
MARINE SCIENCE**5180/02**

Paper 2

October/November 2018

MARK SCHEME

Maximum Mark: 60

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.

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This document consists of **10** 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)	<i>any 1 of:</i> idea of, <u>area</u> of (sea / ocean) where fishing is, banned / restricted / AW ; idea of, <u>area</u> where (marine species) are protected by, laws / governments / regulations / quotas / AW ;	1	area where, fishing / development / tourism, is, restricted / banned I protected I activities unqualified
1(a)(ii)	<i>catch</i> axis has linear scale and bars cover at least half grid ; both axes labelled (catch/kg and year), with units labelled on <i>catch</i> axis ; all points plotted correctly ($\pm \frac{1}{2}$ square) ; neat bars equal width, not touching ;	4	line graph = maximum 3
1(b)(i)	1994 and 1996 ;	1	A 1996 and 1994
1(b)(ii)	1150 ; kg ;	2	R catch/kg and kg/year
1(b)(iii)	increase ; idea of a turning point in trend, e.g. levels off after, <u>1996 / 1998</u> ;	2	date must be present for MP2
1(c)	<i>any 3 of:</i> (a) increased fish population ; (b) idea of, fish spill over from MPA ; (c) idea of, gametes / larvae spill over from MPA ; (d) increased reproduction / MPA is a breeding ground / AW ; (e) ref. to migration (to area) ; (f) idea of, increased food / prey (for seabream) ; (g) increased / high, demand ; (h) increased / high, fishing <u>effort</u> / AW ; (i) improvements to fishing gear / technology ;	3	A descriptions of increased effort, e.g. more boat days

Question	Answer	Marks	Guidance
1(d)	<p><i>one advantage and one disadvantage</i></p> <p><i>advantage</i> sustainable catch / future catches safeguarded ; OR idea of, easier to, find / catch, fish ;</p> <p><i>disadvantage</i> <i>any 1 of:</i> reduced area that can be fished ; reduced profits OR unemployment ; loss of (short term) catch ;</p> <p>have to travel further to fish ;</p>	2	A less time to, find / catch, fish

Question	Answer	Marks	Guidance
2(a)(i)	<p>phytoplankton ;</p> <p>herring ;</p>	2	R zooplankton A named phytoplankton
2(a)(ii)	<p>(zooplankton) decrease ;</p> <p>herring population will increase / less herring are eaten ; herring feed on zooplankton ;</p>	3	
2(a)(iii)	<p>labels – each bar labelled correctly for all 4 levels ; shape – widest at base, narrowing to top ;</p>	2	
2(b)(i)	92% / 91.7% / 91.67% / 91.66 recurring ; ;	2	(1800 – 150) ÷ 1800 in working for one mark

Question	Answer	Marks	Guidance
2(b)(ii)	<p><i>any 3 of:</i></p> <p>(a) (part of herring) not eaten ;</p> <p>(b) (part of herring) indigestible / lost in faeces / egestion ;</p> <p>(c) (energy lost through) movement ;</p> <p>(d) (energy lost) in the form of heat ;</p> <p>(e) (energy lost) through excretion / metabolic waste ;</p>	3	
2(c)	<p><i>any 3 of:</i></p> <p>(a) nutrients / phosphates / nitrates, present in, fish / herring / tuna ;</p> <p>(b) ref. to (less) decomposition / decay / decomposers ;</p> <p>(c) (fewer) nutrients / phosphates / nitrates, available for upwelling ;</p> <p>(d) (fewer) nutrients / phosphates / nitrates, available for, <u>producers / phytoplankton / green plants / algae</u> ;</p> <p>(e) idea of, (nutrients / phosphates / nitrates) <u>permanently</u> removed by fishing ;</p>	3	

Question	Answer	Marks	Guidance
3(a)(i)	<p><i>any 3 of:</i></p> <p>wood ;</p> <p>cheap / easy availability ;</p> <p>easily altered / worked / shaped ;</p> <p>low density / floats ;</p> <p>light ;</p> <p>low corrosion / does not rust ;</p> <p>OR</p> <p>aluminium ;</p> <p>light ;</p> <p>idea of, high strength : weight ratio A strong ;</p> <p>low corrosion / does not rust ;</p> <p>waterproof ;</p> <p>(easily) moulded into shape / malleable ;</p> <p>durable / resilient ;</p>	3	one mark for material, two for description

Question	Answer	Marks	Guidance
3(a)(i)	<p>OR</p> <p>fibre glass ; light ; idea of, high strength : weight ratio A strong ; flexible ; (easily) moulded into shape ; waterproof ; low corrosion / does not rust ; easy to repair ;</p> <p>OR</p> <p>steel ; cheap / easy availability ; strong ; waterproof ; (easily) moulded into shape ;</p>		
3(a)(ii)	<p><i>any 6 of:</i></p> <p>(a) hull / keel ; (b) bowsprit ; (c) deck / fishing platform ; (d) hold / containers, for catch ; (e) places to store fishing equipment ; (f) ice / refrigeration / freezer / cold water ; (g) cabin / shelter area / accommodation / galley ; (h) processing area ; A fish washing area / water tank (i) GPS / satellite navigation / compass / navigational aid ; (j) example of a piece of safety equipment ; (k) engine / mast / sails / oars / motor ; (l) radio / radar / communication system ; (m) fish finders / sonar ; (n) idea of, bait hold ; 1 rudder / tiller / wheel ; 2 chumming platforms ;</p>	6	<p>A stage</p> <p>e.g. first aid kit, flare, life vest</p>

Question	Answer	Marks	Guidance
3(b)(i)	<p><i>description</i> one hook (per line) ; A a hook barbless hook ; no bait (on hook) ; stand on deck / boat / AW ; chummer / chumming / bait thrown into water / water sprayer ;</p> <p><i>impacts</i> low bycatch / only takes target species / only one type of fish ; fish at sustainable rate / one fish at a time / reduced chance of overfishing ;</p>	3	maximum 2 for descriptions or impacts
3(b)(ii)	<p><i>description</i> any 2 of: (long lines with) <u>many</u> hooks ; I hooks unqualified barbed hooks ; baited hooks ; attached to (moving) boat ;</p> <p>use of buoys (to keep line from sinking) ;</p> <p><i>impacts</i> high bycatch / catches many other species ; large number of fish caught / can lead to overfishing / it is unsustainable ; idea of, (high chance of) ghost lines ;</p>	3	maximum 2 for descriptions or impacts

Question	Answer	Marks	Guidance
4(a)(i)	<p><i>any 2 of:</i> raising / rearing / growing, of ,organisms / fish / shellfish / named species ; in <u>natural</u>, water / conditions / currents / environment ;</p> <p>no / minimal use of (artificial) feed ; no / minimal use of, antibiotics / pesticides / chemicals ;</p>	2	I culture of / cultivate, aquatic organisms
4(a)(ii)	<p><i>any 5 of:</i> (a) escape of species ; (b) breeding with wild stock ; (c) idea of, competition with wild stock ; (d) ref. to effect on <u>food chain / web</u> ; (e) disease / pests / lice, spreading to wild fish ; (f) damage to habitats ; (g) release of, antibiotics / pesticides / herbicides ; (h) faeces / waste food / fish bits (fall out) ; (i) idea of, algal blooms / description of ; (j) decomposition / bacterial growth ; (k) eutrophication / description of OR loss of oxygen ;</p>	5	I pollution unqualified

Question	Answer	Marks	Guidance
4(b)	<p><i>any 8 of:</i></p> <p>(a) rigor mortis ; (b) stiffening of muscle ; (c) pre rigor, rigor, post rigor ;</p> <p>(d) putrefaction ; (e) (multiplication of) bacteria / fungi / microorganisms ; (f) breaking down tissues / releasing gases ;</p> <p>(g) autolysis ; (h) enzymes ; (i) breaking down tissues / AW ; (j) rancidity ; (k) fats / AW ; (l) oxidation ;</p>	8	<p>A stiffening of fish / body all three needed, in correct order</p> <p>A self-digestion</p>