

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International Advanced Level

MARK SCHEME for the October/November 2015 series

9693 MARINE SCIENCE

9693/04

Paper 4 (A2 Data Handling and Free-Response),
maximum raw mark 50

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.

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Page 2	Mark Scheme	Syllabus	Paper
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Question	Answers to be awarded credit	Additional Guidance	Mark
1 (a)	harvesting fish without harming future stocks ;		[1]
(b) (i)	1841 / 1842 ;		[1]
(ii)	does not affect swimming ; does not affect recapture ; does not affect feeding behaviour ; does not affect predation ; ease of detection on the fish ;		[2 max]
(iii)	(idea of) more or less would be caught than other catching method / idea of fair test ;		[1]
(c) (i)	276 / 276.15 ; 123 / 124 / 123.85 ;	2 marks for correct answer 1 mark for correct calculation of 15% of 1841 ecf for wrong answer in part b(i)	[2]
(ii)	predation ; food supply ; disease ; bioaccumulation of toxins ;		[2 max]
(d)	satellite images / GPS tracking ; use of patrol boats / coast guard ; punishment e.g. fines ; inspection teams ;		[3 max]

[Total: 12]

Page 3	Mark Scheme	Syllabus	Paper
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Question	Answers to be awarded credit	Additional Guidance	Mark
2 (a)	decrease up to 10 ppt and then increase ; <u>steep</u> decrease from 0-10 ppt ; level off 20-30 ppt ; correct numerical manipulation to show increase or decrease ;		[2 max]
(b)	<u>osmoregulation</u> occurs ; active (transport) ; pumping of salt in at low salinity ; pumping of salt out at high salinity ; <u>respiration</u> increases when need to regulate salt ; leading to greater oxygen consumption ;		[4 max]
(c)	when respiration rate is high, more food is needed ; more food if low salinity or high salinity / less food at 10 ppt ;		[2 max]

[Total: 8]

Page 4	Mark Scheme	Syllabus	Paper
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Question	Answers to be awarded credit	Additional guidance	Mark
3 (a)	tourism that does not damage the environment OR tourism that maintains species / ecosystems / habitats ;		[1]
(b)	<p><i>effects of tourist resort on fishing industry:</i> more roads / traffic / transport / airport ;</p> <p>release of waste / pollution ;</p> <p>possible release of rubbish affecting fish / turtles ;</p> <p>loss of coastline / mangroves ;</p> <p>damage to coral / seabed ;</p> <p>damage to nesting sites of birds / turtles / nursery grounds ;</p> <p>scaring away / disturbing fish ;</p> <p>inflationary effects on prices ;</p> <p>traditional fishing grounds being lost to marine reserves ;</p> <p>damage to nets from powerboats ;</p> <p><i>effects of fishing industry on tourism:</i> smell / unsightly effects of fishing ;</p> <p>interference with tours ;</p> <p>overfishing removing fish tourists want to see ;</p>	maximum 7 marks for effects of tourism / fishing	[9 max]

Page 5	Mark Scheme	Syllabus	Paper
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	<p><i>minimisation:</i> energy conservation / use of renewables ; example of renewable energy source ; recycling plants / use of recycled materials ; using sustainable sources of timber / preventing deforestation ; building waste purification / sewage treatment sites ;</p>		
(c)	<p><i>benefits:</i> substrate for coral attachment / provides habitat ; increase fish stocks ; increase fish diversity ; idea of positive effect on food chains ; prevents coastal erosion / reduces wave energy ; <i>drawbacks:</i> damage to sea bed / coral / substrate ; leakage of toxins / TBT / battery leakage ; leakage of oil ;</p>	maximum 3 marks for benefits / drawbacks	[5 max]

[Total: 15]

Page 6	Mark Scheme	Syllabus	Paper
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Question	Answers to be awarded credit	Additional guidance	Mark
4 (a)	<p><i>reference to:</i></p> <p>ice core data ;</p> <p>fossil record ;</p> <p>rise in <u>mean</u> temperature ;</p> <p>Hawaii data ;</p> <p>sea level rises ;</p> <p>ice cap shrinkage ;</p> <p>loss of glaciers ;</p> <p>changes in ranges of organisms ;</p> <p>extreme weather pattern increase ;</p> <p>rise in CO₂ ;</p> <p>CO₂/CH₄/CFCs are greenhouse gases ;</p> <p>increase fossil fuel burning ;</p> <p>increase cattle farming ;</p> <p><i>reference to:</i></p> <p>solar activity ;</p> <p>natural cycle (of warming and cooling) ;</p> <p>increased CO₂ could be released by sea ;</p>		[9 max]

Page 7	Mark Scheme	Syllabus	Paper
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(b)	<p>increased sea temperature affects enzymes ;</p> <p>increased dissolved CO₂ ;</p> <p>(causing) increased plant/ phytoplankton productivity ;</p> <p>(causing) increased animal productivity ;</p> <p>increased salinity due to evaporation ;</p> <p>reduced salinity due to melting of fresh water ice ;</p> <p>affecting osmoregulation ;</p> <p>excess acidity ;</p> <p>(reduces) photosynthetic rate ;</p> <p>(causing) reduction in food available for animals ;</p> <p>zooxanthellae loss / coral bleaching ;</p>	marks must be in context of the factor that is affected	[6 max]
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[Total: 15]