
MARINE SCIENCE

5180/01

Paper 1 Structured

October/November 2016

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.

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Page 2	Mark Scheme	Syllabus	Paper
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Question	Answer	Mark	Additional Guidance
1(a)	sun / light / solar energy;	1	
1(b)(i)	feeding position / level (in a food chain / web); example from Fig. 1.1;	2	e.g. phytoplankton at first level
1(b)(ii)	organism that, manufactures / produces / synthesises, own food / organism that carries out, photosynthesis / chemosynthesis / is autotrophic; phytoplankton;	2	1 plankton on its own
1(b)(iii)	animal that is, hunted / caught, + eaten; e.g. Adélie penguin / minke whale / zooplankton;	2	example must be from this food web if give predator and prey in example, must be clear which one is the prey species

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Question	Answer	Mark	Additional Guidance
1(c)	<p><i>any two of:</i></p> <p>as heat;</p> <p>movement;</p> <p>excretory products / excretion / urine;</p> <p>not all parts digested / faeces;</p> <p>not all parts eaten;</p> <p>AVP;</p>	2	<p>A (lost in) respiration (not used for)</p> <p>e.g. active transport</p>
	Total:	9	

Question	Answer	Mark	Additional Guidance												
2(a)	<table border="1"> <thead> <tr> <th>group</th> <th>letter</th> </tr> </thead> <tbody> <tr> <td>cephalopod</td> <td>D;</td> </tr> <tr> <td>cnidarian</td> <td>E;</td> </tr> <tr> <td>echinoderm</td> <td>A;</td> </tr> <tr> <td>polychaete</td> <td>C;</td> </tr> <tr> <td>gastropod</td> <td>B;</td> </tr> </tbody> </table>	group	letter	cephalopod	D;	cnidarian	E;	echinoderm	A;	polychaete	C;	gastropod	B;	5	
group	letter														
cephalopod	D;														
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Page 4	Mark Scheme	Syllabus	Paper
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Question	Answer	Mark	Additional Guidance
2(b)	<p><i>any one similarity:</i> streamlined body / tapering head to tail; have finlets; silver, belly / below;</p> <p><i>any one difference:</i> little tunny – finlets small(er); little tunny – wavy stripes; little tunny – dark spots; albacore – pectoral fin is long; albacore – first dorsal fin yellow; albacore – more than one dorsal fin; albacore – (dark) blue OR tunny – (dark) greenish / green / (dark) greenish blue;</p>	2	

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Question	Answer	Mark	Additional Guidance
2(c)	<p><i>any two of:</i></p> <p>colour may vary due to age;</p> <p>colour may vary due to gender of fish;</p> <p>colour may vary due to health of fish;</p> <p>colour may change for camouflage;</p> <p>colour variable between individuals of a <u>species</u>;</p> <p>different <u>species</u> have the same colour;</p> <p>idea of, judgement of colour subjective;</p> <p>idea of, colour varies with, depth/wavelength/light penetration;</p>	2	<p>A colour changes over time</p> <p>A breeding colours</p> <p>A stress</p> <p>A intensity</p>
	Total:	9	

Question	Answer	Mark	Additional Guidance
3(a)(i)	<p>covers;</p> <p>protects gills;</p> <p>involved in, flow/pumping, of water (over gills) OR pumping mechanism;</p>	2	pumping alone is insufficient

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Question	Answer	Mark	Additional Guidance
3(a)(ii)	<p><i>any two of:</i></p> <p>absorption of oxygen;</p> <p>release of carbon dioxide;</p> <p>exchange of ions / secretion of salts;</p> <p>ref. to osmosis / osmoregulation;</p> <p>rakers trap particles / protect the filaments;</p>	2	I control of body temperature
3(a)(iii)	pumps / circulates blood;	1	
3(a)(iv)	<p><i>any one of:</i></p> <p>protection;</p> <p>reduces drag / increases hydrodynamic efficiency;</p> <p>mate / species, recognition;</p>	1	<p>A in terms of physical protection or camouflage</p> <p>I protection from disease</p>

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Question	Answer	Mark	Additional Guidance
3(b)	ref. to eggs and sperm / male and female gametes; fertilisation / AW ; larval stage / larvae; mature (into an adult) / reach maturity / become an adult;	4	A labelled / annotated cycle diagram for all mark points. A join / fuse I meet / mix A juvenile / fingerling
	Total:	10	

Question	Answer	Mark	Additional Guidance
4(a)	D B E C ;;;	3	3 marks for correct sequence 2 marks for any 3 in correct <u>consecutive</u> sequence 1 mark for any 2 in correct <u>consecutive</u> sequence (CDBE = 2 marks but DCBE=1 mark and DEBC=0 marks)
4(b)	(plate) tectonics OR mantle convection;	1	A continental drift

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Question	Answer	Mark	Additional Guidance
5(a)(i)	<p><i>advantage:</i> prevent disease (among fish);</p> <p><i>any one disadvantage:</i> affect other organisms; antibiotic resistance; (increased) cost; loss of beneficial bacteria; negative effect on fish product;</p>	2	<p>A kills bacteria I kill virus/other microorganisms</p> <p>e.g. health risk to consumers A bioaccumulation / description of</p> <p>e.g. flavour, texture, colour</p>
5(a)(ii)	<p><i>any one advantage:</i> fish grow <u>faster</u>/better; provide required nutrient <u>balance</u>; contain dye to enhance fish colouration;</p> <p><i>any one disadvantage:</i> attract other organisms; ref. eutrophication / AW/description of; (increased) cost;</p>	2	<p>I health in terms of fish</p>
5(b)(i)	0.75; million tonnes (per year);	2	<p>A 0.747, 0.7 A million tons</p>

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Question	Answer	Mark	Additional Guidance
5(b)(ii)	<p><i>any two of:</i></p> <p>increase in, number / size, of fish farms;</p> <p>increased productivity of fish farms;</p> <p>increase in / high, demand;</p> <p>increase in / high, value of product;</p>	2	<p>A fish farms are more efficient, improved technology in fish farms, better training of fish farmers, adoption of intensive methods</p> <p>A smaller wild stock</p>
5(c)(i)	<p><u>where</u> goods / services;</p> <p>can be bought / sold;</p>	2	
5(c)(ii)	<p>exchange / swapping of, goods / services;</p> <p>without money;</p>	2	
5(c)(iii)	<p>exchange / purchasing, of goods / services;</p> <p>within a country;</p>	2	
	Total:	14	

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Question	Answer	Mark	Additional Guidance
6(a)	A – sail; B – tiller;	2	I rudder
6(b)(i)	echo sounder;	1	A lead line
6(b)(ii)	radar;	1	
6(b)(iii)	GPS / charts / maps;	1	I compass on its own
6(b)(iv)	compass;	1	A GPS
6(c)	<i>any three of:</i> boat building; repair of, machinery / engines / boats; launching / hauling (of boats); chandlery / AW ; waste disposal; providing utilities (e.g. electricity / fuel / water);	3	R processing / selling / landing, of fish A ice
	Total:	9	

Page 12	Mark Scheme	Syllabus	Paper
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Question	Answer	Mark	Additional Guidance
7(a)	1;	1	
7(b)	<p>light (either at surface OR low at depth);</p> <p>photosynthesis (either at surface OR low at depth);</p> <p>phytoplankton / algae / producers / plants / named example (either at surface OR low at depth);</p> <p>water at surface is warm / ORA;</p> <p>idea of, oxygen solubility is low in warm water OR high in cold water;</p> <p><i>at or near surface:</i></p> <p>oxygen from atmosphere / air;</p> <p>turbulence / waves;</p> <p>oxygen produced by photosynthesis;</p> <p><i>at depth:</i></p> <p>more more oxygen used in respiration than produced by photosynthesis / ORA;</p> <p><i>depth > 2000 m: (little change because)</i></p> <p>few organisms (to respire);</p> <p>temperature changes very little;</p>	4	must have comparative between different depths for full marks
	Total:	5	

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Question	Answer	Mark	Additional Guidance
8(b)(iii)	<p><i>any one of:</i></p> <p>idea of, sanctuaries /MPA;</p> <p>idea of, helping them to breed;</p> <p>collecting and incubating eggs;</p> <p>protection of nests;</p> <p>release of hatchlings;</p> <p>captive breeding;</p> <p>ref. banning collecting of, eggs /turtles /turtle products, ban, trade in animals /tourists during breeding season;</p> <p>AVP;</p>	1	<p>'protection' on its on is not sufficient</p> <p>'make a law' on its own is not sufficient</p> <p>e.g. awareness programme + detail</p>
	Total:	6	

Question	Answer	Mark	Additional Guidance
9(a)(i)	<p>digestion /breakdown, of, fish /flesh /tissue /muscle;</p> <p>by enzymes;</p>	2	
9(a)(ii)	<p>stiffening /hardening, of, fish /flesh /tissue /muscle;</p> <p>after death;</p>	2	

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Question	Answer	Mark	Additional Guidance
9(b)	<p><i>any four of:</i></p> <p>ref. bacteria / bacterial enzymes;</p> <p>fish / cells / tissue / flesh / muscle / chemicals, are broken down / decompose;</p> <p>(bacteria) reproduce / AW;</p> <p>release poisons / toxins;</p> <p>production of, TMA / histidine;</p> <p>unpleasant smell / ammonia;</p>	4	<p>A bacteria grow in numbers, but 'bacteria grow' is insufficient</p>
	Total:	8	