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**MARINE SCIENCE**

**5180/03**

Paper 3 Practical Assessment Paper

**October/November 2016**

MARK SCHEME

Maximum Mark: 60

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**Published**

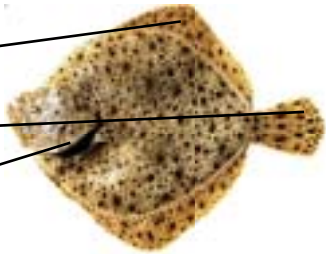
This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, 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.

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<b>Page 2</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
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<b>Question</b>	<b>Answer</b>	<b>Mark</b>	<b>Additional Guidance</b>
1(a)	drawing suitable size; proportions correct (body approximately circular); neat lines (continuous rather than sketchy); features shown (up turned mouth, gill slit);	<b>4</b>	at least half the width of the page  I pectoral fin and eyes
1(b)	dorsal fin labelled correctly;  caudal fin labelled correctly; operculum labelled correctly;	<b>3</b>	
1(c)(i)	scale line on drawing showing the total length from mouth to end of caudal fin correctly as 25 cm ;	<b>1</b>	
1(c)(ii)	$12.3 \div 25$ ; $= 0.49$ ;	<b>2</b>	<b>A</b> 12.1 – 12.5
	<b>Total:</b>	<b>10</b>	

<b>Page 3</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
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<b>Question</b>	<b>Answer</b>	<b>Mark</b>	<b>Additional Guidance</b>																		
2(a)(i)	crab: arthropod(s)/Arthropoda; sea cucumber: echinoderm(s)/echinodermata;	<b>2</b>	1 additional <u>correct</u> nomenclature																		
2(a)(ii)	<table border="1"> <thead> <tr> <th><b>feature</b></th> <th><b>crab</b></th> <th><b>sea cucumber</b></th> </tr> </thead> <tbody> <tr> <td>has a jointed exoskeleton</td> <td>✓</td> <td>x ;</td> </tr> <tr> <td>has a double row of tube feet</td> <td>x</td> <td>✓ ;</td> </tr> <tr> <td>has a mouth surrounded by tentacles</td> <td>x</td> <td>✓ ;</td> </tr> <tr> <td>has four pairs of walking legs</td> <td>✓</td> <td>x ;</td> </tr> <tr> <td>has a soft, cylindrical body</td> <td>x</td> <td>✓ ;</td> </tr> </tbody> </table>	<b>feature</b>	<b>crab</b>	<b>sea cucumber</b>	has a jointed exoskeleton	✓	x ;	has a double row of tube feet	x	✓ ;	has a mouth surrounded by tentacles	x	✓ ;	has four pairs of walking legs	✓	x ;	has a soft, cylindrical body	x	✓ ;	<b>5</b>	
<b>feature</b>	<b>crab</b>	<b>sea cucumber</b>																			
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2(b)(i)	<table border="1"> <thead> <tr> <th><b>shell</b></th> <th><b>maximum width / mm</b></th> </tr> </thead> <tbody> <tr> <td>A</td> <td>12 – 14</td> </tr> <tr> <td>B</td> <td>17 – 19</td> </tr> <tr> <td>C</td> <td>21 – 23</td> </tr> <tr> <td>D</td> <td>23 – 25</td> </tr> <tr> <td>E</td> <td>25 – 27</td> </tr> </tbody> </table> ;;	<b>shell</b>	<b>maximum width / mm</b>	A	12 – 14	B	17 – 19	C	21 – 23	D	23 – 25	E	25 – 27	<b>2</b>	all 5 measurements correct = 2 marks 4 measurements correct = 1 mark						
<b>shell</b>	<b>maximum width / mm</b>																				
A	12 – 14																				
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<b>Page 4</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
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<b>Question</b>	<b>Answer</b>	<b>Mark</b>	<b>Additional Guidance</b>
2(b)(ii)	total; divided by five; correct answer with units;	<b>3</b>	<b>ECF</b>
	<b>Total:</b>	<b>12</b>	

<b>Question</b>	<b>Answer</b>	<b>Mark</b>	<b>Additional Guidance</b>
3(a)	add biuret (reagent); blue to lilac / mauve;	<b>2</b>	
3(b)	add Benedict's (reagent); heat; blue to green / yellow / orange / brick-red;	<b>3</b>	
3(c)	with (dilute) acid; heat / concentrated / leave for time; neutralise / description of; Benedict's (reagent) test;	<b>4</b>	
	<b>Total:</b>	<b>9</b>	

<b>Page 5</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
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<b>Question</b>	<b>Answer</b>	<b>Mark</b>	<b>Additional Guidance</b>														
4(a)	neat table with (ruled) lines; headings: diameter / cm <b>AND</b> height / m; tabulating the data (all 12 results); diameters (and associated heights) correctly ranked;	<b>4</b>	<table border="1"> <thead> <tr> <th>diameter / cm</th> <th>height / m</th> </tr> </thead> <tbody> <tr> <td>12</td> <td>3.4</td> </tr> <tr> <td>15</td> <td>4.3</td> </tr> <tr> <td>20</td> <td>6.0</td> </tr> <tr> <td>24</td> <td>6.5</td> </tr> <tr> <td>30</td> <td>7.8</td> </tr> <tr> <td>35</td> <td>10.2</td> </tr> </tbody> </table>	diameter / cm	height / m	12	3.4	15	4.3	20	6.0	24	6.5	30	7.8	35	10.2
diameter / cm	height / m																
12	3.4																
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4(b)	both <b>axes</b> labelled, with units; suitable linear <b>scale</b> , for both axes; <b>plots</b> correct $\pm \frac{1}{2}$ square; suitable line of best fit, <u>not</u> extrapolated;	<b>4</b>	plots to cover at least $\frac{1}{2}$ grid  bar chart max 3, MP1,2,3														
4(c)	height is directly proportional to diameter / <b>AW</b> ;	<b>1</b>	<b>A</b> as one increases the other increases														
	<b>Total:</b>	<b>9</b>															

Page 6	Mark Scheme	Syllabus	Paper
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Question	Answer	Mark	Additional Guidance
5(a)	<p><i>any 9 of:</i></p> <ol style="list-style-type: none"> <li>1 use of bottle / drifter;</li> <li>2 tied to string;</li> <li>3 stated length;</li> <li>4 stop watch / timer / stop clock;</li> <li>5 bottle released and timed for string to play out / <b>AW</b>;</li> <li>6 time <u>recorded</u> ;</li> <li>7 speed = distance ÷ time;</li> <li>8 repeat (at least twice) and find mean;</li> <li>9 measure speed on both (N and S) sides;</li> <li>10 at same time of day / on same day;</li> <li>11 safety precaution (e.g. wear life jacket / do not go into deep water);</li> </ol>	9	A measured length
5(b)	<p><i>any 6 of:</i></p> <ol style="list-style-type: none"> <li>1 suggested table for results;</li> <li>2 suitable headings for columns;</li> <li>3 (space for) repeated measurements indicated in table;</li> <li>4 means;</li> <li>5 bar chart showing N + S / both (mean) values;</li> <li>6 credit axes labelled (on bar chart) (location and current speed);</li> <li>7 interpretation of results in relation to hypothesis;</li> <li>8 speed = distance ÷ time;</li> </ol>	6	<p>stated or drawn I units (minimum of site + time)</p> <p>stated or drawn</p> <p><b>only allow if not credited in (a)</b></p>

<b>Page 7</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
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<b>Question</b>	<b>Answer</b>	<b>Mark</b>	<b>Additional Guidance</b>
5(c)	<i>any 5 of:</i> 1 reference to difficulty finding current speed with drifter; 2 use of flowmeter 3 current may be affected by tides; 4 reference to anomalous results; 5 measure at different times; 6 measure at other sites (e.g. E and W/other islands); 7 investigate current direction;	<b>5</b>	e.g. effect of wind / waves / weather I use more sophisticated / scientific equipment
	<b>Total:</b>	<b>20</b>	