



# Cambridge IGCSE™

**MARINE SCIENCE**

**0697/01**

Paper 1 Structured

**For examination from 2020**

**MARK SCHEME**

Maximum Mark: 80

**Specimen**

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This document has **14** pages. Blank pages are indicated.

## 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.

### Generic Science 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 | <p><u>'List rule' guidance</u> (see examples below)</p> <p>For questions that require <i>n</i> responses (e.g. State <b>two</b> reasons ...):</p> <ul style="list-style-type: none"> <li>• The response should be read as continuous prose, even when numbered answer spaces are provided</li> <li>• Any response marked <i>ignore</i> in the mark scheme should not count towards <i>n</i></li> <li>• Incorrect responses should not be awarded credit but will still count towards <i>n</i></li> <li>• Read the entire response to check for any responses that contradict those that would otherwise be credited. Credit should <b>not</b> 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.</li> <li>• Non-contradictory responses after the first <i>n</i> responses may be ignored even if they include incorrect science</li> </ul> |

## 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.

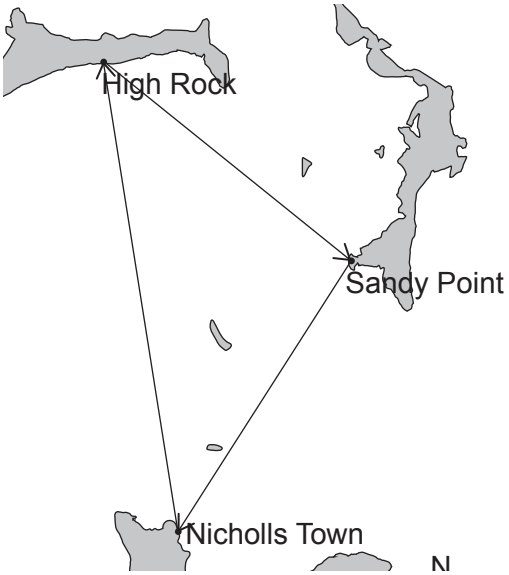
Question	Answer	Marks	Guidance														
1(a)	<table border="1"> <thead> <tr> <th>group</th> <th>letter</th> </tr> </thead> <tbody> <tr> <td>mammals</td> <td><b>B</b> ;</td> </tr> <tr> <td>bony fish</td> <td><b>A</b> ;</td> </tr> <tr> <td>molluscs</td> <td><b>D</b> ;</td> </tr> <tr> <td>arthropods</td> <td><b>C</b> ;</td> </tr> <tr> <td>reptiles</td> <td><b>F</b> ;</td> </tr> <tr> <td>algae</td> <td><b>E</b> ;</td> </tr> </tbody> </table>	group	letter	mammals	<b>B</b> ;	bony fish	<b>A</b> ;	molluscs	<b>D</b> ;	arthropods	<b>C</b> ;	reptiles	<b>F</b> ;	algae	<b>E</b> ;	<b>5</b>	<b>R</b> more than 1 per box 6 correct = 5 marks 4 / 5 correct = 4 marks 3 correct = 3 marks 2 correct = 2 marks 1 correct = 1 mark
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1(b)(i)	<i>Cetorhinus</i> ;	<b>1</b>	<b>R</b> <i>Cetorhinus maximus</i>														
1(b)(ii)	<i>nasus</i> ;	<b>1</b>															

Question	Answer	Marks	Guidance
2(a)	<i>any 2 of:</i> idea of, transfer / modification / change / alteration ; of the DNA / genes / genome / allele / genotype (of an organism) ;	<b>2</b>	
2(b)	<i>any 2 of:</i> idea of, resistance to extreme environments ; ;  disease resistance ; herbicide / insecticide / pesticide, resistance ; enhanced nutrition ; production of, medicines / drugs / useful chemicals ; research ; increase profit ; increased yield / size ; ref. consumer appeal ; idea of, increased / improved, shelf life ; pollution indicators ;	<b>2</b>	e.g. extreme temperatures, extreme moisture, high wind  e.g. more vitamins / protein  e.g. taste, texture, colour, muscle(:fat), muscle (mass)  <b>I</b> better quality <b>I</b> higher demand

Question	Answer	Marks	Guidance
2(c)(i)	85 ;	1	
2(c)(ii)	GE salmon takes 350 days ; normal salmon takes 400 days ; normal salmon take 50 days more ;	3	
2(c)(iii)	<i>any 2 of:</i> idea of, fish reach marketable size quicker ; reduced operating costs / description of ; more profit ; increased yield ;	2	
2(c)(iv)	<i>any 1 of:</i> idea of, breed with wild stock ; idea of, interfere with food chains / AW ; idea of, consumer concerns ; idea of, high capital investment / expensive ;	1	I escape (into wild) unqualified


Question	Answer	Marks	Guidance
3(a)(i)	900 <b>OR</b> 450 ; m ;	2	<b>A</b> 875–925 <b>OR</b> 425–475 <b>A</b> metres I 'depth / m'
3(a)(ii)	decreases ; from 20 to 7 (°C) / by 13 (°C) ;	2	<b>R</b> at decreasing depth temperature is higher <b>A</b> 19.75–20.25 to 6.75–7.25 <b>I</b> references to depth for MP2 allow for full marks reverse argument if make it clearly referring to depth decreasing
3(a)(iii)	temperature decreasing from 1000 m ; to 4000 m ;	2	<b>I</b> angle <b>R</b> vertical line from 1000 m $\pm \frac{1}{2}$ square of 4000 m
3(b)(i)	photosynthesis ;	1	
3(b)(ii)	as depth increases, light (intensity) decreases ;	1	<b>R</b> directly proportional <b>A</b> inversely proportional

Question	Answer	Marks	Guidance
3(b)(iii)	<p>high light (intensity) ; for photosynthesis <b>OR</b> fixing, carbon / energy <b>OR</b> making, food / sugar / glucose ;</p> <p><i>any 1 of:</i> (by) algae / phytoplankton / producer / plant <b>OR</b> (more) animals / organisms, due to (more) oxygen / food ;</p>	<b>3</b>	<p><b>A</b> more light, more light penetration</p> <p><b>A</b> idea of, development of a, food chain / web</p>
Question	Answer	Marks	Guidance
4(a)	<p><i>any 2 of:</i> ref. to finding position / location ; planning a route / way ;</p> <p><u>direction</u> of travel (of a boat, ship) ;</p>	<b>2</b>	<p>e.g. working out where you are e.g. how to get to a destination, planning a journey <b>A</b> finding a way <b>A</b> idea of, steering to imply direction <b>I</b> travel unqualified <b>I</b> going from one place to another</p>

Question	Answer	Marks	Guidance
4(b)	 <p>correct route indicated by straight lines ;</p> <p>with arrow heads on each section of the route ;</p>	<b>2</b>	
4(c)(i)	North ;	<b>1</b>	
4(c)(ii)	South West ;	<b>1</b>	
4(d)	<i>any 2 of:</i> compass ; radar ; GPS ; echo sounder ; charts ; almanac / tide tables ;	<b>2</b>	



Question	Answer	Marks	Guidance
5(a)(i)	mackerel ;	1	R horse mackerel
5(a)(ii)	any 1 of: water ; vitamins ; minerals ;	1	A named vitamin e.g. vitamin D A named mineral e.g. nitrate
5(b)	any 1 of: keep for later use ; for, long distance transport / export ; add value ; access to new markets ;	1	
5(c)	water ; 115 (°C) ; enzymes ; putrefaction ;	4	A bacteria  A rigor mortis ONLY if enzymes is given in previous space

Question	Answer	Marks	Guidance
6(a)(i)	A – eye ; B – carapace ; C – (walking) leg ; D – antenna ;	4	
6(a)(ii)		1	

Question	Answer	Marks	Guidance
6(b)	any 4 of: ova / eggs ; sperm ; external fertilisation / <b>AW</b> ; (planktonic) larvae ; moulting ; ref. one life cycle stage e.g. nauplius, metanauplius, protozoa, zoea, mysis, postlarva ;	4	A labelled annotated diagram for all MP A female gamete A male gamete

Question	Answer	Marks	Guidance
7(a)(i)	idea of, <u>continued</u> , employment / jobs / labour ;  <u>increased</u> , earnings / income / profit / revenue ;	2	
7(a)(ii)	any 2 of: closed seasons / seasonal fishing ; closed areas / marine reserves / no take zones ; quotas / catch limits ; use of permits / licences ; gear restrictions ; restrictions on boat size / type ; restrictions of type of fish targeted ; minimum size to be fished ; surveillance / use of customs / patrols / inspection of catch ; punishment e.g. fines / imprisonment ;	2	I rules / laws unqualified
7(b)	promotes sustainable fishing ;	1	

Question	Answer	Marks	Guidance
8(a)	<p><i>Full marks for either 3 separate ways OR 2 ways plus extra detail of one of them. Source / impact mark must be correctly linked to a way.</i></p> <p>fertilisers ; from, runoff / farmland <b>OR</b> lead to eutrophication / algal blooms ;</p> <p>pesticides / herbicides / insecticides ; from, runoff / farmland <b>OR</b> bioaccumulation / non-target death / effects of bioaccumulation ;</p> <p>heavy metals / antifouling paint ; from painting, boats / underwater structure <b>OR</b> from effluent <b>OR</b> direct toxicity / mutations / imposex / bioaccumulation / non-target death / effects of bioaccumulation ;</p> <p>oil / fuel ; from, spillages / leaks / washed off, boats / rigs <b>OR</b> negative impact e.g. smothering of bird feathers, toxic through ingestion, impacts of detergents for dispersal ;</p> <p>(un treated) sewage ; from, cities / towns / resorts / cruise ships <b>OR</b> leads to eutrophication / algal blooms ;</p> <p>AVP (source <b>OR</b> impact) ; ;</p>	<b>3</b>	<p><b>1</b> unspecified toxins or chemicals unless qualified</p> <p>e.g. nuclear waste from power plants / direct disposal at depth <b>OR</b> idea of, mutations e.g. detergents from washing / oil dispersant <b>OR</b> negative impact e.g. removes oil from seabird feathers, causes eutrophication / idea of</p>

Question	Answer	Marks	Guidance
8(b)(i)	<i>any 2 of:</i> starve / unable to feed ; killed by predators ; blocking of digestive system ; blood loss from wounds ; wounds (become) infected ; drowns / suffocate / strangled / choking ;  overheats ;	<b>2</b>	<b>A</b> dies from exhaustion  <b>A</b> cannot (get to the surface to) breathe / cannot get oxygen
8(b)(ii)	<i>any 2 of:</i> idea of, long(er) lasting <b>OR</b> do not need to replace (as) often ; reduced cost / cheap(er) ; light(er) weight / doesn't absorb water ; (more) stretchy / don't snap as easily ; (more) flexible ;	<b>2</b>	<b>I</b> ref. to not breaking down easily  <b>A</b> idea of durability  <b>A</b> stronger
8(c)	<i>any 3 of:</i> anchored net / weighted net ; buoy / float ; set at different depth / locations (depending on species) ; fish (swim through and) get trapped by operculum / gills ;	<b>3</b>	

Question	Answer	Marks	Guidance
9(a)	lagoons ; coral reefs ; continental shelves ;	<b>2</b>	3 correct = 2 marks 1 / 2 correct = 1 mark
9(b)	<i>any 2 of:</i> Indian Ocean ; Atlantic ; Pacific ; Mediterranean ;	<b>2</b>	

Question	Answer	Marks	Guidance
9(c)	the removal / harvesting / catching of (fish / organisms) ; to levels that cannot sustain a population / at rates faster than populations can recover / faster than fish can reproduce / before they reach reproductive age / more than the MSY ;	2	

Question	Answer	Marks	Guidance								
10(a)(i)	exchange of, goods / services ; without using money ;	2									
10(a)(ii)	(place) where, goods / services, are, bought / sold / traded ;	1									
10(b)	<table border="1"> <thead> <tr> <th>definition</th> <th>term</th> </tr> </thead> <tbody> <tr> <td>the desire to want more things than we need</td> <td>unlimited wants ;</td> </tr> <tr> <td>what we use to produce goods and services</td> <td>resources ;</td> </tr> <tr> <td>the loss of potential gain from other alternatives when one alternative is chosen</td> <td>opportunity cost ;</td> </tr> </tbody> </table>	definition	term	the desire to want more things than we need	unlimited wants ;	what we use to produce goods and services	resources ;	the loss of potential gain from other alternatives when one alternative is chosen	opportunity cost ;	3	R more than 1 per box
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