

Cambridge IGCSE™

MARINE SCIENCE**0697/13**

Paper 1 Theory and Data Handling

October/November 2024

MARK SCHEME

Maximum Mark: 80

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 Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' 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 Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the October/November 2024 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

This document consists of **13** printed pages.

PUBLISHED**Generic Marking Principles**

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptions for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

GENERIC MARKING PRINCIPLE 6:

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

Science-Specific Marking Principles

1 Examiners should consider the context and scientific use of any keywords when awarding marks. Although keywords may be present, marks should not be awarded if the keywords are used incorrectly.

2 The examiner should not choose between contradictory statements given in the same question part, and credit should not be awarded for any correct statement that is contradicted within the same question part. Wrong science that is irrelevant to the question should be ignored.

3 Although spellings do not have to be correct, spellings of syllabus terms must allow for clear and unambiguous separation from other syllabus terms with which they may be confused (e.g. ethane / ethene, glucagon / glycogen, refraction / reflection).

4 The error carried forward (ecf) principle should be applied, where appropriate. If an incorrect answer is subsequently used in a scientifically correct way, the candidate should be awarded these subsequent marking points. Further guidance will be included in the mark scheme where necessary and any exceptions to this general principle will be noted.

5 'List rule' guidance

For questions that require *n* responses (e.g. State **two** reasons ...):

- The response should be read as continuous prose, even when numbered answer spaces are provided.
- Any response marked *ignore* in the mark scheme should not count towards *n*.
- Incorrect responses should not be awarded credit but will still count towards *n*.
- Read the entire response to check for any responses that contradict those that would otherwise be credited. Credit should **not** be awarded for any responses that are contradicted within the rest of the response. Where two responses contradict one another, this should be treated as a single incorrect response.
- Non-contradictory responses after the first *n* responses may be ignored even if they include incorrect science.

6 Calculation specific guidance

Correct answers to calculations should be given full credit even if there is no working or incorrect working, **unless** the question states 'show your working'.

For questions in which the number of significant figures required is not stated, credit should be awarded for correct answers when rounded by the examiner to the number of significant figures given in the mark scheme. This may not apply to measured values.

For answers given in standard form (e.g. $a \times 10^n$) in which the convention of restricting the value of the coefficient (a) to a value between 1 and 10 is not followed, credit may still be awarded if the answer can be converted to the answer given in the mark scheme.

Unless a separate mark is given for a unit, a missing or incorrect unit will normally mean that the final calculation mark is not awarded. Exceptions to this general principle will be noted in the mark scheme.

7 Guidance for chemical equations

Multiples / fractions of coefficients used in chemical equations are acceptable unless stated otherwise in the mark scheme.

State symbols given in an equation should be ignored unless asked for in the question or stated otherwise in the mark scheme.

Key Points

- Refer to the *Instructions for Examiners (marking scripts on-screen) 2021* booklet for details of all procedures.
- As soon as you are able (usually about two days after the paper set date), please access the question paper and provisional mark scheme from the **RM support portal**. In conjunction with the provisional mark scheme, browse scripts in **RM Assessor (scoris)** and feed any issues or comments to your **Team Leader**.
- The decisions of the **Principal Examiner** are final, and the final agreed mark scheme must be applied as intended by the Principal Examiner. If you are in any doubt about applying this mark scheme, consult your **Team Leader** by telephone or by email.
- Please report any serious problems during marking to your **Team Leader / Principal Examiner** (details in the confidential package).
- If you require technical support, please contact the **RM Helpdesk**. If you require administrative support relating to the examination process, please contact the **CIE Examiner Helpdesk**. For all queries relating to payment, please contact **Cambridge Assessment Finance Division**. Up-to-date contact details for each of these can be found in the *Instructions for Examiners (marking scripts on-screen) 2021* booklet.
- The schedule of dates is very important. It is **essential** that you meet the **Batch 1** and **Batch 2** deadlines. If you experience problems, you must contact your Team Leader without delay.
- Mark strictly to the mark scheme. All marks awarded must relate directly to the mark scheme. However, always credit correct, relevant, science, even if it lies outside of the syllabus content. For answers not provided for in the mark scheme, give as far as possible equivalent marks for equivalent work. If in doubt, consult your Team Leader.
- Never transfer marks allocated for one question item to another.
- Where work has been crossed out, mark it when nothing else has been written.
- Do not penalise grammatical constructions / spelling of words that are not in the syllabus, so long as the meaning is clear.
- Credit should be given to all the candidate's correct responses, wherever they have been written (including blank pages, around diagrams, etc.).
- Additional materials may be attached and must be checked for candidates' responses. Show that you have checked blank pages for answers by placing an annotation on each blank page. Do not use crosses or ticks for this purpose, unless the points are credited as part of a response to a specific question. In this instance, please use the On Page Comment tool to clearly annotate which question part the marks relate to.
- If the candidate has left an answer blank, or has left a mark / comment that does not in any way relate to the question (for example 'my dog is black' or '----' or 'can't do' or '?') use the **NR** (No Response, #) option.
- Award 0 marks for any attempt which does not earn credit. This includes copying out all / part of the question or any working that does not earn any marks (whether crossed out or not).
- This mark scheme will use the following abbreviations:

;	separates marking points
/	separates alternatives within a marking point
()	contents of brackets are not required but should be implied / the contents set the context of the answer
R	reject
A	accept (answers that are correctly cued by the question or guidance you have received)
I	ignore (mark as if this material was not present)
AW	alternative wording (where responses vary more than usual, accept other ways of expressing the same idea)

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AVP alternative valid point (where a greater than usual variety of responses is expected)

ORA or reverse argument

OWTTE other words to that effect

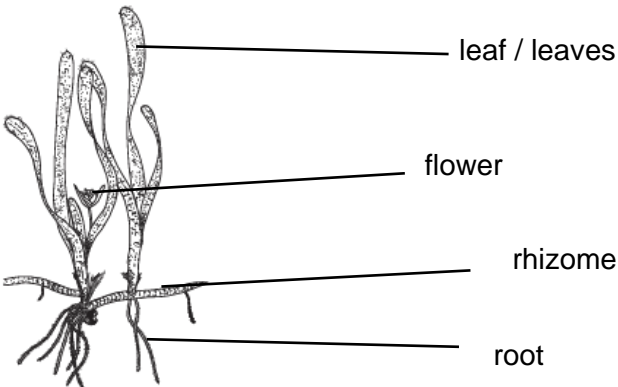
- **underline** actual word underlined must be used by the candidate (grammatical variants excepted)
- **MAX** indicates the maximum number of marks that can be awarded
- **+** statements on both sides of the **+** are needed for that mark
- **OR** separates two different routes to a mark point and only one should be awarded
- **ECF** error carried forward (credit an operation from a previous incorrect response)

Question	Answer			Marks															
1(a)	<table border="1"> <thead> <tr> <th data-bbox="333 217 461 282">label</th> <th data-bbox="472 217 752 282">name</th> <th data-bbox="752 217 1111 282">state of matter</th> </tr> </thead> <tbody> <tr> <td data-bbox="333 282 461 347">J</td> <td data-bbox="472 282 752 347">crust</td> <td data-bbox="752 282 1111 347">solid</td> </tr> <tr> <td data-bbox="333 347 461 413">K</td> <td data-bbox="472 347 752 413">mantle</td> <td data-bbox="752 347 1111 413">solid / liquid</td> </tr> <tr> <td data-bbox="333 413 461 478">L</td> <td data-bbox="472 413 752 478">outer core</td> <td data-bbox="752 413 1111 478">liquid</td> </tr> <tr> <td data-bbox="333 478 461 544">M</td> <td data-bbox="472 478 752 544">inner core</td> <td data-bbox="752 478 1111 544">solid</td> </tr> </tbody> </table>	label	name	state of matter	J	crust	solid	K	mantle	solid / liquid	L	outer core	liquid	M	inner core	solid			4
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1(b)(i)	X = transform (boundary) ; Y = divergent / constructive (boundary) ;			2															
1(b)(ii)	(oceanic plate) subducted (OWTTE) plate melts ; pressure increases on melted crust / magma OR release / rise of magma / eruption ;			2															
1(b)(iii)	removal of sand / substrate (from sandy shores) ; mangrove / sea grass, ripped loose / coral reefs damaged / habitat destruction ; organism washed away from habitats / carried inland ; AVP ;			2															

Question	Answer	Marks														
2(a)(i)	<table border="0" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center; width: 30%;">name</th> <th style="text-align: center;">definition</th> </tr> </thead> <tbody> <tr> <td style="border: 1px solid black; padding: 5px; text-align: center;">community</td> <td style="border: 1px solid black; padding: 5px;">the community and the environment interacting together</td> </tr> <tr> <td style="border: 1px solid black; padding: 5px; text-align: center;">habitat</td> <td style="border: 1px solid black; padding: 5px;">a group of organisms of one species living in the same area at the same time</td> </tr> <tr> <td style="border: 1px solid black; padding: 5px; text-align: center;">population</td> <td style="border: 1px solid black; padding: 5px;">a group of organisms that can reproduce fertile offspring</td> </tr> <tr> <td style="border: 1px solid black; padding: 5px; text-align: center;">environment</td> <td style="border: 1px solid black; padding: 5px;">the external biotic and abiotic surroundings of an organism</td> </tr> <tr> <td></td> <td style="border: 1px solid black; padding: 5px;">all the population of different species in one area</td> </tr> <tr> <td></td> <td style="border: 1px solid black; padding: 5px;">the area where an organism lives and interacts with its environment and other organisms</td> </tr> </tbody> </table>	name	definition	community	the community and the environment interacting together	habitat	a group of organisms of one species living in the same area at the same time	population	a group of organisms that can reproduce fertile offspring	environment	the external biotic and abiotic surroundings of an organism		all the population of different species in one area		the area where an organism lives and interacts with its environment and other organisms	4
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2(b)(i)	<i>Any two from:</i> diatoms dinoflagellates cyanobacteria ;	1														
2(b)(ii)	cod (fish) ;	1														
2(b)(iii)	parasite / detritivore / decomposer / bacteria ;	1														
2(b)(iv)	<i>Any 2 from:</i> predation / harvesting ; food availability / competition (for food) ; disease / parasite (load) ;	2														

Question	Answer	Marks
3(a)	<p><i>Any 3 from:</i></p> <p>atmospheric dissolution (of oxygen) OWTTE; atmospheric dissolution of carbon dioxide / carbon dioxide present in (sea)water ; (presence of light) used by photosynthesis / photosynthetic organisms / producers / named photosynthetic organisms ; <i>idea of producers / photosynthesis, releasing / producing oxygen ;</i></p>	3
3(b)(i)	<p>more carbon dioxide / CO₂ in water (than in air) ORA ; more oxygen / O₂ in air (than in water) ORA ;</p>	2
3(b)(ii)	<p><i>Any 3 from:</i></p> <p>no light so no photosynthesis occurs ; (so) no carbon dioxide being absorbed by the producers (from the water) ; organisms / plants / animals, are respiring ; (respiration) releases carbon dioxide (into the water) ;</p>	3
3(c)	<p>Midnight zone ; <i>plus any 2 from:</i> (bio)luminescent lure ; large / backward facing teeth ; dark / dull colouration ; AVP ;</p>	3

Question	Answer	Marks
4(a)(i)	<p>A nucleus ; B cell wall ; C chloroplast ; D cytoplasm ;</p>	3
4(a)(ii)	<p>to absorb light / photosynthesis ;</p>	1

Question	Answer	Marks														
4(a)(iii)	(similarity) photosynthetic / chloroplast ; (difference) dinoflagellate has, flagella / flagellum ;	2														
4(b)(i)	 <p>lines must touch the feature any 2 correct ; all 4 correct ;</p>	2														
4(b)(ii)	<table border="0"> <thead> <tr> <th data-bbox="360 906 524 938">feature</th> <th data-bbox="853 906 1189 938">function</th> </tr> </thead> <tbody> <tr> <td data-bbox="360 1027 524 1098">leaf</td> <td data-bbox="853 943 1189 1013">anchors the seagrass to the substrate and absorbs minerals</td> </tr> <tr> <td data-bbox="360 1114 524 1184">root</td> <td data-bbox="853 1027 1189 1098">keeps the leaves floating</td> </tr> <tr> <td data-bbox="360 1200 524 1270">flower</td> <td data-bbox="853 1114 1189 1184">the organ of photosynthesis</td> </tr> <tr> <td data-bbox="360 1286 524 1356">rhizome</td> <td data-bbox="853 1200 1189 1270">for asexual reproduction</td> </tr> <tr> <td></td> <td data-bbox="853 1286 1189 1356">for sexual reproduction</td> </tr> <tr> <td></td> <td data-bbox="853 1366 1189 1436">for protection</td> </tr> </tbody> </table>	feature	function	leaf	anchors the seagrass to the substrate and absorbs minerals	root	keeps the leaves floating	flower	the organ of photosynthesis	rhizome	for asexual reproduction		for sexual reproduction		for protection	4
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Question	Answer	Marks
5(a)(i)	<i>Any 2 from:</i> timber / firewood / construction ; coastal protection / reduced erosion ; food supply ; medicines ; fish nursery area ; increases biodiversity ; tourism ; AVP ;	2
5(a)(ii)	<i>Any 1 from :</i> increased / provides income ; constant energy supply ; (relatively) cheap (oil / energy) ;	1
5(a)(iii)	burning / combustion (of fossil fuel / oil) ; (burning / its use) releases carbon dioxide ; causes enhanced greenhouse effect ;	3
5(a)(iv)	<i>Any 2 from:</i> stated / change in, water temperature ; increase in water depth / sea level rises ; decreasing pH / more acidic water / acidification ; increase in extreme weather events ; habitat loss ;	2
5(a)(v)	<i>Any 2 from:</i> skimmers ; booms ; dispersant (sprays) ; burning ;	2
5(b)(i)	(mangrove) plants are grown on, in controlled conditions / protected environment ;	1

Question	Answer	Marks
5(b)(ii)	pollution problems need to be resolved ; otherwise the new plants will die off ;	2

Question	Answer	Marks
6(a)	<i>Any 4 from:</i> temperature in polar is colder ; so, at the poles / in colder water, less evaporation occurs ORA ; so particles have less (kinetic) energy ORA ; cannot escape from liquid ORA ; (solid) ice covers the water ; AVP ;	4
6(b)	<i>Any 1 from:</i> nutrients taken up by marine producers ; nutrients passed along food chains ; <i>and any 1 from:</i> death / decomposition / excretion / faeces / marine snow ; (marine snow / dead organisms) sink through water ; downwelling ;	2
6(c)(i)	$25\,000\,000 \times 0.06$; $1\,500\,000 / 1.5 \times 10^{-6} / 1.5$ million, (tonnes) ;	2
6(c)(ii)	<i>Any 2 from :</i> kills (OWTTE) marine animals when plastic is eaten / ingested / mistaken for food ; microplastics (bio)accumulate along the food chain ; (micro)plastic is toxic ; form garbage patches ; AVP ;	2

Question	Answer	Marks
7(a)	<p><i>Any 3 from:</i> low(er) air pressure (over Pacific / ocean) ; reversal of <u>trade</u> winds ;</p> <p>drive (water) currents, in opposite direction / west to east / increased onshore wind (E Pacific) ; increases (surface) water temperature in Eastern Pacific ;</p>	3
7(b)	<p><i>Any 3 from:</i> reduced, upwelling / nutrients, in Eastern Pacific ; lower fish catch, Eastern Pacific or Western Pacific ; higher rainfall / flooding Eastern Pacific ; drought / lower rainfall / bushfires in Western Pacific / Australia / Pacific islands ;</p> <p>AVP ;</p>	3

Question	Answer	Marks
8(a)(i)	Pacific Ocean ;	1
8(a)(ii)	<p><i>Any 2 from:</i> smaller body of water ; close to land / partially enclosed, by land ; can be found within oceans ;</p>	2
8(b)	<p><i>Any 6 from:</i> using magnetism ; olfaction / smell ; mental maps / landmarks ; location of sun / moon / stars ;</p> <p>to find / follow, food (source) ; find mates ;</p> <p>lay eggs in suitable areas ; avoid predators ;</p>	6