Cambridge Assessment International Education

Cambridge Lower Secondary Checkpoint

SCIENCE **0893/02**

Paper 2 **October 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.

IB23 10_0893_02/7RP

Question	Answer	Marks	Further Information
1(a)	**B**	**1**	more than **one** answer circled = 0 marks **Accept** any indication of the correct answer, e.g. ticking or underlining, but circling takes precedence
1(b)	filter urine	**2**	each correct answer = 1 mark **Accept** clean **or** purifies
1(c)	DNA	**1**	**Accept** deoxyribonucleic acid **Ignore** genes **or** nucleic acid

Question	Answer	Marks	Further Information
2(a)	(melting point) decreases	**1**	
2(b)	francium	**1**	**Accept** Fr **Accept** francium circled in the table, but answer line takes precedence
2(c)	hydrogen	**1**	more than **one** answer circled = 0 marks **Accept** any indication of the correct answer, e.g. ticking or underlining, but circling takes precedence

Question	Answer	Marks	Further Information
3(a)	**any one from** (idea that) thermal energy transfers (from water) to cup (idea that) thermal energy transfers (from water) to his hand(s) (idea that) thermal energy transfers (from water) to air	**1**	**Accept** heat or 'it' for thermal energy throughout **Accept** (idea that) thermal energy transfers from cup to hands **or** thermal energy heats the hand **Accept** (idea that) thermal energy transfers from cup to air **Accept** (idea that) thermal energy transfers from hand to air **Accept** (idea that) thermal energy transfers from hotter region to colder region **or** thermal energy dissipates **Accept** thermal energy of water decreases
3(b)	hand **B** is colder	**1**	**Note** answer must be comparative **Note** assume answer refers to hand **B** unless hand **A** is specified

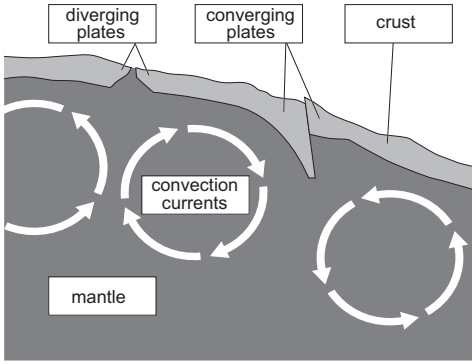
Question	Answer	Marks	Further Information
4(a)	(idea of) sharing electrons (between atoms) (idea of) a pair of electrons (being shared)	**2**	each correct answer = 1 mark **Accept** two electrons shared (between atoms) = 2 marks **Accept** a shared pair of electrons (between atoms) = 2 marks **Ignore** comments about metals and non-metals, intermolecular forces or ions
4(b)	8	**1**	

Question	Answer	Marks	Further Information
5(a)	**B** (and) **D**	**1**	**both** correct either order = 1 mark
5(b)	**C** (and) **D**	**1**	**both** correct either order = 1 mark
5(c)	**A** (and) **B**	**1**	**both** correct either order = 1 mark
5(d)	waveform drawn with greater amplitude	**1**	**Accept** waveform drawn on the same grid as **E**, but answer grid takes precedence **Ignore** any change in frequency **Note** a smooth curve is **not** necessary as long as all the amplitudes are higher than **E**

Question	Answer	Marks	Further Information
6(a)	(The number of owls decrease because) they (only) feed on small rodents (The number of wild cats stays the same because) wild cats will eat (more) rabbits	**2**	each correct answer = 1 mark **Accept** they have no food **or** have no alternative food **or** have less food **Ignore** the small rodents died **or** small rodents decrease in number **Accept** they have another food source **or** can eat rabbits and rodents **Ignore** the rabbit does not decrease **or** rabbits are not affected **or** number of rabbits stays the same
6(b)	source of light for photosynthesis (use light energy) to make carbohydrates	**3**	each correct answer = 1 mark **Accept** source of energy **or** (source of) sunlight **or** (source of) light **Ignore** provides heat **Accept** a description of photosynthesis **Accept** (use light energy) to make glucose **or** make starch **Accept** just make own food

Question	Answer	Marks	Further Information
7	(density =) mass ÷ volume 7.9(2857)	**2**	**Accept** 222÷28 **Accept** correct rounding, e.g. 7.93 **or** 7.929 **or** 7.9286 **Accept** correct answer with no working = 2 marks **Accept** 8 **or** 7.92 = 1 mark

Question	Answer	Marks	Further Information
8(a)	H	**1**	**Accept** hydrogen
8(b)	**any two from** Na, A*l*, Si, P, S, C*l*, Ar	**1**	 **Accept** correct names **Note** if an incorrect element is given = 0 marks
8(c)	neon **or** helium	**1**	**Accept** Ne **or** He

Question	Answer	Marks	Further Information
9(a)		**2**	**all five** labels correct = 2 marks **two**, **three or four** labels correct = 1 mark **one** label correct = 0 marks **Accept** crust instead of the label for diverging **or** converging plates
9(b)	(idea that) the shapes (of the coastlines) of South America and Africa are complementary **or** (idea that) the coastlines fit together like (pieces of) a jigsaw (idea that) this suggests that they were once joined together and have moved apart as the tectonic plates move apart	**2**	each correct answer = 1 mark **Accept** (idea that) the coastlines fit together (almost perfectly) **Accept** (idea that) the continents fit together (almost perfectly) **Note** coastlines match is **not** sufficient **Do not accept** they are the same shape **Note** have moved apart is **not** sufficient but **Accept** have moved apart as tectonic plate move **Accept** continental drift as tectonic plates move **or** (continents) split apart as tectonic plates move **Note** once joined together **or** once part of Pangea is **not** sufficient **Ignore** move apart and break

Question	Answer	Marks	Further Information
9(c)	**any one from** (location of) volcanoes (location of) earthquakes fossil records alignment of magnetic material in the crust	1	**Ignore** same fossil fuels **Accept** same rock types **Ignore** mountain ranges and mountain building

Question	Answer	Marks	Further Information
10(a)	ohm **or** Ω	**1**	
10(b)	(resistance =) $\frac{\text{voltage}}{\text{current}}$ 2	**2**	each correct answer = 1 mark **Accept** $\frac{V}{I}$ **or** V = IR **Accept** symbols **or** words **or** units or pairs of numbers from the graph in any correct rearrangement, e.g. volts ÷ amps **or** 4 and 2 seen in calculation **Note** correct answer only = 1 mark **Ignore** units

Question	Answer	Marks	Further Information
11(a)(i)	(idea that) the percentage of an element found on the Earth is similar to the percentage of an element found on the Moon	**1**	**Accept** Earth and Moon have similar compositions (of elements) **Accept** the elements are similar on Earth and Moon **or** most elements found on both Earth and Moon **or** Moon has most of the elements found on Earth **Ignore** percentage of oxygen on Earth and Moon is high
11(a)(ii)	iron	**1**	
11(b)	**any two from** find the percentage of more elements (on the Earth and on the Moon) presence of water on Moon both Moon and Earth spin Moon is less dense than the Earth	**2**	each correct answer = 1 mark **Allow** find the percentage of elements (on Earth and the Moon) not named in the table **Ignore** presence of carbon dioxide on Moon **Accept** both orbit the Sun **or** both reflect light **Accept** both have cores with iron **or** Moon has a small iron core **or** both have molten cores **Accept** similar age of rocks on Moon and the Earth **Accept** similar types of rock on Earth and the Moon

Question	Answer	Marks	Further Information
12(a)	both have (7) electrons	**1**	**Accept** both have a positive (and a negative part) **Accept** both have a negative part **Ignore** references to nucleus and protons e.g. both have nucleus or both have protons
12(b)	**A** does **not** have nucleus **or B** has a nucleus **or** **A** does **not** have electrons in orbits or shells **or B** has electrons in orbits or shells	**1**	**Note** assume unqualified answers refer to model **A** **Ignore** size of nucleus **Accept A** has no shells or orbits **or B** has shells or orbits **Accept** circles or rings for shells **Note** electrons in different positions is **not** sufficient

Question	Answer	Marks	Further Information
12(c)	(strength) **any one from** shows the relative positions of the nucleus and/or electrons shows the positive and negative part of the atom shows particles that are too small to be seen shows the space in an atom shows electrons in shells **or** shows electronic structure **or** shows number of electrons (limitation) **any one from** does **not** show the movement of the electrons the model is two dimensional **or** model is **not** in three dimensions does **not** show particles within the nucleus **or** does not show protons **or** does not show neutrons the model is **not** to scale	**2**	each correct answer = 1 mark **Accept** gives a clear understanding of the atom **or** provides an image and understanding of an atom **Accept** show the charge of particles **Accept** shows (outermost) shell or orbits **or** shows electrons **or** shows how many electrons in a shell **Accept** can tell which group it is in **or** can tell which period it is in **Accept** do not know the exact size of the atom **or** not same size as real atoms **Accept** not proven as it is a theory

Question	Answer	Marks	Further Information
13(a)	up **or** upwards **and** cold water has been warmed **or** the warmed water rises **or** **(**the warmed water has an upward) convection current	**1**	**Note** the mark should be awarded wherever it is written **both** correct for the mark **Accept** up **then** down **Ignore** away from the hot water **or** up **and** down **Ignore** heat rises
13(b)	(very hot water) use **heat proof** gloves (red ink) wear gloves **or** do **not** use poisonous red ink (use plastic …) glass may break **or** may cut hand on glass	**3**	each correct answer = 1 mark **Accept** safety gloves **or** protective gloves **or** thick gloves **or** use tongs **Ignore** reduce water temperature **Accept** use a food colour **Note** use another ink colour unqualified is **not** sufficient **Ignore** use a pipette **or** use a syringe **Accept** glass may crack **Ignore** the glass might explode **or** beaker may be hot

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Further Information</th></tr>
<tr><td>14(a)(i)</td><td>
<table>
<tr><th>mass range
in g or grams</th><th>number of tomatoes
in mass range</th></tr>
<tr><td>(76 – 80)</td><td>2</td></tr>
<tr><td>(81 – 85)</td><td>4</td></tr>
<tr><td>(86 – 90)</td><td>8</td></tr>
<tr><td>(91 – 95)</td><td>9</td></tr>
<tr><td>(96 – 100)</td><td>12</td></tr>
<tr><td>(101 – 105)</td><td>6</td></tr>
<tr><td>(more than 105)</td><td>3</td></tr>
</table>
</td><td>2</td><td>g or grams in heading = 1 mark

all numbers correct = 1 mark</td></tr>
<tr><td>14(a)(ii)</td><td>bar chart</td><td>1</td><td>Accept histogram or frequency polygon or bar graph

Ignore graph or frequency chart

Do not accept line graph, scatter plot or pie chart</td></tr>
<tr><td>14(b)</td><td>protein</td><td>1</td><td>Ignore chlorophyll</td></tr>
</table>