



**Anglo-Chinese School
(Barker Road)**

END-OF-YEAR EXAMINATION 2024

SECONDARY TWO EXPRESS

SCIENCE

Total Duration for All Sections: 2 hours

SECTION A

INSTRUCTIONS TO CANDIDATES:

The use of an approved scientific calculator is expected, where appropriate.
Do not use glue or correction fluid.

INFORMATION FOR CANDIDATES:

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 separate OTAS answer sheet.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer. Any rough working should be done in this booklet.

A copy of the Periodic Table is printed on page 12 of this booklet.

SECTION A (30 marks)

Select the best answer and shade it on the OTAS provided.

A1 Which of the following are skills and attitudes of a good scientist?

- 1 displays curiosity and asks questions
- 2 perseveres despite failures
- 3 possesses good verbal and written communication skills
- 4 recognises only observations that support the hypothesis of an experiment

- A** 1 and 3
B 1, 2 and 3
C 1, 3 and 4
D All of the above

A2 Sodium hydroxide solution is corrosive to skin when in contact.

Which hazard symbol should be labelled on the container of sodium hydroxide solution?

A



B



C



D

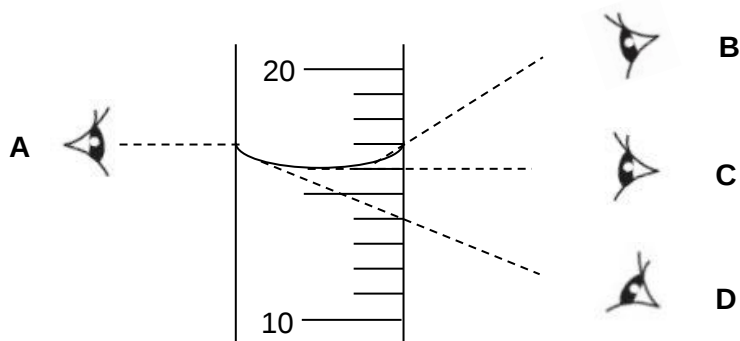


A3 Four students, **A**, **B**, **C** and **D** classified some materials based on three physical properties.

Which student has classified the materials correctly?

	good electrical conductor	poor thermal conductor	flexible
A	ceramic	glass	metal
B	fibre	plastic	fibre
C	glass	glass	ceramic
D	metal	fibre	plastic

A4 In the diagram below, where should the eye be placed so that the reading can be taken accurately?



A5 The chemical formula for chalk is CaCO_3 .

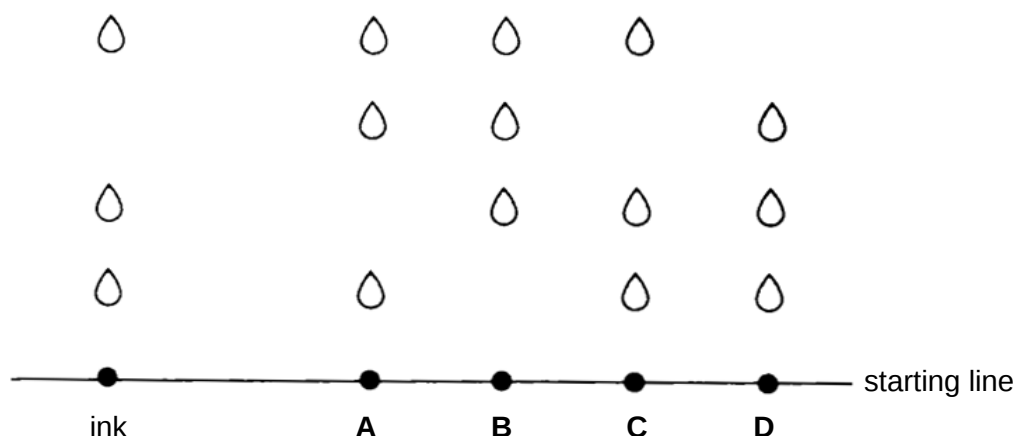
Which of the following statements is true?

- A** Chalk is a compound made up of three atoms.
- B** Chalk is a compound made up of three different elements.
- C** Chalk is a mixture made up of three different elements.
- D** Chalk is a mixture made up of a metal and non-metals.

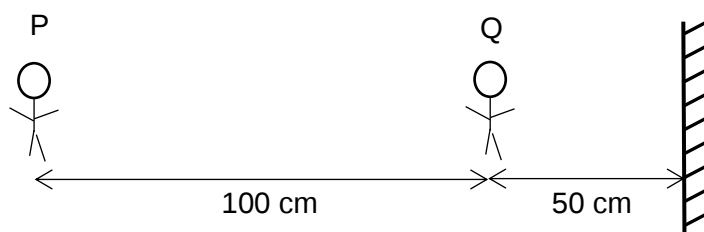
- A6** An individual suspects that someone has forged her signature on a cheque. The inks from the pens of four suspects, **A**, **B**, **C** and **D**, were compared with the ink on the form using chromatography.

The resulting chromatogram is shown below.

Which suspect, **A**, **B**, **C** or **D**, is guilty of forging the signature?



- A7** Individual Q is standing 50 cm in front of a plane mirror. He sees the image of P standing 100 cm behind him.



What is the distance between the image of P from individual Q?

- | | | | |
|----------|--------|----------|--------|
| A | 100 cm | B | 150 cm |
| C | 200 cm | D | 300 cm |
- A8** A student noticed a mirror at the corner of a shop, and she can see many other customers in shop, but they looked smaller.

What type of mirror is described here?

- | | | | |
|----------|----------------|----------|---------------|
| A | concave mirror | B | convex mirror |
| C | plane mirror | D | rough mirror |

A9 The liver is an organ because

- A** it is made of different types of cells performing the same function.
- B** it is made of different types of organelles performing the same function.
- C** it is made of several systems working together to perform a function.
- D** it is made of several tissues working together to perform a function.

A10 The table below shows the boiling points of some elements found in a mixture of gases.

element	helium	nitrogen	oxygen
boiling point / °C	- 269	- 196	- 183

Which elements have particles that are far apart and moving at high speeds at -190 °C?

- A** helium
- B** helium and oxygen
- C** helium and nitrogen
- D** nitrogen and oxygen

A11 Which atom has an **incorrect** number of sub-atomic particles?

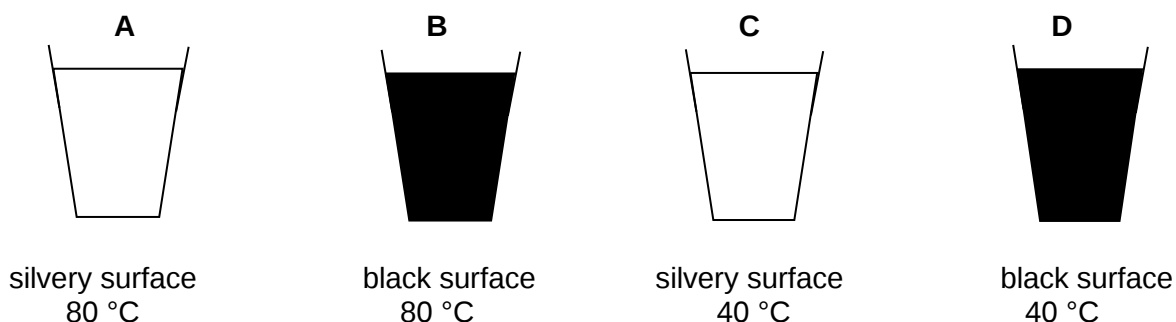
atom	number of protons	number of neutrons	number of electrons
A	1	0	1
B	3	4	3
C	11	11	12
D	12	12	12

A12 Which of the following shows the correct information related to force?

	instrument to measure force	SI unit
A	beam balance	kilogram
B	electronic balance	joule
C	spring balance	newton
D	weighing scale	pascal

- A13** Four cups, made of the same material, are filled with the same amount of water at different temperatures. They are placed on a table in a room with room temperature at 30 °C.

Which cup will lose heat fastest to the surroundings?



- A14** An iron solid, a balloon filled with helium gas, and glass of liquid water are all heated from room temperature to 90 °C.

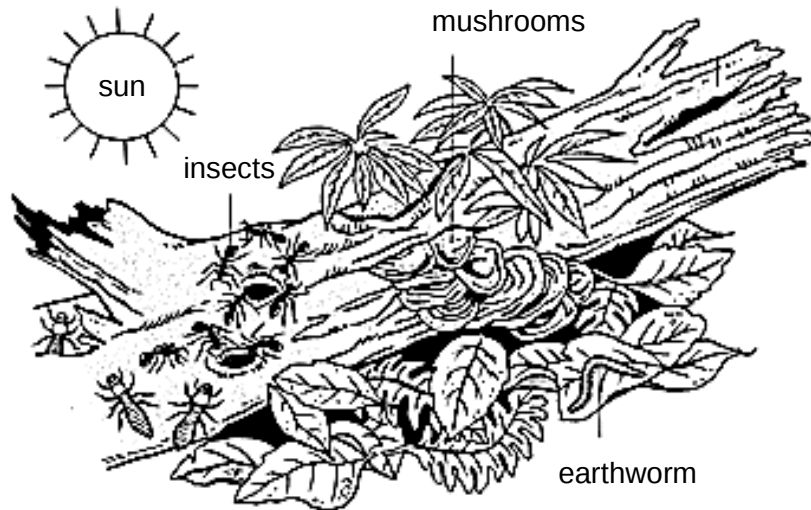
Which row correctly arranges the substances in order of their extent of expansion?

	expands the least → expands the most		
A	helium	water	iron
B	iron	helium	water
C	iron	water	helium
D	water	iron	helium

- A15** Which of the following reactions shows thermal decomposition?

- A** carbon dioxide + water → glucose + oxygen
B calcium carbonate → carbon dioxide + calcium oxide
C magnesium + oxygen → magnesium oxide
D sulfuric acid + sodium hydroxide → sodium sulfate + water

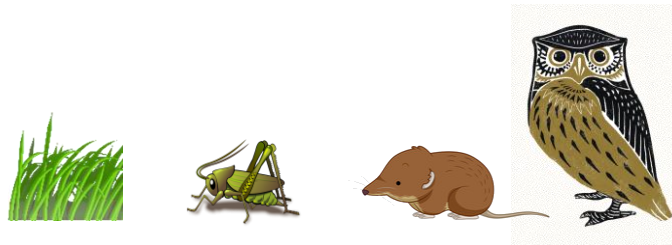
A16 The diagram below shows a dead log community.



Which of the labelled parts make up the biotic environment?

- A sun only
- B earthworm and mushrooms
- C earthworm, insects and mushrooms
- D all of the above

A17 Which is the tertiary consumer of this food chain?



Grass → grasshopper → shrew → owl

- A grass
- B grasshopper
- C owl
- D shrew

A18 Which statement is true for parasitism?

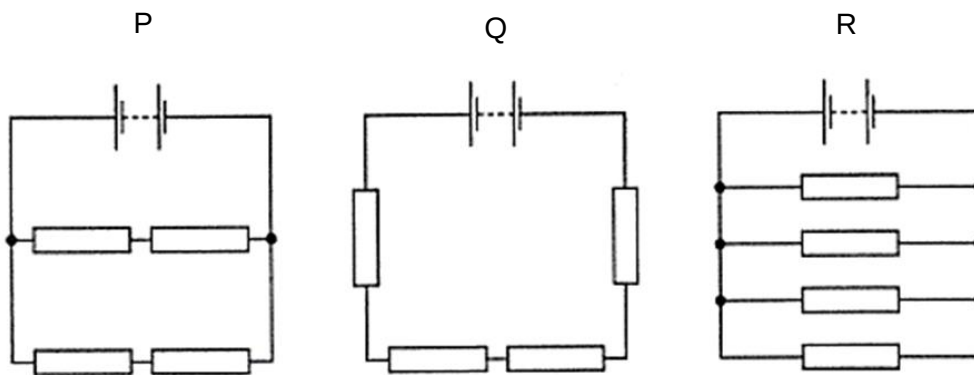
- A** Both organisms are harmed.
- B** Both organisms benefit.
- C** One organism benefit, and the other is harmed.
- D** One organism benefit, and the other is unaffected.

A19 It is estimated that 90% of the energy which flows through living organisms in a food chain is lost between one trophic level and the next. The producers in a food chain contain 1000 units of energy.

How many units will reach the secondary consumers in the food chain?

- A** 0.1 units
- B** 1 unit
- C** 10 units
- D** 100 units

20 Four identical resistors are connected in circuits P, Q and R.



Which list shows the circuits in order of their effective resistance from the largest to smallest?

- A** $P \rightarrow Q \rightarrow R$
- B** $P \rightarrow R \rightarrow Q$
- C** $Q \rightarrow P \rightarrow R$
- D** $Q \rightarrow R \rightarrow P$

- A25** A person consumed nutrient T. Chemical digestion of nutrient T occurred in the mouth and small intestine but not in the stomach.

What is nutrient T?

- A** fat
- B** minerals
- C** protein
- D** starch

- A26** Which process provides an organism with the energy needed for tissue repair?

- A** ingestion
- B** growth
- C** nutrition
- D** respiration

- A27** Which substance is **not** transported by plasma in blood?

- A** amino acids
- B** glucose
- C** oxygen
- D** waste products

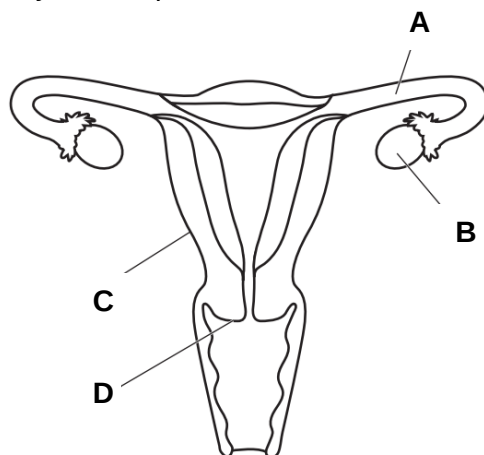
- A28** Non-identical twins are twins that are genetically different from each other.

How can such a type of twin arise?

- A** one zygote dividing into two cells that each develops into a foetus
- B** one egg being fertilised by two sperm cells
- C** two sperm cells fertilising the same egg
- D** two sperm cells fertilising two separate eggs

A29 The diagram shows the female reproductive system.

Where is fertilisation most likely to take place?



A30 What can be used to reduce the transmission of HIV?

	face masks	screening blood donors	sterile needles for drug use
A	✓	X	X
B	X	✓	✓
C	X	X	✓
D	✓	✓	X

key

✓ = can reduce transmission

X = cannot reduce transmission

END OF SECTION A

The Periodic Table of Elements

Group																	
1	2											13	14	15	16	17	18
Key proton (atomic) number atomic symbol name relative atomic mass							1 H hydrogen 1										2 He helium 4
												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
3 Li lithium 7	4 Be beryllium 9																
11 Na sodium 23	12 Mg magnesium 24	3	4	5	6	7	8	9	10	11	12						
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 oganeson —

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.).

The Avogadro constant, $L = 6.02 \times 10^{23} \text{ mol}^{-1}$

