



Cambridge O Level

MARINE SCIENCE

5180/01

Paper 1 Structured

May/June 2021

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 2021 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

This document consists of **11** 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 descriptors 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.

Question	Answer		Marks										
1(a)	<table border="1"> <thead> <tr> <th data-bbox="322 213 629 279">description</th> <th data-bbox="629 213 1384 279">name of organism</th> </tr> </thead> <tbody> <tr> <td data-bbox="322 279 629 344">a herbivore</td> <td data-bbox="629 279 1384 344">sea cucumber / jellyfish / crustacean ;</td> </tr> <tr> <td data-bbox="322 344 629 410">a primary producer</td> <td data-bbox="629 344 1384 410">phytoplankton / algae ;</td> </tr> <tr> <td data-bbox="322 410 629 475">an organism TL 4</td> <td data-bbox="629 410 1384 475">killer whale / great white shark / sea turtles / large fish ;</td> </tr> <tr> <td data-bbox="322 475 629 541">a prey of sea turtles</td> <td data-bbox="629 475 1384 541">jellyfish / sea cucumber / crustaceans / small fish ;</td> </tr> </tbody> </table>	description	name of organism	a herbivore	sea cucumber / jellyfish / crustacean ;	a primary producer	phytoplankton / algae ;	an organism TL 4	killer whale / great white shark / sea turtles / large fish ;	a prey of sea turtles	jellyfish / sea cucumber / crustaceans / small fish ;		4
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1(b)	<p><i>Any 2 from :</i> photosynthetic ; uses light (energy) ; uses carbon dioxide and water ; plus energy / glucose / carbohydrate + transferred along food chain / provided to other organisms ;</p> <p>OR</p> <p><i>Any 2 from :</i> chemosynthetic ; uses chemical energy ; use of hydrogen sulfide and carbon dioxide ; plus energy / glucose / carbohydrate, + transferred along food chain / provided to other organisms ;</p>		3										
1(c)	increases ; as fewer turtles to feed on them ;		2										
1(d)	<i>any 2 from:</i> ban on harvesting (eggs / meat) ; idea of protecting an area for the turtles ; ban on trade ; AVP ;;		2										

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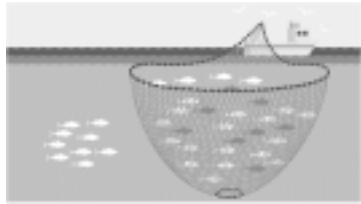
Question	Answer	Marks								
2(a)	<table border="1"> <thead> <tr> <th data-bbox="336 213 584 277">group</th> <th data-bbox="584 213 931 277">name</th> </tr> </thead> <tbody> <tr> <td data-bbox="336 277 584 341">phylum</td> <td data-bbox="584 277 931 341">arthropod / arthropoda ;</td> </tr> <tr> <td data-bbox="336 341 584 405">class ;</td> <td data-bbox="584 341 931 405">crustacea</td> </tr> <tr> <td data-bbox="336 405 584 469">genus</td> <td data-bbox="584 405 931 469">Ocypode ;</td> </tr> </tbody> </table>	group	name	phylum	arthropod / arthropoda ;	class ;	crustacea	genus	Ocypode ;	3
group	name									
phylum	arthropod / arthropoda ;									
class ;	crustacea									
genus	Ocypode ;									
2(b)(i)	<p>eggs and sperm / male and female gametes / male and female sex cells, released OR spermatophore transferred to female + ref. to release of, eggs / female gametes / sex cells ;</p> <p>(gametes) fuse ;</p>	2								
2(b)(ii)	<p>juvenile ;</p> <p>float / drift or carried in the <u>current</u> ;</p>	2								
2(b)(iii)	<p><i>any 1 from:</i></p> <p>can be moved to new areas (to colonise) ;</p> <p>no energy expended caring for young ;</p> <p><u>plenty</u> (of plankton) to feed on ;</p>	1								
2(c)(i)	cast off, exoskeleton / shell / carapace / (hard) external cover ;	1								
2(c)(ii)	<p><i>any 2 from:</i></p> <p>shell doesn't grow / is fixed in size or shape / body no longer fits inside the shell ;</p> <p>repair damage to shell / repair <u>weakened</u> shell / regrow missing parts ;</p> <p>(removes it) to grow (entire body) ;</p>	2								

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Question	Answer	Marks
3(a)	<i>any 2 from:</i> any 2 named greenhouse gases from CO ₂ , methane, water vapour ;; emissions from human activities / named activity (e.g. burning fossil fuels / deforestation / decay or breakdown of rubbish / number of cattle) ;;	2
3(b)(i)	<i>any 3 from:</i> current is (constant) flow of water in <u>one</u> direction / current is the horizontal movement of water ; currents caused by, temperature gradients / sea floor geomorphology / upwelling ; tide is <u>regular</u> rise and fall of water (level) / tide is a <u>regular</u> vertical movement of water ; tide is caused by, rotation of the Earth / gravitational effect of sun or moon (or both) ;	3
3(b)(ii)	(position of the tide) increases ;	1
3(c)(i)	acidity / alkalinity / concentration of, H ions, or H ⁺ ;	1
3(c)(ii)	(measure of the) percentage / concentration / parts per thousand / grams per dm ³ ; (dissolved) salts (in the water) ;	2

Question	Answer	Marks
4(a)(i)	<i>any 3 from:</i> increases, nutrients / named nutrient, in water ; leads to, eutrophication / algal bloom ; ref. to reduced oxygen levels (in water) / dead zones / increase BOD ; (sewage) may deposit on top of / floats above, corals ; blocking sunlight, (light blocked for) zooxanthellae / photosynthesis ; blocks polyps' feeding mechanism ; bacteria may cause disease ;	3
4(a)(ii)	<i>any 2 from:</i> toxic / poisonous (to coral) ; passes along food chains / bioaccumulation ; kills organisms in higher trophic levels ;	2

Question	Answer	Marks
4(b)(i)	<i>any 2 from:</i> reduces ; (because it) takes increased effort to <u>catch</u> (those left) ; fewer fish are <u>caught</u> ;	2
4(b)(ii)	quotas / licenses / boat restrictions (boat days or size of boat) / gear restrictions (or named) / closed seasons / closed areas / surveillance ; reduces catch; more fish to breed / increased recruitment / more sustainable ;	3

Question	Answer	Marks
5(a)	latitude 35 (degrees) 41 (minutes) + /- 10 (minutes) ; longitude 27 (degrees) 5 (minutes) + /- 10 (minutes) ;	2
5(b)(i)	compass (rose) ;	1
5(b)(ii)	south ;	1
5(b)(iii)	<i>any 1 from:</i> wind ; current ;	1
5(c)	locate fish ; check depth of water ;	2
5(d)(i)		1
5(d)(ii)	by-catch / named by-catch e.g dolphins, turtles ;	1

Question	Answer	Marks
6(a)(i)	for growth / (tissue) repair / energy ;	1
6(a)(ii)	for energy / insulation ;	1
6(a)(iii)	(for replication of) genetic material / production of proteins ;	1
6(b)	(social) low fat / reduces malnutrition / provides (named) essential nutrients ; <i>up to any 2 from:</i> provides (individuals with) jobs / income source of, national income / foreign currency easily obtained cheap reduces cost of healthcare ;;	2
6(c)(i)	bacterial growth / bacterial action / breakdown of tissue by <u>bacteria</u> ; bad smell / ref. to TMA ;	2
6(c)(ii)	<i>any 3 from:</i> gutted and washed ; cut / filleted ; pre-cooked ; brining / named additives ; <u>sealed</u> (into can) / seaming ; heated, to kill bacteria / to 110 °C (or higher up to 121 °C) ;	3

Question	Answer	Marks
7(a)(i)	<p><i>any 2 from:</i> reduce environmental impact (of tourism) / conserve, the (local) environment / habitats / ecosystems / species ; educate (tourists) on the ecosystem / biodiversity ; fundraising for, conservation / protection (of species / habitats etc.) conserve, the (local) environment / habitats / ecosystems / species ; reduce, energy consumption / CO₂ emissions ; showcase environmentally friendly building practices ; reduce / eliminate, plastics use ; recycling waste material (inc. water) / use of greywater ;</p>	2
7(a)(ii)	<p><i>any 2 from:</i> fishing grounds / harbour, cause, noise / smell / unsightliness ; tourists / activities (e.g. diving / sailing / fishing) may get in the way of fishing vessels / equipment / reduce fishermen's catch OR tourists will want to dive in MPA and fishermen fish very close to the MPA ; conflict at harbour between tourist boats and fishermen landing catch OWTTE ;</p>	2
7(a)(iii)	<p><i>any 2 from:</i> increases income ; sells more fish / sell to the tourists or hotel ; uses boat for tourist, transport / fishing / SCUBA trips / help fishermen in emergencies / provides additional employment opportunities for fishermen ;</p>	2
7(b)	<p>(tourism) greater, number / biodiversity, of species / organisms (for tourists to see) / more pristine habitats for tourists to see / can do tourist activities without being disturbed (by fishing vessels or equipment) ;</p> <p>(fishermen) protected, nursery / breeding area, (for target species) / increase stocks close to the MPA / tourists won't get in the way of fishing activities (if they go to MPA) ;</p>	2

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Question	Answer	Marks
7(c)	<p><i>any 3 from:</i> (named) fuel ; sewage / waste disposal / recycling facilities ; (fish) market ; emergency services / example ; water supply ; fish handling / processing, facilities ; ice (supply) / cold storage facilities ; good transport links ; boat / engine / nets / fishing equipment, making / building / servicing / facilities / repairs ; electrical / electricity supply ; chandlery / selling (named) equipment ; deep water landing ;</p>	3

Question	Answer	Marks
8(a)(i)	A (north) Atlantic + B Indian ;	1
8(a)(ii)	<p>production / stock levels / reproduction <u>rate</u> / disease (in fish), demand / human population, OR (cultural) selection of fish eaten, exploitation / fishing rate OWTTE / development of improved fishing methods / lack of investment in fishing gear / presence of MPAs ;;</p>	2
8(b)(i)	<p>finer / confiscation of equipment / imprisonment / make it illegal / surveillance ;</p>	1
8(b)(ii)	2017 ;	1
8(b)(iii)	<p><i>any 2 from:</i> population (of sharks) decreased ; better / change in, fishing practices, to stop them being caught ;</p>	2
8(c)(i)	a user / buyer, of, goods / services ;	1
8(c)(ii)	fewer caught in 2017 than 2014 / decrease in sharks caught ;	1