



Cambridge O Level

MARINE SCIENCE

5180/02

Paper 2

October/November 2020

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 **12** 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.

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- This mark scheme will use the following abbreviations:

;	separates marking points
/	separates alternatives within a marking point
()	contents of brackets are not required but should be implied / the contents set the context of the answer
R	reject
A	accept (answers that are correctly cued by the question or guidance you have received)
I	ignore (mark as if this material was not present)
AW	alternative wording (where responses vary more than usual, accept other ways of expressing the same idea)
AVP	alternative valid point (where a greater than usual variety of responses is expected)
ORA	or reverse argument
<u>underline</u>	actual word underlined must be used by the candidate (grammatical variants excepted)
MAX	indicates the maximum number of marks that can be awarded
+	statements on both sides of the + are needed for that mark
OR	separates two different routes to a mark point and only one should be awarded
ECF	error carried forward (credit an operation from a previous incorrect response)

Question	Answer	Marks
1(a)(i)	both axes labelled with year and annual catch / million kg ; linear scales and half grid used for plots ; plots correct (\pm half square) ; points joined with straight lines (and no extrapolation) ;	4
1(a)(ii)	as the years increase the catch decreases / AW ;	1
1(b)(i)	maximum catch that can be taken without causing the populations to decrease / fish that can be caught without reducing the population / AW ;	1
1(b)(ii)	<i>any 3 of:</i> over fishing / catches exceeding the MSY ; catching young / immature fish / fish before they have reproduced ; migration of fish ; loss of food / food chain effect ; reduced demand for the tuna / less fishing ; loss of habitats / spawning grounds ;	3
1(c)(i)	392 000 ;; (boat) days ;	3

Question	Answer	Marks
1(c)(ii)	<i>any 1 of:</i> improved fishing methods / fish finding / boat technology ; stock recovered or increased / AW ;	1
1(c)(iii)	<i>any 2 of:</i> some boats may be bigger ; some boats may have better equipment / AW ; boats visit different fishing areas / AW ; boat days may not be logged accurately / catch not logged / recorded accurately / AW ;	2
Question	Answer	Marks
2(a)(i)	phytoplankton ;	1
2(a)(ii)	herring ;	1
2(a)(iii)	cod linked between herring and porpoise with two arrows ; arrows in correct direction ;	2
2(b)(i)	PCB increase in concentration along the food chain / AW ;	1

Question	Answer	Marks
2(b)(ii)	<p><i>any 2 of:</i></p> <p>(transferred) when <u>eating organisms</u> ;</p> <p>higher trophic levels eat many of lower levels / AW ;</p> <p>PCBs / plastic do not break down / excreted from bodies / retained in body ;</p> <p>bioaccumulation / biomagnification ;</p>	2
2(c)(i)	30 000 (kJ per m ² per year) ;	1
2(c)(ii)	<p><i>any 2 of:</i></p> <p>wrong light wavelength / colour ;</p> <p>light is reflected ;</p> <p>light passes through / misses chloroplasts / passes through the phytoplankton ;</p> <p>idea of other limiting factors are present (e.g. temperature is too low) ;</p> <p>heats up plankton ;</p> <p>shading / shadowed (from above) ;</p>	2
2(d)(i)	<p>680 (days) ;</p> <p>clear correct method indicated on graph ;</p>	2

Question	Answer	Marks
2(d)(ii)	<i>any 3 of:</i> exposure to light / UV ; agitation / wave action ; warmer temperature ; higher oxygen ;	3

Question	Answer	Marks
3(a)	<p><i>Max 5 (advantages) of:</i> provides employment ; conservation of species / habitats ; educates people about conservation / awareness of oceans; prevention of extinction of species / protects endangered species ; provides infrastructure for local people ; encourages breeding programmes for species ; money for local projects / local economy ; reduce carbon footprint / less damaging than conventional tourism / AW ;</p> <p><i>Max 5 (disadvantages) of:</i> setting up of no fishing areas / conflict with fishing industry ; competition for other industries ; ban on aquaculture ; loss of fishing jobs / loss of fishing ; raising prices for local people / less areas for local people to live ; pollution / litter ; AVP ;</p>	7

Question	Answer	Marks
3(b)	<p><i>any 4 of:</i></p> <p>volcano (erupts) forming an island ;</p> <p>coral reefs form (along the sides / colonisation) ;</p> <p><u>fringing</u> reefs form ;</p> <p>island sinks ;</p> <p><u>barrier</u> reef forms ;</p> <p>shallow lagoon left in centre ;</p>	4
3(c)	<p><i>any 4 of:</i></p> <p>underwater earthquake occurs / landslide / underwater volcano ;</p> <p>at plate boundary ;</p> <p>sudden release of <u>energy</u> / AW ;</p> <p>sudden displacement of large volume of water ;</p> <p>long wavelength of displaced water / fast movement / wave speeds up ;</p> <p>as waves approach coast, wavelength decreases and amplitude increases / wave speed decreases / AW ;</p>	4

Question	Answer	Marks
4(a)	the skill / practice of handling a boat or ship at sea / safe handling at sea / AW ;	1
4(b)	<p><i>max 4 (method) of:</i></p> <p>uses <u>short</u> lines ;</p> <p>uses one hook ;</p> <p>barbless hooks ;</p> <p>baitless hooks ;</p> <p>use of chum ;</p> <p>use of water splashing ;</p> <p>stand on the fishing platform ;</p> <p><i>max 4 (impact) of:</i></p> <p>low bycatch / specific ;</p> <p>less risk of overfishing / one fish at a time ;</p> <p>low chance of tackle loss ;</p> <p>uses bait fish taken from wild / damaging baitfish populations ;</p> <p>no damage to habitats / seabed ;</p>	6

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Question	Answer	Marks
4(c)	<p><i>any 8 of:</i> chilling ; fish are washed ; place fish (gently) into ice / refrigerated sea water (RSW) / chilled sea water (CSW) / icing ;</p> <p>freezing ; rapid cooling in freezer ; store at -20°C ;</p> <p>irradiation ; fish is exposed to radioactivity / Cobalt 60 / X-rays ; to kill bacteria / Shigella / <i>Salmonella</i> / <i>Streptococcus</i> ;</p> <p>canning ; fish is cleaned / gutted ; bones / fins / head / tail removed ; placed into cans with lids ; heat to temperature greater than 100°C / high temperatures to sterilise ; seal cans ;</p> <p>salting ; detail of salting, e.g. placing into concentrated brine ;</p> <p>drying ; detail, e.g. placing on drying stands ;</p> <p>pickling ; detail, e.g. placing into vinegar ;</p> <p>smoking ; detail, e.g. placing over burning wood in smokehouse ;</p>	8