CAMBRIDGE
International Education

Cambridge IGCSE™

MARINE SCIENCE **0697/11**

Paper 1 Theory and Data Handling **May/June 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 May/June 2024 series for most Cambridge IGCSE, Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

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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.

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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.

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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.

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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.

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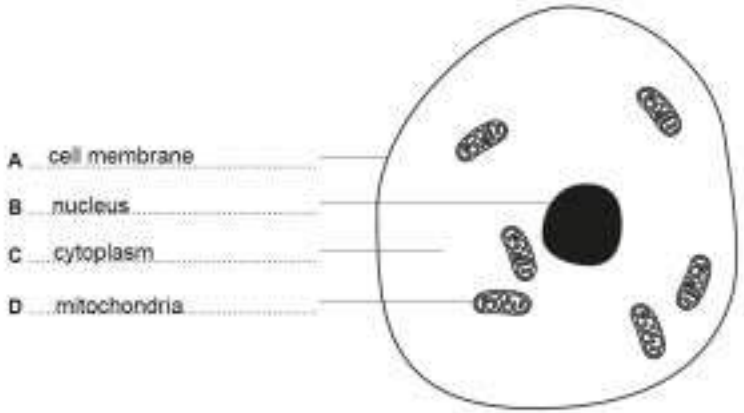
Question	Answer	Marks
1(a)(i)		**3**
1(a)(ii)	to release energy / undertake (aerobic) respiration ;	**1**
1(a)(iii)	*any **2** of* vacuole ; cell wall ; chloroplast(s) ;	**2**

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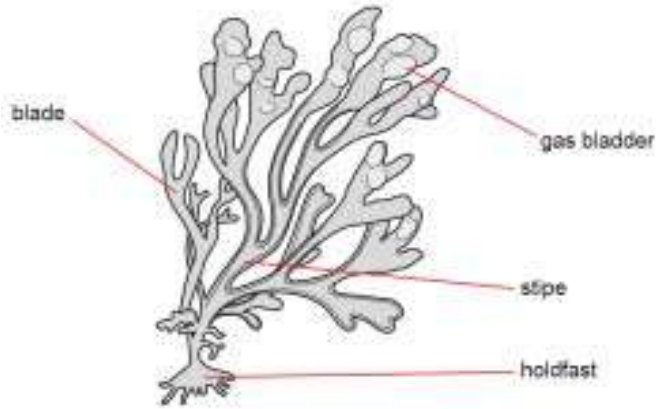
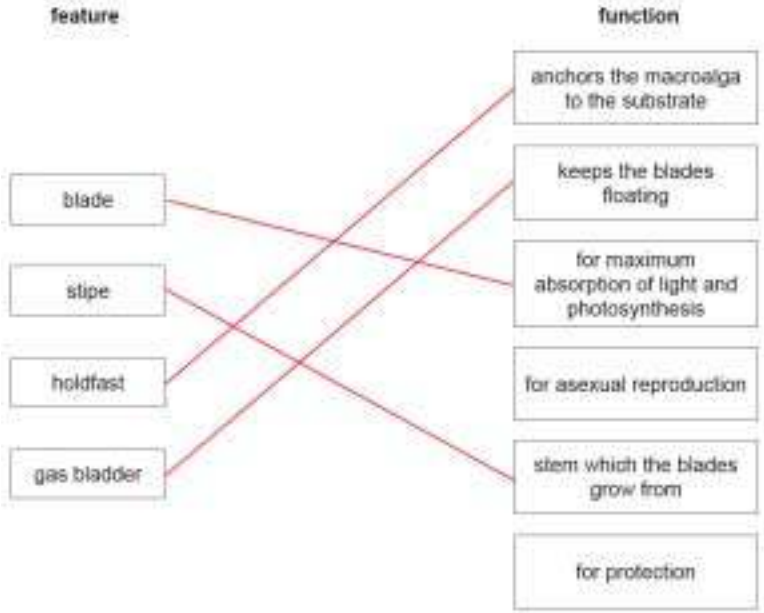
Question	Answer	Marks
1(b)(i)		**2**
1(b)(ii)		**4**

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Question	Answer	Marks
2(a)	compound ; 3 / three; bones / shells ;	**3**
2(b)(i)	process at 2 precipitation **AND** process at 3 run-off ;	**1**
2(b)(ii)	higher / increased, temperature, increases rate (of evaporation) ORA ; higher / increased, wind speed, increases rate (of evaporation) ORA ;	**2**
2(b)(iii)	(in the ocean) evaporation increases the salinity ; (because) salts do not evaporate / pure or only, water evaporates ; little effect on fresh water, as few salts present / salinity is low ;	**3**

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Question	Answer	Marks
3(a)(i)	algae **and** phytoplankton ;	**1**
3(a)(ii)	sea anemones / shorebirds ;	**1**
3(a)(iii)	small crustaceans ;	**1**
3(a)(iv)	(respiration) releases energy ; used by the organism (in activities) ; in the form of heat ;	**3**
3(b)	*any **pair** of:* hard shell ; to protect against, predators / wave action ; can close shell tightly ; to prevent water loss (at low tide) ; (byssus) threads : for attachment ;	**2**
3(c)	*any **2** of:* food supply / decrease in number of sea urchins ; disease / parasites ; competition ; predation ;	**2**

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Question	Answer	Marks
3(d)	(environment) – the external surroundings of an organism / population **OR** the external surroundings including biotic and abiotic factors ; (habitat) – area where an organism lives ; and interacts with its environment ;	**3**

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Question	Answer	Marks
4(a)(i)	<table><tr><td>ocean zone</td><td>name</td><td>depth range / m</td><td>concentration of dissolved oxygen</td><td>pressure</td></tr><tr><td>1</td><td>sunlight (zone)</td><td>0 – 200</td><td>high</td><td>low</td></tr><tr><td>2</td><td>twilight (zone)</td><td>200 – 1000 (A ECF from sunlight zone)</td><td>medium</td><td>medium</td></tr><tr><td>3</td><td>midnight zone</td><td>over 1000</td><td>low</td><td>high</td></tr></table>	4
4(a)(ii)	high levels in the atmosphere so it dissolves in the water ; photosynthesis releases oxygen ;	2
4(a)(iii)	lower temperature with increasing depth ; would allow more oxygen to dissolve / increases solubility of oxygen ;	2
4(b)(i)	***either**:* (phytoplankton) to obtain sunlight ; for growth / population growth ; **or** (zooplankton) to find food / phytoplankton ; that live near the surface ;	2

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Question	Answer	Marks
4(b)(ii)	*any **3** of:* energy from the Sun was captured by phytoplankton ; passed along the food chain ; (organisms) waste / dead organisms, sink ; detritivores find and eat them ;	**3**

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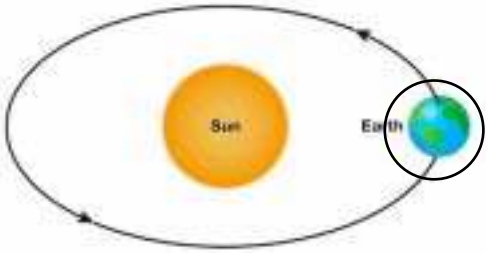
Question	Answer	Marks
5(a)(i)	gravity ;	**1**
5(a)(ii)	 Moon shown closer to the Earth than the Sun ; orbit shown with an arrow on (either direction) ;	**2**
5(b)(i)	iron ;	**1**
5(b)(ii)	(iron core) produces a magnetic field ; some animals detect this (magnetic field) ; to help them navigate (around the oceans) ;	**3**
5(c)	*any **4** of:* (at) convergent plate boundary ; plates become stuck on each other ; massive <u>sudden,</u> earthquake / volcanic eruption / landslide **OR** <u>sudden</u>, movement / rising of the sea floor / release, of energy when plates released ; moves / displaces, <u>large</u> volume of water ; forms, long wavelength / fast moving, wave ;	**4**

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Question	Answer	Marks
6(a)	(advantage) constant supply of energy / energy dense / relatively cheap / stable (to transport) ; (disadvantage) non-renewable / produce carbon dioxide or other named damaging gas, when burned / environmental damaged from extraction / becoming more difficult to extract ;	**2**
6(b)(i)	MARPOL **OR** International Convention for the Prevention of Pollution from Ships	**1**
6(b)(ii)	*any **2** of:* (continued) increase for 4 years / until 1974 / 75 ; took (approx.) 14 years to reach levels of early 1970's / steady decrease since 1974 / 5 ; increased again in early 1990's ; continued to drop until 2008 ; relatively stable / at low level, since 2008 ;	**2**
6(b)(iii)	(1974) 118 ,27 **AND** (1984) 34, 8 ; (118–27) = 91 **AND** (34–8) = 26 ; 91 – 26 = 65 ;	**3**
6(b)(iv)	takes several years to build a (new) ship / modify an (existing) ship ; so old ships still transporting oil and having spills ;	**2**
6(c)(i)	*any **2** of:* wind / wave / tidal ;	**1**

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Question	Answer	Marks
6(c)(ii)	*any **pair** of:* (wind / tidal) turbines can injure / kill wildlife ; due to spinning blades ; (any named source) underwater cables to carry energy to land ; may damage, seabed / habitat, for organisms ; (tidal) *idea that* tidal range / time submerged for, changes ; impacts habitats of tidal organisms (e.g. migrating birds) ; (tidal) – requires large tidal barrages ; which can obstruct migratory (marine) organisms ;	**2**

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Question	Answer	Marks
7(a)	*any **6** of:* (positive impacts) (idea of) tourists appreciate the environment and want to preserve it for the future ; development of Marine Protected Areas (MPAs) ; involvement of / income for, conservation organisations ; education of tourists regarding local marine ecosystems ; (negative impacts) competition for land or resources ; named pollution ; damage to sensitive ecosystems (e.g. people standing on reefs / boats dropping anchors) ; removal of organisms to sell (food or souvenirs) ; interaction with organisms and behavioural consequences ;	**6**
7(b)	*any **group** of:* use of renewable energy and resources ; reduces carbon footprint of tourists ; but infrastructure / named (e.g. wind turbine) may need to be built ; limiting water use ; reduces, freshwater supply requirements / treatment of waste water ; but tourists may not be happy (using salt water for showers) ; banning single-use plastics ; reduces plastics pollution of the ocean ; but alternatives may increase cost (for tourists) ; limiting motorised transport ; reduces carbon footprint of tourists ; but most tourists will have flown to get near to the resort ; limit number of tourists / government tax on tourists ; reduces the human impact ; but reduces income for conservational organisations ;	**3**

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