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**MARINE SCIENCE****5180/01**

Paper 1 Structured

**October/November 2018**

MARK SCHEME

Maximum Mark: 80

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**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 2018 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

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This document consists of **15** 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:**

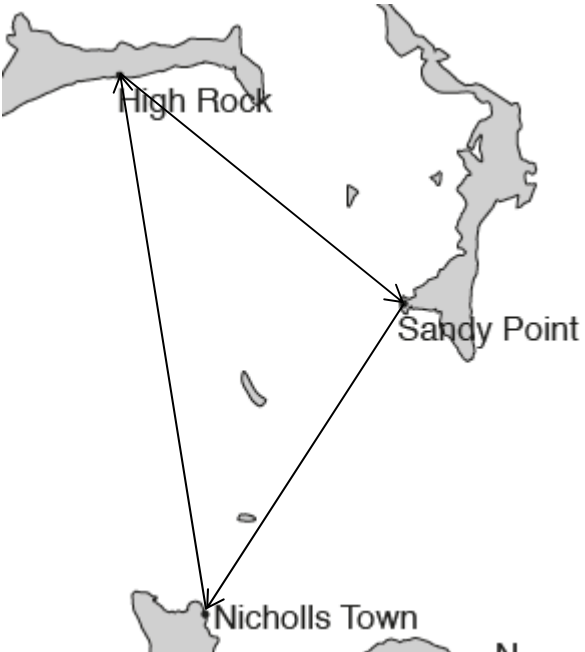
Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

Question	Answer	Marks	Guidance														
1(a)	<table border="1" data-bbox="573 217 1099 676"> <thead> <tr> <th data-bbox="573 217 949 282">group</th> <th data-bbox="949 217 1099 282">letter</th> </tr> </thead> <tbody> <tr> <td data-bbox="573 282 949 347">mammals</td> <td data-bbox="949 282 1099 347">B ;</td> </tr> <tr> <td data-bbox="573 347 949 413">bony fish</td> <td data-bbox="949 347 1099 413">A ;</td> </tr> <tr> <td data-bbox="573 413 949 478">molluscs</td> <td data-bbox="949 413 1099 478">D ;</td> </tr> <tr> <td data-bbox="573 478 949 544">arthropods</td> <td data-bbox="949 478 1099 544">C ;</td> </tr> <tr> <td data-bbox="573 544 949 609">reptiles</td> <td data-bbox="949 544 1099 609">F ;</td> </tr> <tr> <td data-bbox="573 609 949 675">algae</td> <td data-bbox="949 609 1099 675">E ;</td> </tr> </tbody> </table>	group	letter	mammals	B ;	bony fish	A ;	molluscs	D ;	arthropods	C ;	reptiles	F ;	algae	E ;	5	<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
group	letter																
mammals	B ;																
bony fish	A ;																
molluscs	D ;																
arthropods	C ;																
reptiles	F ;																
algae	E ;																
1(b)(i)	<i>Cetorhinus</i> ;	1	<b>R</b> <i>Cetorhinus maximus</i>														
1(b)(ii)	<i>nasus</i> ;	1															

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

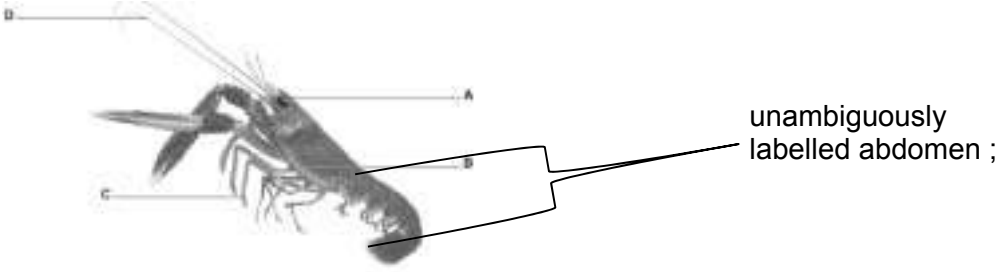
Question	Answer	Marks	Guidance
3(a)(i)	900 <b>OR</b> 450 ; m ;	<b>2</b>	<b>A</b> 875–925 <b>OR</b> 425–475 <b>A</b> metres <b>I</b> 'depth / m'
3(a)(ii)	decreases ; from 20 to 7 (°C) / by 13 (°C) ;	<b>2</b>	<b>R</b> at decreasing depth temperature is higher <b>A</b> 19.75–20.25 to 6.75–7.25 <b>I</b> 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 ;	<b>2</b>	<b>I</b> angle <b>R</b> vertical line from 1000 m $\pm \frac{1}{2}$ square of 4000 m
3(b)(i)	photosynthesis ;	<b>1</b>	
3(b)(ii)	as depth increases, light (intensity) decreases ;	<b>1</b>	<b>R</b> <u>directly</u> proportional <b>A</b> <u>inversely</u> proportional
3(b)(iii)	high light (intensity) ; for photosynthesis <b>OR</b> fixing, carbon / energy <b>OR</b> making, food / sugar / glucose ;  <i>any 1 of:</i> (by) algae / phytoplankton / producer / plant <b>OR</b> (more) animals/organisms, due to (more) oxygen / food ;	<b>3</b>	<b>A</b> more light, more light penetration          <b>A</b> idea of, development of a, food chain / web

Question	Answer	Marks	Guidance
4(a)	<p><i>any 2 of:</i>            ref. to finding position / location ;            planning a route / way ;    <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            A finding a way            A idea of, steering to imply direction            I travel unqualified            I going from one place to another</p>
4(b)	 <p>correct route indicated by straight lines ;              with arrow heads on each section of the route ;</p>	<b>2</b>	
4(c)(i)	North ;	<b>1</b>	



Question	Answer	Marks	Guidance
4(c)(ii)	South West ;	1	
4(d)	<i>any 2 of:</i> compass ; radar ; GPS ; echo sounder ; charts ; almanac / tide tables ;	2	

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

Question	Answer	Marks	Guidance
6(a)(i)	<b>A</b> – eye ; <b>B</b> – carapace ;  <b>C</b> – (walking) leg ;  <b>D</b> – antenna ;	<b>4</b>	
6(a)(ii)		<b>1</b>	
6(b)	<i>any 4 of:</i> ova / eggs ; sperm ; <u>external fertilisation</u> / <b>AW</b> ; (planktonic) larvae ; moulting ; ref. one life cycle stage e.g. nauplius, metanauplius, protozoa, zoea, mysis, postlarva ;	<b>4</b>	<b>A</b> labelled annotated diagram for all MP <b>A</b> female gamete <b>A</b> male gamete

Question	Answer	Marks	Guidance
7(a)(i)	idea of, <u>continued</u> , employment / jobs / labour ;  <u>increased</u> , earnings / income / profit / revenue ;	<b>2</b>	
7(a)(ii)	<i>any 2 of:</i> 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 ;	<b>2</b>	1 rules / laws unqualified
7(b)	promotes sustainable fishing ;	<b>1</b>	



Question	Answer	Marks	Guidance
8(b)(i)	<p><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 ;</p>	2	<p><b>A</b> dies from exhaustion</p> <p><b>A</b> cannot (get to the surface to) breathe / cannot get oxygen</p>
8(b)(ii)	<p><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 ;</p>	2	<p><b>I</b> ref. to not breaking down easily</p> <p><b>A</b> idea of durability</p> <p><b>A</b> stronger</p>
8(c)	<p><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 ;</p>	3	

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>	
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 ;	<b>2</b>	

Question	Answer	Marks	Guidance								
10(a)(i)	exchange of, goods / services ; without using money ;	<b>2</b>									
10(a)(ii)	(place) where, goods / services, are, bought / sold / traded ;	<b>1</b>									
10(b)	<table border="1"> <thead> <tr> <th data-bbox="344 384 949 450">definition</th> <th data-bbox="949 384 1326 450">term</th> </tr> </thead> <tbody> <tr> <td data-bbox="344 450 949 552">the desire to want more things than we need</td> <td data-bbox="949 450 1326 552">unlimited wants ;</td> </tr> <tr> <td data-bbox="344 552 949 617">what we use to produce goods and services</td> <td data-bbox="949 552 1326 617">resources ;</td> </tr> <tr> <td data-bbox="344 617 949 715">the loss of potential gain from other alternatives when one alternative is chosen</td> <td data-bbox="949 617 1326 715">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 ;	<b>3</b>	<b>R</b> more than 1 per box
definition	term										
the desire to want more things than we need	unlimited wants ;										
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