



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.

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)	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

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

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) louder sound or amplify the sound or larger amplitude Accept destructive interference Accept (produces a) quieter sound or smaller 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 $\text{Cu} + 2\text{AgNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + 2\text{Ag}$

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 °C and 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

Page 18 of 18