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**MARINE SCIENCE**

**9693/01**

Paper 1 AS Structured Questions

**October/November 2019**

MARK SCHEME

Maximum Mark: 75

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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 2019 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 **9** 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)(i)	animal that, hunts / traps / captures / kills ; and eats / consumes, other animals ;	2	
1(a)(ii)	1.9 body lengths ;	1	must include unit for the mark
1(a)(iii)	fish swam closer together for protection against predator ;	1	
1(b)(i)	<i>any two from</i> protection from (tuna) predators / more likely to see predators ; more eyes to look for food ; increased attack efficiency ; breaking up 'bait balls' ; increases hydrodynamic efficiency ;	2	
1 (b) (ii)	<i>any two from</i> build-up of waste products ; less, oxygen / food, available ; increased attacks from predators / more visible to predators ; increased risk of spread of disease / parasites ; attracts fishing fleets ;	2	

Question	Answer	Marks	Guidance
2(a)(i)	BDAC ;	1	
2(a)(ii)	consistently supported by lots of evidence / can't be tested ;	1	
2(b)	lagoon labelled ; reef labelled ; island labelled ;	4	 <p>The diagram shows a lagoon system with three labels: 'island' pointing to a central landmass, 'reef' pointing to a narrow strip of land between the island and the lagoon, and 'lagoon' pointing to the body of water.</p>

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Question	Answer	Marks	Guidance
2(c)	<p><i>any four from</i>  storm damage / typhoons / hurricanes / storm surge / cyclone ;  temperature change / global warming ;  coral bleaching / loss of zooxanthellae ;  ocean acidification / decrease in pH ;  predation / named predator ;  named damage by humans, e.g. anchorage of boats ;  (sedimentation) blocking light preventing photosynthesis ;  sedimentation blocking coral polyps, mouths / feeding ;  nutrient runoff / algal bloom / eutrophication / (named) water pollution ;  abrasive sediments ;  desiccation ;</p>	<b>4</b>	

Question	Answer	Marks	Guidance
3(a)(i)	arrow drawn from right to left ;	<b>1</b>	
3(a)(ii)	<p>sea water temperature off the coast of Australia is cooler than normal /  sea water temperature off the coast of S. America is warmer than  normal / sea water temperature is cool off the coast of Australia <b>and</b>  warm off the coast of S. America ;  higher rainfall off the coast of S. America than normal / lower rainfall  off the coast of Australia than normal / high rainfall off the coast of S.  America <b>and</b>, low / no, rainfall off the coast of Australia ;</p>	<b>2</b>	must be comparative
3(a)(iii)	<p>death of cold water species / fish ; <b>A</b> reduction in fish populations  <i>plus any three from</i>  decrease in available nutrients (to surface) ;  reduced, primary productivity / (named) producers ;  flooding / increased runoff ;  decreased salinity ;  reduced upwelling ;  less fish breeding ;</p>	<b>1 + 3</b>	

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Question	Answer	Marks	Guidance
3(b)	<i>any four from</i> wind blows <u>surface</u> water ; uneven heating of the Earth's surface / described ; hot air rises ; cools and sinks ; ref to air convection currents ; ref to Coriolis effect / described ;	<b>4</b>	

Question	Answer	Marks	Guidance
4(a)(i)	5 ;	<b>1</b>	
4(a)(ii)	zooplankton ;	<b>1</b>	
4(a)(iii)	<i>any two from</i> kills the sample ; only a small sample is taken (then biomass estimated / calculation used) ; population density is different in different areas / sample might be unrepresentative ;	<b>2</b>	
4(a)(iv)	five closed boxes drawn <b>and</b> centrally stacked ; correctly labelled <b>and</b> right way up ; box for parasites larger than tuna <b>and</b> box for tuna smaller than mackerel ;	<b>3</b>	
4(b)	photosynthesis ; chemosynthesis ;	<b>2</b>	

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Question	Answer	Marks	Guidance
4(c)	<i>any three from</i> respiration / metabolism / heat ; excretion ; movement / other named process ; not all the organism is eaten ; not all organisms in that trophic level are eaten ; not all food is digested / some lost in faeces ;	<b>3</b>	

Question	Answer	Marks	Guidance
5(a)(i)	2.4 – sediments on the continental shelf 2.7 to 2.9 – continental crust 3.0 to 3.3 – oceanic crust 3.4 to 5.6 – mantle ;;;	<b>3</b>	sediments – 2.4 = 1 mark mantle – 3.4 to 5.6 = 1 mark continental and oceanic crust in the correct order = 1 mark
5(a)(ii)	mass divided by volume ;	<b>1</b>	
5(b)(i)	<i>any two from</i> partially enclosed body of water ; where, freshwater / river, meets saltwater / the sea ; salinity is variable ; is tidal ;	<b>2</b>	
5(b)(ii)	<i>any three from</i> river brings sediment ; sediment deposited / deposition ; little, wave action / erosion / slow flow rate ; ref to feedback loop ; ref to small / fine particle size ; ref to shallow slope ;	<b>3</b>	

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Question	Answer	Marks	Guidance
6(a)(i)	°C ;	1	
6(a)(ii)	salinity increases with depth ; temperature decreases with depth ;	2	
6(a)(iii)	any value from 40–50 ; 200 ;	2	
6(b)	<i>any three from</i> evaporation ; precipitation ; upwelling ; runoff ; volcanic activity / hydrothermal vents ; temperature ; glacial melt ;	3	

Question	Answer	Marks	Guidance
7(a)(i)	harvesting / fishing ;	1	
7(a)(ii)	death / organisms not eaten ; decay / decomposition ; sinking to sea floor ;	3	
7(b)	<i>any four from</i> less atmospheric dissolution ; less available hydrogencarbonate ions / carbonate ions / dissolved carbon dioxide / carbonic acid ; less, photosynthesis / productivity ; less, growth / biomass / reproduction ; less, food / energy, available for the rest of the food chain ;	4	



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Question	Answer	Marks	Guidance
8(a)	interaction ; between living organisms and their non-living environment / <b>AW</b> ;	<b>2</b>	
8(b)	<i>any four from</i> unstable environment ; wave action causes erosion ; lack of (stable) substrate to attach ; so lack of producers ; few organisms adapted to survive in this environment ; ref to (usually) only burrowing organisms are successful ; ref to few available niches ; narrow range of food sources available ;	<b>4</b>	
8(c)	hydrothermal vents / <b>AVP</b> ;	<b>1</b>	e.g. hypersaline pool
8(d)	named example of organisms with a generalised niche, e.g. tuna / shark ; <i>plus any two from</i> low biodiversity in the open sea ; less competition for resources ; (organisms) that occupy generalised niche are able to exploit range of habitats ; <b>A</b> example such as different depths (organisms) that occupy generalised niche are able to exploit range of food sources ;	<b>3</b>	