

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.

This document has **16** pages.

General guidelines on marking

Many descriptive answers can be expressed in a variety of ways. Professional judgement can be used in these cases, providing it matches the marking points and further information in the mark scheme.

Answers may have words spelt incorrectly. Credit is normally given for phonetically correct answers, unless the word has a scientifically different meaning. For example, where the answer should be antennae, credit will be given for antenna but not for anthen (too close to anther).

Only the science is being assessed so answers do not need to be grammatically correct. Significant figures will be indicated in the question or in the mark scheme. Unless specified all marking points are independent.

Annotations and abbreviations

/ or	alternate responses for the same marking point
() brackets	the words or units in brackets do not need to be stated, for example, (recycles or releases or provides) minerals = minerals scores the mark
<u>Underline</u>	exact word is required
Accept	an acceptable response
Do not accept	indicates an incorrect response that would contradict another otherwise correct alternative
Ignore	indicates an irrelevant answer that is not creditworthy. Full marks can still be achieved even with answers that are ignored.
Note	provides extra information when necessary
ecf	error carried forward; marks are awarded if an incorrect response has been carried forward from earlier working, provided the subsequent working is correct
ora	or reverse argument; for example, as mass increases, volume increases could be written as mass decreases, volume decreases

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

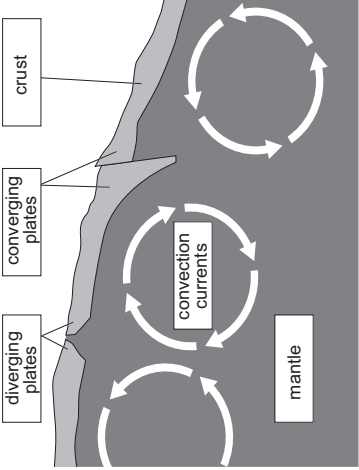
Question	Answer	Marks	Further Information
3(a)	<p>any one from</p> <p>(idea that) thermal energy transfers (from water) to cup</p> <p>(idea that) thermal energy transfers (from water) to his hand(s)</p> <p>(idea that) thermal energy transfers (from water) to air</p>	1	<p>Accept heat or 'it' for thermal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

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

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, Al, Si, P, S, Cl, 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)	 <p>The diagram illustrates plate tectonics. It shows a cross-section of the Earth's crust and upper mantle. On the left, two plates are moving apart, labeled 'diverging plates'. On the right, two plates are moving together, labeled 'converging plates'. Below the crust, the mantle is shown with circular arrows representing 'convection currents'. Labels include 'diverging plates', 'converging plates', 'crust', 'convection currents', and 'mantle'.</p>	2	<p>all five labels correct = 2 marks</p> <p>two, three or four labels correct = 1 mark</p> <p>one label correct = 0 marks</p> <p>Accept crust instead of the label for diverging or converging plates</p>
9(b)	<p>(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</p> <p>(idea that) this suggests that they were once joined together and have moved apart as the tectonic plates move apart</p>	2	<p>each correct answer = 1 mark</p> <p>Accept (idea that) the coastlines fit together (almost perfectly)</p> <p>Accept (idea that) the continents fit together (almost perfectly)</p> <p>Note coastlines match is not sufficient</p> <p>Do not accept they are the same shape</p> <p>Note have moved apart is not sufficient but Accept have moved apart as tectonic plate move</p> <p>Accept continental drift as tectonic plates move or (continents) split apart as tectonic plates move</p> <p>Note once joined together or once part of Pangea is not sufficient</p> <p>Ignore move apart and break</p>

Question	Answer	Marks	Further Information
9(c)	<p>any one from</p> <ul style="list-style-type: none"> (location of) volcanoes (location of) earthquakes fossil records alignment of magnetic material in the crust 	1	<p>Ignore same fossil fuels</p> <p>Accept same rock types</p> <p>Ignore mountain ranges and mountain building</p>

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

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	<p>Accept Earth and Moon have similar compositions (of elements)</p> <p>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</p> <p>Ignore percentage of oxygen on Earth and Moon is high</p>
11(a)(ii)	iron	1	
11(b)	<p>any two from</p> <p>find the percentage of more elements (on the Earth and on the Moon)</p> <p>presence of water on Moon</p> <p>both Moon and Earth spin</p> <p>Moon is less dense than the Earth</p>	2	<p>each correct answer = 1 mark</p> <p>Allow find the percentage of elements (on Earth and the Moon) not named in the table</p> <p>Ignore presence of carbon dioxide on Moon</p> <p>Accept both orbit the Sun or both reflect light</p> <p>Accept both have cores with iron or Moon has a small iron core or both have molten cores</p> <p>Accept similar age of rocks on Moon and the Earth</p> <p>Accept similar types of rock on Earth and the Moon</p>

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

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

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

Question	Answer	Marks	Further Information																
14(a)(i)	<table border="1"> <thead> <tr> <th>mass range in g or grams</th> <th>number of tomatoes in mass range</th> </tr> </thead> <tbody> <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> </tbody> </table>	mass range in g or grams	number of tomatoes in mass range	(76 – 80)	2	(81 – 85)	4	(86 – 90)	8	(91 – 95)	9	(96 – 100)	12	(101 – 105)	6	(more than 105)	3	2	g or grams in heading = 1 mark all numbers correct = 1 mark
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14(a)(ii)	bar chart	1	Accept histogram or frequency polygon or bar graph Ignore graph or frequency chart Do not accept line graph, scatter plot or pie chart																
14(b)	protein	1	Ignore chlorophyll																