Cambridge O Level

Cambridge Assessment International Education
Cambridge Ordinary Level

MARINE SCIENCE **5180/03**

Paper 3 Practical Assessment Paper **October/November 2017**

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.

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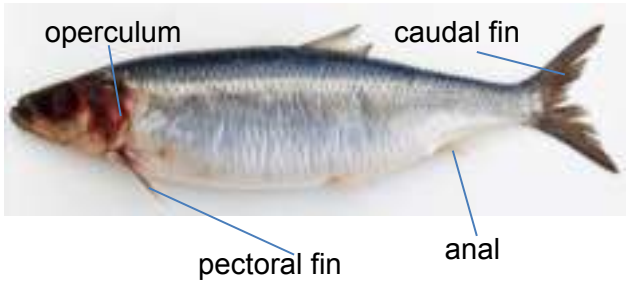
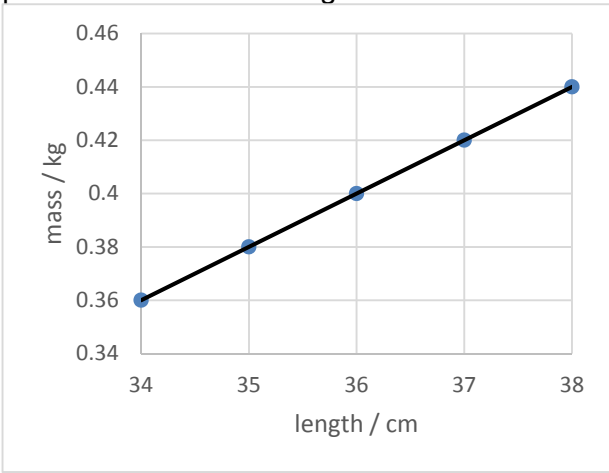
Question	Answer	Marks	Guidance
1(a)	drawing correct **size** ; **proportions** correct (belly / back correct size, not too fat / too thin, caudal fin correct proportion to body / operculum NOT reaching the top of the head ; **features** shown (5 fins, eye, mouth, operculum, **NO** extras) ; neat **lines** (continuous rather than sketchy) ;	**4**	
1(b)	operculum ; pectoral fin ; anal fin ; caudal fin ;	**4**	
1(c)(i)	13.8 cm ;	**1**	**A: 13.7–13.9 cm** units to be included
1(c)(ii)	13.8 ÷ 28 ; = 0.49 ;	**2**	ECF from **(c)(i)** for 2 marks correct answer, with no working, gains both marks
1(d)	(post-anal) tail / caudal fin ;	**1**	

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>2(a)</td><td>A annelida / annelid ;

B cnidaria / cnidarian ;</td><td>2</td><td></td></tr>
<tr><td>2(b)</td><td>
<table>
<tr><th>feature</th><th>A</th><th>B</th></tr>
<tr><td>segmented body</td><td>✓</td><td>× ;</td></tr>
<tr><td>tentacles</td><td>×</td><td>✓ ;</td></tr>
<tr><td>pairs of parapodia</td><td>✓</td><td>× ;</td></tr>
<tr><td>head with antennae</td><td>✓</td><td>× ;</td></tr>
<tr><td>separate mouth and anus</td><td>✓</td><td>× ;</td></tr>
</table>
</td><td>5</td><td></td></tr>
</table>

Question	Answer	Marks	Guidance
3(a)	*any 6 of:* 1 ref. to taking samples from two areas ; 2 weigh / find mass ; 3 dry both samples / keep in the sun / heat to drive water off sand / ref. evaporation of water ; 4 ref. to drying to constant mass / no more water coming off / water being collected / ref. to condensation of water ; 5 find loss in mass / find the difference in mass / weigh water collected / measure volume (of water collected) ; 6 this is the moisture content ; 7 find percentage loss in mass ; 8 difference divided by original mass · 100 ;	**6**	

Question	Answer	Marks	Guidance
3(b)	*any 2 of:* rain ; exposure time / distance from tide line / water line ; particle size ; porosity / **AW** ; presence of organic matter / **AW** ; temperature / ref. to, hot / heat / cool / cold ; humidity ; wind ;	**2**	
3(c)	*any 3 of:* sand moves / unstable (substrate) ; too dry ; idea of, less / little, food available ; plants unable to attach / no substrate for attachment ; no / little, shelter / no protection ; ref. to rocky shore having more habitats than sandy shore ;	**3**	**ORA** for rocky shore **I** nutrients

Question	Answer	Marks	Guidance
4(a)	neat table with discreet cells ; headings: length / cm AND mass / kg in column headings ; tabulating the data (all 10 results, correctly paired) ; lengths correctly ranked ;	**4**	<table><tr><th>length / cm</th><th>mass / kg</th></tr><tr><td>34</td><td>0.36</td></tr><tr><td>35</td><td>0.38</td></tr><tr><td>36</td><td>0.40</td></tr><tr><td>37</td><td>0.42</td></tr><tr><td>38</td><td>0.44</td></tr></table>
4(b)	both **axes** labelled, with units ; suitable linear **scale** for both axes ; **plots** correct ± ½ square ; suitable **line** of best fit, not extrapolated ;	**4**	plots to cover at least ½ grid in both directions  **ECF** if table of data is incorrect
4(c)	mass and length are directly proportional / **AW** ;	**1**	
4(d)	mean length = 36 (cm) ; mean mass = 0.4 (kg) ;	**2**	

Question	Answer	Marks	Guidance
5(a)	*any 8 of:* 1 use of a quadrat / quadrat described (or drawn) ; 2 suitable stated size of quadrat ; 3 quadrat subdivided / smaller grid within quadrat ; 4 ref. to random sampling (in each area) ; 5 how random samples obtained ; 6 count number of mussels (in each quadrat) / est. percentage cover ; 7 repeat twice more (min) in the sample area ; 8 repeat (in each area), in other part of the shore / for each location ; 9 credit safety precautions / respect for the environment ; 10 record results as collected (e.g. on paper etc.) ; 11 calculation of mean (ONLY once, here or in b)	**8**	

Question	Answer	Marks	Guidance
5(b)	*any 5 of:* 1 ref. to tabulation of raw data ; 2 column for sample number ; 3 column for number of mussels ; 4 calculation of mean (average) numbers of mussels ; 5 results expressed as numbers per unit area ; 6 bar chart with two bars (for means in each area) ; 7 axes labelled as location **AND** number of mussels ;	**5**	maximum 5 marks for presentation of results must discuss interpretation of results for full marks For MP 2 / 3 accept ECF from method in **5(a)**)
	AND at least 1 from : 8 interpretation of results in relation to hypothesis ; 9 commenting on quality of results ;	**1**	e.g. taking into account anomalous result

Question	Answer	Marks	Guidance
5(c)	*any 5 of:* 1 may be difficult to count (individual) mussels ; 2 ref. to limited number of samples / more samples needed ; 3 quadrat method only an estimate of population / not counting all individuals ; 4 upper and middle shore difficult to define ; 5 need to carry out investigation on more shores – different types of shore / different islands ; 6 compare numbers on lower shore / different zones ; 7 carry out investigation at different times of the year ; 8 investigate distribution in relation to another (named) factor ; 9 ref. to repeats needed ; (**ONLY** if not credited in a or b) 10 correct reference to accuracy / reliability of data ; 11 improve by taking photographs and counting from that ;	**5**	**A** ref. to mistaking other species for mussels **ECF** for % cover method – it is only an estimate