Cambridge Assessment International Education

Cambridge Lower Secondary Checkpoint

SCIENCE **0893/02**

Paper 2 **April 2023**

MARK SCHEME

Maximum Mark: 50

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Markers were instructed to award marks. It does not indicate the details of the discussions that took place at a Markers' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the End of Series Report. Cambridge will not enter into discussions about these mark schemes.

Question	Answer	Marks	Further Information
1(a)	DNA **or** deoxyribonucleic acid	**1**	**Do not accept** chromosome **Ignore** genes **or** genetic material **or** allele
1(b)(i)	2 white **and** 3 grey **or** 1 white **and** 4 grey **or** 0 white **and** 5 grey	**1**	

Question	Answer	Marks	Further Information
1(b)(ii)	**any three from** **M1** (idea that) less predation of grey shrews **or** fewer grey shrews eaten **or** grey shrews are more difficult to hunt **M2** grey shrews have better camouflage **or** (idea that) grey ones blend in with the ground better than white shrews **M3** (idea that) more grey shrews survive **or** so grey shrews number increases **M4** more grey shrews are able to breed **or** more grey shrews reproduce **M5** pass grey (fur) gene onto next generation **or** pass advantageous gene onto next generation **M6** (process) repeats for many generations	**3**	each correct answer = 1 mark **Accept ora** where appropriate **Accept** black or brown for grey throughout **Accept** idea that fewer grey shrews are killed **Accept** (idea that) easier to see the white shrews **Accept** pass on advantageous mutation to next generation

Question	Answer	Marks	Further Information
1(b)(iii)	**any two from** wear gloves (handling shrews) eye protection (face) mask **or** filter disinfect traps (between use) **or** sanitise (traps)	**2**	each correct answer = 1 mark **Accept** use nets (instead of hands) **Accept** glasses **or** goggles **Ignore** protective suit **Accept** wash hands after investigation **or** touching shrews

Question	Answer	Marks	Further Information
2(a)	2.8.7	**1**	**Accept** a diagram of the correct electronic structure
2(b)	Mg	**1**	**Accept** magnesium, but symbol takes precedence
2 (c)	**any one from** unreactive **or** inert gas at room temperature low melting point **or** low boiling point colourless	**1**	 **Do not accept** little reaction **Accept** low density **Note** being a gas is **not** sufficient **Accept** has a higher boiling point than neon **or** has a higher melting point than neon **Accept** atom has 18 protons **or** proton number is 18 **or** atomic number is 18 **or** has a stable electronic structure **or** has a stable atomic structure **or** it has eight electrons in its outer shell **Do not accept** is coloured **or** colourful **Do not accept** is a metal **or** a halogen

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Further Information</th></tr>
<tr><td>3(a)</td><td>
<table>
<tr><th>part of plant</th><th>order of pathway</th></tr>
<tr><td>leaf</td><td>(5)</td></tr>
<tr><td>leaf xylem</td><td>4</td></tr>
<tr><td>root hair cell</td><td>1</td></tr>
<tr><td>root xylem</td><td>2</td></tr>
<tr><td>stem xylem</td><td>3</td></tr>
</table>
</td><td>1</td><td>all four correct for the mark</td></tr>
<tr><td>3(b)</td><td>transpiration</td><td>1</td><td>Accept evaporation or evapotranspiration
Ignore diffusion
Do not accept sweating</td></tr>
<tr><td>3(c)</td><td>reduces population size or population declines</td><td>1</td><td>Ignore they die or cannot grow as well or becomes extinct

Ignore any reason given</td></tr>
</table>

Question	Answer	Marks	Further Information
4(a)	**W**	**1**	more than **one** answer circled = 0 marks **Accept** any indication of the correct answer, e.g.ticking or underlining, but circling takes precedence
4(b)	(number of waves) 4	**1**	
4(c)	(time = 1 second) reinforce (time = 3 seconds) cancel each other **or** cancel out	**2**	each correct answer = 1 mark **Accept** constructive interference **Accept** (produces a) loud**er** sound **or** amplify the sound **or** larg**er** amplitude **Accept** destructive interference **Accept** (produces a) quiet**er** sound **or** small**er** amplitude

Question	Answer	Marks	Further Information
5(a)	respiration	**1**	**Do not accept** breathing
5(b)	photosynthesis	**1**	
5(c)	both release carbon dioxide **or** both release heat (into the surroundings) **or** both exothermic	**1**	**Ignore** they are both part of the carbon cycle **Ignore** they break down carbon (compounds) **Do not accept** both release carbon

Question	Answer	Marks	Further Information
5(d)	**any two from** ice caps melt **or** glaciers melt sea levels rise (more) flooding **or** (more) land under water **or** (more) cities under water drought **or** famine (more frequent) extreme weather, e.g. (more) typhoons/cyclones/tornadoes global warming extinction of plant (species) **or** extinction of animal (species) (increased number of) forest fires **or** wildfires	**2**	each correct answer = 1 mark **Ignore** reference to ozone and ozone depletion **Note** ice melts or snow melts unqualified is **not** sufficient **Accept** sea level changes **Accept** (more extreme) heat waves **Ignore** weather change **or** unpredictable weather **Accept** Earth or atmosphere becomes warmer **Accept** sea temperatures rise **or** ocean warming **Accept** temperature change **or** temperature increase **Accept** examples of extinction, e.g. danger of polar bears becoming extinct **or** mass extinction (of plants and/or animals) **or** coral bleaching **or** loss of habitats

Question	Answer	Marks	Further Information
6(a)	(as you go down the group atomic radius) increases **or** goes up	**1**	
6(b)	number in the range 20 to 45 (°C)	**1**	**Accept** a range of values providing the range is entirely within 20 to 45 °C **Accept** answer written in table, but answer line takes precedence
6(c)	**giant** (ionic)	**1**	**Do not accept** giant covalent **Ignore** lattice

Question	Answer	Marks	Further Information
7	buzzer **variable** resistor	**2**	each correct answer = 1 mark **Accept** rheostat **Do not accept** resistor on its own **Do not accept** variation resistor

Question	Answer	Marks	Further Information
8(a)	**C** **B** (E) **D** (F) **A**	**3**	**all four** letters in the correct order = 3 marks **CB** in correct order = 1 mark **D** in the middle = 1 mark **A** at the end = 1 mark
8(b)	rocks from the Earth and the Moon had the same properties **or** Moon rocks have a lower density than Earth rocks	**1**	**Accept** rocks from the Moon were similar to rocks on Earth **or** rocks from the Moon are same type as rocks on Earth **or** has the same components/composition as rocks on Earth **or** Moon and Earth contain the same minerals **Do not accept** Moon and Earth have an iron core
8(c)	**any one from** (idea that) the dense iron from the cores (of both planets) merged to create the Earth there are more dense **rocks** on the Earth the less dense rocks (were ejected and) formed the Moon	**1**	**Accept ora** **Accept** it was the less dense rocks that were ejected

Question	Answer	Marks	Further Information
9(a)	changes in seasons ☐ changes to the environment over time ✓ increased reproduction ☐ new diseases ✓ new food sources ☐	**2**	each correct tick = 1 mark **three** ticks and **two** correct = 1 mark **three** ticks and **one** correct = 0 marks **four** or **five** ticks = 0 marks **Accept** any indication of the correct answer, e.g. circling or underlining, but ticking takes precedence
9(b)	(idea that) death rate greater than reproduction rate	**1**	**Accept** low reproduction rate and high death rate **Accept** death rate is increasing and the reproduction rate is decreasing **Accept** birth rate for reproduction rate **Ignore** reference to no reproduction

Question	Answer	Marks	Further Information
10(a)	displacement	**1**	more than **one** answer circled = 0 marks **Accept** any indication of the correct answer, e.g. ticking or underlining, but circling takes precedence
10(b)	copper + silver nitrate → copper nitrate + silver	**1**	**Accept** reactants in either order and products in either order **Accept** = for → **Accept** correct symbol equation (balanced or unbalanced), but names take precedence $Cu + 2AgNO_3 \rightarrow Cu(NO_3)_2 + 2Ag$

Question	Answer	Marks	Further Information
10(c)	copper + iron nitrate ☐ magnesium + zinc nitrate ✓ silver + magnesium nitrate ☐ iron + zinc nitrate ☐ magnesium is more reactive than zinc **or** magnesium is higher in the reactivity series than zinc **or** zinc is less reactive than magnesium **or** zinc is lower in the reactivity series than magnesium	**2**	each correct answer = 1 mark more than **one** answer ticked = 0 marks for the question incorrect answer ticked = 0 marks for the question **Accept** any indication of the correct answer, e.g. circling or underlining, but ticking takes precedence **Note** magnesium is more reactive is **not** sufficient **or** it is more reactive than zinc is **not** sufficient **Note** the more reactive metal displaces the less reactive metal is **not** sufficient must refer to magnesium and zinc **Do not accept** magnesium is more reactive than zinc nitrate

Question	Answer	Marks	Further Information
11(a)	°C	**1**	**Accept** degrees C **or** degrees Celsius **or** °Celsius **or** Kelvin(s) **or** K **Accept** answer written in table(s), but answer line takes precedence **Do not accept** C°
11(b)	(cardboard) 18 (°C) (newspaper) 17 (°C) (bubble wrap) 12 (°C)	**1**	**all three** correct for the mark
11(c)	yes (no marks) the temperature has decreased by the smallest amount **or** the temperature drop is the smallest (over the same amount of time) **or** least temperature change	**1**	**Note** if no = 0 marks for the question **Accept** temperature change was only 12 °C compared to 17 °Cand 18 °C
11(d)	67 circled in the table for cardboard (idea that) 67 does **not** fit the pattern **or** 67 not in the correct sequence	**2**	**Note** if any other temperature **or** time selected = 0 marks for the question each correct answer = 1 mark **Accept** 67 written by the question, but circling in the table takes precedence **Accept** 60 circled in the table for cardboard **Accept** temperature drops then gets higher **or** (idea that) temperature at 60 s is less than at 120 s **or** temperature should be higher than 75 °C

Question	Answer	Marks	Further Information
11(e)	**any two from** use the same starting temperature use the same temperature of the surroundings **or** same room temperature use the same volume of water use a lid on each beaker use the same thickness of insulation repeat the investigation stir the water	**2**	each correct answer = 1 mark **Accept** use same mass of water **or** same amount of water **or** same level of water **Accept** cover the top of beaker **or** put a stopper on the beaker **Ignore** put a layer of oil on water so heat doesn't escape **Accept** same surface area of insulation **Accept** repeat the investigation **and** calculate the mean = 2 marks **Accept** greater variety of insulation **Accept** insulate the bottom of the beaker **Accept** smaller time intervals between readings **Accept** use a temperature sensor and a data logger **Ignore** a more accurate or precise thermometer

Question	Answer	Marks	Further Information
12(a)	(gas) syringe **or** measuring cylinder (inverted in a trough of water)	**1**	**Accept** graduated cylinder
12(b)	repeats (the investigation)	**1**	**Ignore** changing time intervals **or** using a different total time
12(c)	(safety risk) hydrochloric acid is corrosive (how the risk is reduced) wear goggles **or** gloves	**2**	each correct answer = 1 mark **Note** award the answers wherever they are seen **Accept** acid **or** hydrochloric **or** solution (in the flask) for hydrochloric acid **Accept** hydrochloric acid burns **or** hydrochloric acid is harmful **or** hydrochloric acid getting into eyes **or** hydrochloric acid is an irritant **Note** hydrochloric acid coming into contact with hands is **not** sufficient **Ignore** references to the gas being produced or explosions **Do not accept** hydrochloric acid is flammable **Accept** gloves **or** apron **or** lab coat **or** glasses **Ignore** facemask **or** protective gear