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**MARINE SCIENCE**

**5180/03**

Paper 3 Practical Assessment Paper

**October/November 2019**

MARK SCHEME

Maximum Mark: 60

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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 **10** printed pages.

**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)	drawing suitable size ; proportions correct (carapace shape correct, front pincer elongated & correct bend) ; neat lines rather than sketchy ;  <i>features</i> 5 legs, at least 4 show evidence of joints ; paddle shape of back leg ;	<b>5</b>	at least the size of the original  <b>1</b> more than 1 / 2 the crab drawn  
1(a)(ii)	eye, leg and the carapace correctly labelled, with line touching the feature ;	<b>3</b>	
1(b)(i)	0.45 ; ;	<b>2</b>	if not achieved look for evidence of correct working – 11.7 / 26
1(b)(ii)	10.0 ; cm ;	<b>2</b>	allow <b>ECF</b> from <b>b(i)</b>

Question	Answer	Marks	Guidance
2(a)(i)	<p><i>any 2 from:</i>  presence of finlets ;  2 dorsal fins / 1st and 2nd dorsal fins ;  location of pectoral / pelvic fin ;  caudal fin, shape / size ;  narrow caudal peduncle ;  fins qualified (e.g. number, name) ;  eyes ;  (terminal) mouth ;  operculum ;  operculum opening ;  overall shape / fusiform shape ;  lateral line ;</p>	<b>2</b>	<p><b>A</b> description of</p>
2(a)(ii)	<p><i>any 2 from:</i>  long(er) (second) dorsal fin ;  large® first dorsal fin ;  curved second dorsal fin ;  light(er) coloured fins ;  lack of stripes / spots on body ;  long(er) pectoral fin ;  shape of operculum ;  long(er) anal fin ;  deep(er) curve on caudal fin ;  lateral line more visible ;  more spines ;  large(r) caudal fin ;  presence of nostrils ;  <b>AVP</b> ;</p>	<b>2</b>	<p>e.g. terminal mouth (A) vs superior mouth (B)</p>
2(b)(i)	88 ;	<b>1</b>	<b>A</b> ± 1 mm (87–89)

Question	Answer	Marks	Guidance
2(b)(ii)	84 ; ;	<b>2</b>	allow <b>ECF</b> from <b>(b)(i)</b>  look for evidence of correct working for partial credit- $(85 + 93 + 72 + 82 + 88) / 5 =$
2(b)(iii)	<i>idea of</i> , sample size small / only 5 measured / only a sample / unrepresentative sample ;  <i>any 2 from:</i> some in the shoal are much bigger / smaller ; may not be from 1 shoal ; may be anomalous results ; could be different ages ; could be different sexes ; larger fish may swim, faster / slower, and may, not be caught / be more likely to be caught / <b>ORA</b> ;	<b>3</b>	

Question	Answer	Marks	Guidance
3(a)	<p><i>any 6 from:</i>            secchi disc ;            measured / marked rope + attached ;            lowered into water until, disappears / can no longer be seen ;            length / distance noted / record the depth ;            pulled back up until re-appears + length noted ;            mean of 2 values calculated ;            repeated at one station / location ;            repeated, at min. 2 more distances from pipe / minimum of two other sites ;            ref. to transect ;  <u>relevant</u> safety point ;</p>	<b>6</b>	<b>A</b> secchi disc described <b>OR</b> drawn
3(b)(i)	<p>add potassium iodide solution ;            colour change (from brown) to blue / black ;</p>	<b>2</b>	<b>A</b> iodine (solution)
3(b)(ii)	<p>add biuret (reagent) ;            (blue) to purple / lilac / mauve / violet ;</p>	<b>2</b>	

Question	Answer	Marks	Guidance
4(a)(i)	table drawn ; headings correct, with unit + unit only given in heading ; correctly linked data ; ordered in time order ;	<b>4</b>	
4(a)(ii)	both <b>axes</b> labelled, including units ; appropriate linear <b>scale</b> for both axes ; all <b>plots</b> correct $\pm 1 / 2$ small square ; points joined with a smooth <b>line</b> ;	<b>4</b>	<b>A</b> ECF from table  <b>R</b> dot to dot <b>R</b> extrapolation
4(a)(iii)	answer consistent with their graph ;	<b>1</b>	
4(b)	<i>idea of</i> , too shallow to reach (the pontoon) outside of this time ;	<b>1</b>	<i>idea of</i> , deep enough for boat to moor

Question	Answer	Marks	Guidance
5(a)	<p><i>any 13 from:</i></p> <ol style="list-style-type: none"> <li>1. fish measured (weight or length) / repeat with other sized fish ;</li> <li>2. ovaries removed ;</li> <li>3. weigh <u>ovaries</u> / use displacement method to find volume of <u>ovaries</u> ;</li> <li>4. <i>idea of</i>, sample (taken) from ovaries ;</li> <li>5. (sample) added to beaker water + stirred to separate eggs ;</li> <li>6. (sample) poured through black cloth (stretched over beaker) ;</li> <li>7. black cloth has gridlines ;</li> <li>8. number of eggs counted (in a section) ;</li> <li>9. (in up to 10) <u>randomly</u> selected grid squares ;</li> <li>10. multiplied up to number of eggs in whole ovary / example of the sum ;</li> <li>11. <i>safety</i>: wash hands / take care with sharp implements, e.g. scalpel / seekers / knife ;</li> <li>12. repeated at least 2 more times ;</li> </ol> <p>a) mean found ;</p> <p><i>table:</i></p> <ol style="list-style-type: none"> <li>b) correct headings plus units (fish length / weight / small and large fish / size of fish) + number of eggs ;</li> <li>c) any 1 additional column / row for additional detail, e.g. mass of ovary, total eggs in ovary , repeats, average ;</li> <li>d) suggested graph (line or bar chart, dependent on variables chosen) ;</li> <li>e) correct labels for graph length / mass + no. of eggs ;</li> <li>f) interpretation of results in relation to the hypothesis ;</li> </ol>	<b>13</b>	

Question	Answer	Marks	Guidance
5(b)	<p><i>max. 4 from :</i></p> <ol style="list-style-type: none"> <li>1. <i>(fish sampled)</i> may be from different species ;</li> <li>2. <i>(fish sampled)</i> may be from different shoals ;</li> <li>3. <i>(fish sampled)</i> may be from different parts of the ocean ;</li> <li>4. ref. to estimate (due to very large numbers in an ovary) / anomalous result qualified ;</li> <li>5. accuracy is not high / stated issue with method / not all eggs are counted ;</li> <li>6. (so) more samples needed ;</li> <li>7. size of eggs may vary, (so calculating up may increase inaccuracy) ;</li> <li>8. repeat with more fish (ONLY if not repeated in method) ;</li> <li>9. <b>AVP</b> ;</li> <li>10. compare with different years ;</li> <li>11. compare with different age of fish ;</li> <li>a) compare with different species ;</li> <li>b) investigate size of eggs in relation to fish size ;</li> <li>c) take fish or samples from different, regions / oceans / areas / islands</li> <li>d) <b>AVP</b> ;</li> </ol>	<b>5</b>	e.g. some eggs too small to count