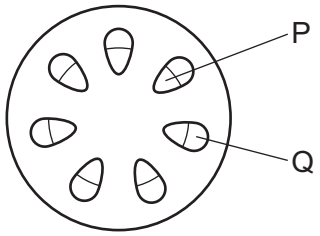
Which row identifies structures 1, 2 and 3?

	1	2	3
A	trachea	liver	small intestine
B	trachea	stomach	large intestine
C	oesophagus	liver	large intestine
D	oesophagus	stomach	small intestine

8 Which row describes molecules produced by chemical digestion?

	size	solubility
A	large	insoluble
B	large	soluble
C	small	insoluble
D	small	soluble

9 The diagram shows a cross-section of a stem.



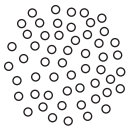
Which row identifies the tissues and their functions?

	tissue		function	
	P	Q	P	Q
A	xylem	phloem	transport of water	transport of sucrose
B	xylem	phloem	transport of sucrose	transport of water
C	phloem	xylem	transport of water	transport of sucrose
D	phloem	xylem	transport of sucrose	transport of water

10 The diagram shows some components of the blood.

Which cell transports oxygen?

A



B

C

D

11 What is the name of the human male gamete?

A penis

B scrotum

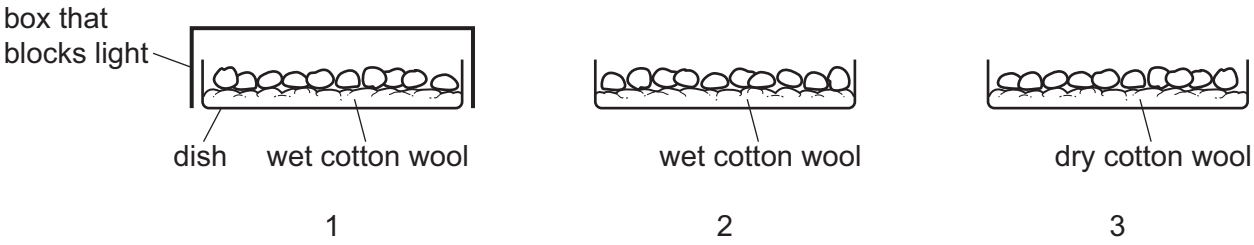
C sperm

D testis

12 The diagram shows an investigation into the germination of seeds.

Each dish contains 10 seeds of the same species.

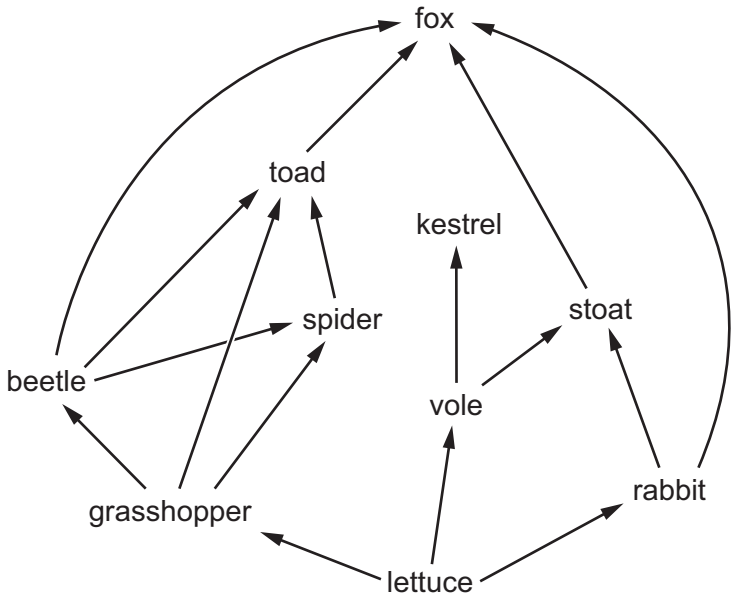
The dishes are placed in the light at 20 °C.



In which dishes will the seeds germinate?

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

13 The diagram shows a food web.



Which organisms in this food web are **only** secondary consumers?

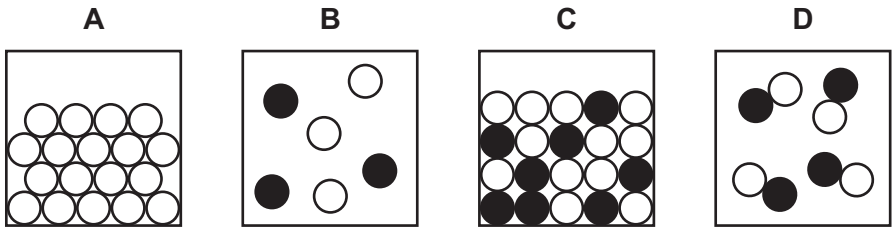
A beetle, kestrel and stoat

B fox, spider and toad

C grasshopper, rabbit and vole

D kestrel, spider and stoat

14 Which diagram shows a gas made up of molecules?



15 Which row describes the fluorine atom $^{19}_{9}F$?

	number of protons	number of neutrons	number of electrons
A	9	9	10
B	9	10	9
C	10	9	10
D	10	19	9

16 Lithium reacts with chlorine to form lithium chloride.

Lithium chloride is an ionic substance.

Which row describes how the ions are formed from the atoms?

	lithium atom	chlorine atom
A	gains an electron	gains an electron
B	gains an electron	loses an electron
C	loses an electron	gains an electron
D	loses an electron	loses an electron

17 Which process is a physical change?

A electrolysis

B melting

C oxidation

D polymerisation

18 Which property is used to arrange elements in order in the Periodic Table?

A the number of neutrons in each atom

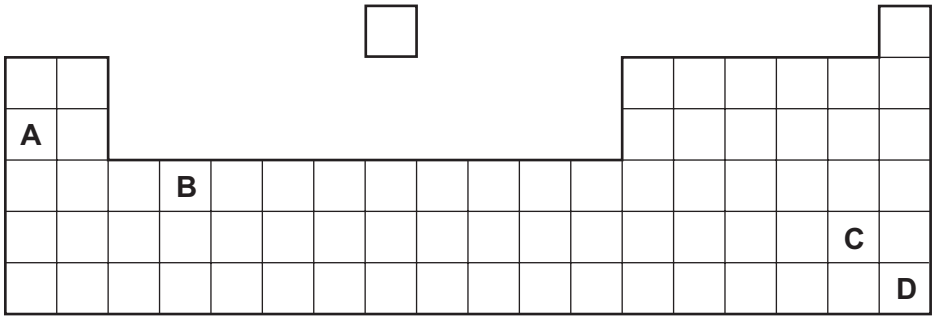
B the number of neutrons + protons in each atom

C the number of protons in each atom

D the number of protons + electrons in each atom

19 A soft metal reacts vigorously with cold water.

What is the position of this metal in the Periodic Table?



20 What is an alloy?

A a compound of non-metals

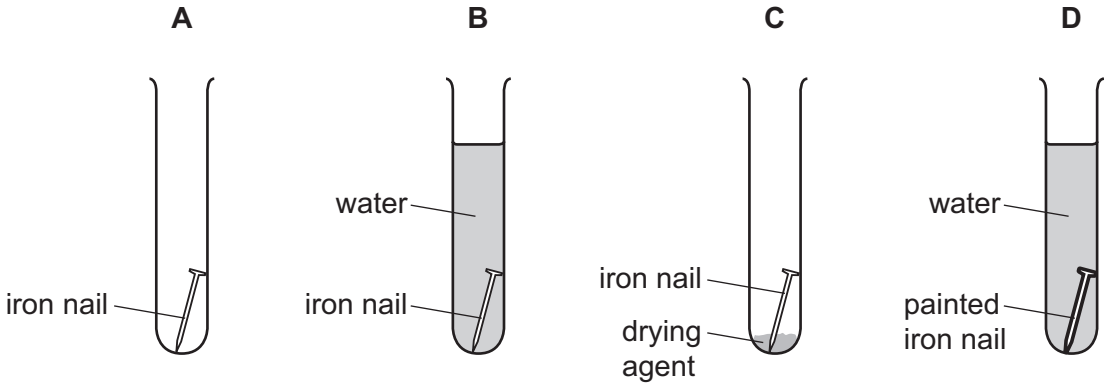
B a compound of a metal and other elements

C a mixture of non-metals

D a mixture of a metal and other elements

21 An experiment is set up to investigate the rusting of iron nails.

Which test-tube shows a barrier method of rust prevention?



22 Which statement describes the extraction of aluminium?

A It is extracted from bauxite using electrolysis.

B It is extracted from bauxite using carbon.

C It is extracted from hematite using electrolysis.

D It is extracted from hematite using carbon.

23 Anhydrous copper(II) sulfate and anhydrous cobalt(II) chloride are used to test for the presence of water.

Which row shows the observations for a positive result?

	anhydrous copper(II) sulfate	anhydrous cobalt(II) chloride
A	blue	blue
B	blue	pink
C	white	blue
D	white	pink

24 Which equation shows the complete combustion of an alkane?

A methane + oxygen → water + carbon dioxide

B methane + oxygen → water + carbon monoxide

C ethene + oxygen → water + carbon dioxide

D ethene + oxygen → water + carbon monoxide

25 Which method is used to separate two liquids?

A crystallisation

B distillation

C evaporation

D filtration

26 The results of tests done on three gases, X, Y and Z, are shown.

test	X	Y	Z
lighted splint	burns brighter	pops	goes out
glowing splint	relights	goes out	goes out
damp red litmus paper	stays red	stays red	goes blue

Which row identifies X, Y and Z?

	X	Y	Z
A	hydrogen	oxygen	ammonia
B	hydrogen	oxygen	chlorine
C	oxygen	hydrogen	ammonia
D	oxygen	hydrogen	chlorine

27 Which observation shows the presence of iron(III) ions?

A A blue solution is formed with excess aqueous ammonia.

B A green precipitate is formed with aqueous sodium hydroxide.

C A red-brown precipitate is formed with aqueous sodium hydroxide.

D A white precipitate is formed with aqueous ammonia.

28 The gravitational field strength, *g*, on the Moon is 1.6 N / kg.

An object has a mass of 4.0 kg on the Earth.

Which row shows the mass and the weight of the object on the Moon?

	mass on the Moon / kg	weight on the Moon / N
A	4.0	2.5
B	4.0	6.4
C	6.4	2.5
D	6.4	4.0

29 A student describes how electricity is generated using an energy resource.

'Energy stored in hot rocks underground is used to heat water and this produces steam. The steam turns a turbine and the turbine turns a generator.'

What is this type of energy resource?

A geothermal

B hydroelectric

C nuclear fission

D wind

30 Which statement about power is correct?

A Power is force × area.

B Power is force ÷ area.

C Power is work done × time.

D Power is work done ÷ time.

31 Which statement is correct for both liquids and gases?

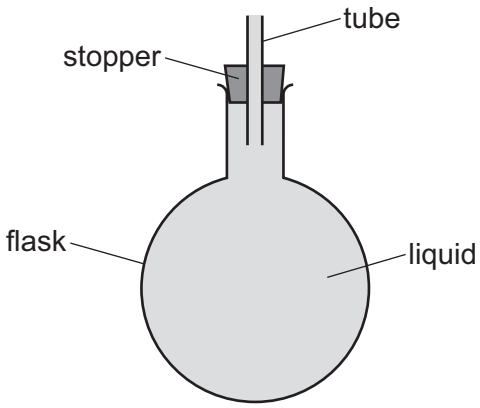
A They are able to flow.

B They occupy a fixed volume.

C Their particles are close together.

D Their particles have a regular arrangement.

32 The diagram shows a glass flask with a stopper. A narrow glass tube passes through the stopper. The flask and tube are full of a liquid.



A Bunsen burner is used to heat the liquid in the flask. Some liquid flows out of the top of the tube.

Which statement explains why this happens?

A The flask contracts.

B The flask expands.

C The liquid contracts.

D The liquid expands.

33 Energy is transferred from a hot object by thermal radiation.

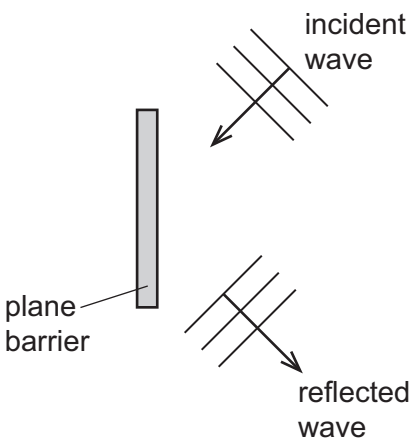
Which row shows the name of this radiation and whether the radiation is electromagnetic?

	name of radiation	electromagnetic
A	gamma	yes
B	gamma	no
C	infrared	yes
D	infrared	no

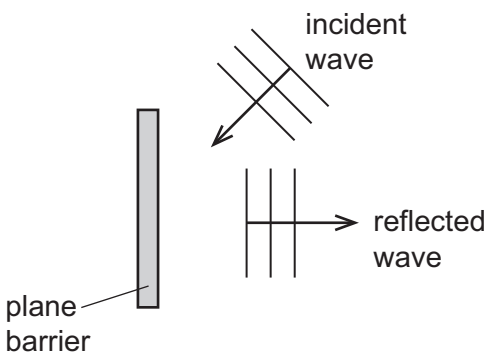
34 A water wave is incident on a plane barrier.

Which diagram shows the direction of travel of the reflected wave?

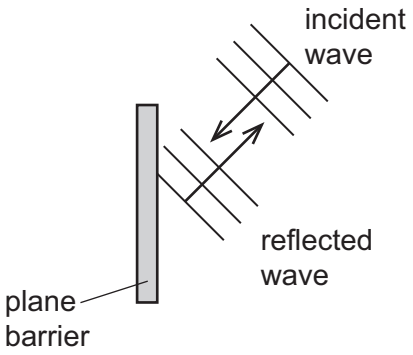
A



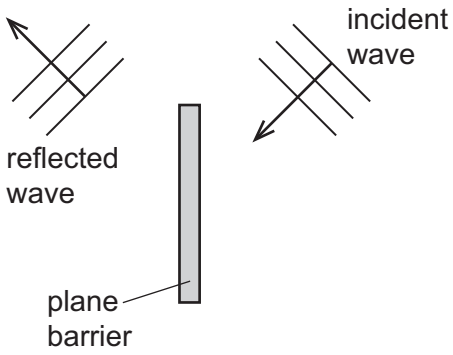
B



C

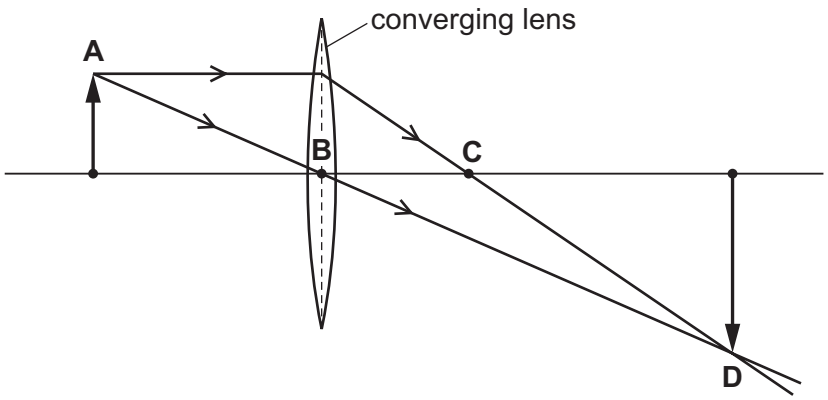


D



35 The diagram shows the formation of a real image by a thin converging lens.

Which labelled point is the principal focus of the lens?



36 A water tank is filled with cold water. There is a heater at the bottom of the tank.

The heater is switched on.

Hot water rises to the top of the tank.

What is the name of this process?

A conduction

B convection

C evaporation

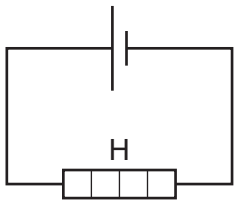
D radiation

37 A resistor of resistance 2000 Ω is connected to a 40 V power supply.

What is the current in the resistor?

A 2.0 mA **B** 20 mA **C** 50 mA **D** 500 mA

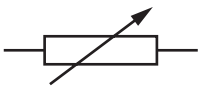
38 A student connects a meter into the circuit shown to measure the current in heater H.



Which row shows the name of the meter and how it is connected into the circuit?

	meter	how it is connected
A	ammeter	in series with H
B	ammeter	in parallel with H
C	voltmeter	in series with H
D	voltmeter	in parallel with H

39 Which electrical component is represented by the symbol shown?



A fixed resistor

B fuse

C lamp

D variable resistor

40 Which pair contains the names of one planet closer to the Sun than Mars and one planet further away from the Sun than Mars?

A Earth and Mercury

B Earth and Venus

C Neptune and Mercury

D Neptune and Uranus

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.).