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**MARINE SCIENCE**

**5180/01**

Paper 1 Structured

**October/November 2017**

MARK SCHEME

Maximum Mark: 80

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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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Question	Answer	Marks	Guidance
1(a)	(phylum) chordata/ chordate ;  (genus) <i>Thunnus</i> ;	2	
1(b)	<b>A</b> – caudal (fin) ;  <b>B</b> – pectoral (fin) ;  <b>C</b> – pelvic (fin) ;  <b>D</b> – dorsal (fin) ;	4	I qualification of dorsal (e.g. first, second)
1(c)	propels / moves fish / <b>AW</b> ;	1	I swimming unqualified
1(d)	stabilise <del>against</del> rolling / <b>AW</b> ;	1	I for rolling
1(e)(i)	(maintain neutral) buoyancy / description of <b>OR</b> sound detection ;	1	
1(e)(ii)	swim continuously ;  pectoral fins provide <u>lift</u> ;  <b>OR</b>  body fat ;  (fat is) less dense (than water) (so provides lift) ;	2	I fat is light

Question	Answer	Marks	Guidance
2(a)	<p><i>any 2 of:</i>  ref. to tropical conditions / description of ;  ref. to estuarine conditions / description of ;  ref. to muddy / <b>AW</b> ;  shallow water ;</p>	<b>2</b>	
2(b)	<p><i>any 3 of:</i>  reduce, force / energy of waves ;  ref. (prop roots) reduce wave height / acts as breakwater / acts as wave break ;  reduce depth of water ;  reduces flooding ;  reduce erosion / stabilise shore ;  (protection) from storms / tsunamis / cyclones / hurricanes ;  (roots) provide shelter (from predators / wave action) ;</p>	<b>3</b>	

Question	Answer	Marks	Guidance
2(c)(i)	Kedah ; Negeri Sembilan ;	2	A in either order
2(c)(ii)	22 496 ; ;	2	

Question	Answer	Marks	Guidance														
3(a)	<table border="1"> <thead> <tr> <th>feature</th> <th>letter</th> </tr> </thead> <tbody> <tr> <td>has an operculum</td> <td>A ;</td> </tr> <tr> <td>has an exoskeleton</td> <td>D ;</td> </tr> <tr> <td>has a body covered with fur</td> <td>C ;</td> </tr> <tr> <td>has a cartilaginous skeleton</td> <td>E ;</td> </tr> <tr> <td>has stinging cells</td> <td>B ;</td> </tr> <tr> <td>has tube feet</td> <td>F ;</td> </tr> </tbody> </table>	feature	letter	has an operculum	A ;	has an exoskeleton	D ;	has a body covered with fur	C ;	has a cartilaginous skeleton	E ;	has stinging cells	B ;	has tube feet	F ;	6	
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3(b)	identification (of organisms)/AW ;	1	A sorting /grouping /classification														

Question	Answer	Marks	Guidance
4(a)	goods / services, to another country / <b>AW</b> ;	1	
4(b)	4 ;	1	
4(c)	April ;	1	
4(d)(i)	20.4 ;	1	
4(d)(ii)	8.4 ;	1	<b>A</b> ECF (28.8–4di)
4(e)	<p><i>any 2 of:</i></p> <ul style="list-style-type: none"> <li>1 price / tariff / tax ;</li> <li>2 supply / quantity (available) / quota ;</li> <li>3 demand / (the) market / type of fish / what the item is ;</li> <li>4 distance ;</li> <li>5 quality ;</li> <li>6 laws / licences ;</li> <li>7 time of year / season / month ;</li> <li>8 weather ;</li> <li>9 labour supply / cost ;</li> <li>10 capital ;</li> <li>11 economic growth ;</li> <li>12 contract sales ;</li> <li>13 conflict / war ;</li> <li>14 politics / trade barrier ;</li> <li>15 competition ;</li> <li>16 (availability of) transport</li> </ul>	2	

Question	Answer	Marks	Guidance
5(a)	the breeding / rearing / farming / growing ; of aquatic / marine, plants / animals / named example ;	<b>2</b>	
5(b)(i)	minus ; 2.4 ;	<b>2</b>	
5(b)(ii)	as feed increases, dissolved oxygen decreases / <b>ORA</b> ;	<b>1</b>	<b>I</b> inversely proportional
5(b)(iii)	increased growth (rate) of fish (with more food) ; more oxygen <u>used</u> <b>OR</b> more respiration ; <b>OR</b> more waste products from fish / surplus food ; more, bacteria / decay, which <u>use</u> oxygen <b>OR</b> <u>eutrophication</u> ; <b>AVP</b> ; e.g. floating food prevents oxygen dissolution	<b>2</b>	

Question	Answer	Marks	Guidance
6(a)(i)	7 ;	1	I minus
6(a)(ii)	salmon <b>AND</b> mackerel ;	1	either order
6(b)(i)	<i>any 1 of:</i> (storage or source of) energy ;  (thermal) insulation / description of ;  protection (of soft organs) ;  cell membranes ;  making hormones ;  idea of, electrical insulation ;	1	R idea of, energy <u>production</u>
6(b)(ii)	<i>any 1 of:</i> growth ;  repair ;  make, enzymes / hormones ;	1	
6(c)	<i>any 2 of:</i> vitamins ;  minerals (salts / ions) ;  carbohydrate ;	2	A maximum of one named vitamin  A maximum of one named mineral  A sugar or named (animal) carbohydrates  A water

Question	Answer	Marks	Guidance
7(a)(i)	floating / buoyant, object / description of ; establishment of a food chain / description of / ecosystem ;	<b>2</b>	<b>A</b> either in terms of at the surface or in the body of the water <b>I</b> for navigation (of fish or fishermen)
7(a)(ii)	<i>any 2 of:</i> fish are more easily found / less time finding fish ; increased CPUE / less effort / easier to catch fish ; less fuel used / more profitable ; navigational aid (for fishermen) ;	<b>2</b>	<b>I</b> efficient unqualified
7(b)	<i>any 3 of:</i> non-target / endangered, species / named example, caught / by-catch ; (excessively) large numbers caught (at once) / harder to regulate catch size ; unsustainable / (easy to) exceed MSY ; risk of catching juvenile / young / immature fish ;	<b>3</b>	<b>I</b> vague descriptions such as 'wipe out ecosystem' or 'destroy foodchains' <b>A</b> overfishing / over-exploitation / depletion



Question	Answer	Marks	Guidance
8(a)(i)	<p><i>any 3 of:</i>            reduce / prevent / stop, spoilage ;            idea of, increases shelf life ;            adds value / consumer appeal ;            allows <u>long distance</u> transport / export ;</p>	3	
8(a)(ii)	canning ;	1	
8(b)	<p><i>any 3 of:</i>            fillet / chopping up of, fish ;            exposure to gamma / X rays ;  <u>kills</u>, bacteria / micro-organisms / pathogens ;            detail of radioactive source e.g. cobalt 60 / caesium 137 ;            ref. to different intensities of radiation / for different lengths of time ;  <u>radapperrisation</u> <b>OR</b> <u>radication</u> <b>OR</b> <u>radurisation</u> ;</p>	3	
8(c)	<p>oxidation / description of ;            of fat / lipid / oil ;            causes unpleasant taste <b>OR</b> smell ;</p>	3	

Question	Answer	Marks	Guidance
9(a)(i)	(animal) feeds <u>only</u> on plants / producers ;	1	
9(a)(ii)	(animal) feeds <u>only</u> on animals ;	1	
9(a)(iii)	group of / number of, organisms of <u>same species</u> ; living in the same, area / habitat / ecosystem / community ; at the same time ;	3	
9(b)	<i>any 3 of:</i> temperature ; light intensity ; light wavelength ; (dissolved) oxygen ; (dissolved) carbon dioxide ; pressure / depth ; pH / acidity ; named type of pollution ; idea of, desiccation risk ;	3	I dissolved gases unqualified

Question	Answer	Marks	Guidance
10(a)	<i>any 2 of:</i> maintain employment ;  increase earnings ;  protection of fisheries resources ;	<b>2</b>	I managing fishing
10(b)	idea of, (a species) which is likely to become extinct/ <b>AW</b> ;	<b>1</b>	<b>A</b> near to extinction I low numbers unqualified
10(c)	<i>any 2 of:</i> protection / preservation <b>OR</b> limiting human impact ;  of ecosystems / habitats / plants / animals / organisms / named example ;  idea of, for the future / over the time ;	<b>2</b>	I conserve
10(d)(i)	8600 ;	<b>1</b>	
10(d)(ii)	<i>any 2 of:</i> idea of, unattractive to purchasers ;  idea of, (identify it as rare) so that people do not, catch / kill / harm / trade, it ;  idea of, (identify for) population / individual, monitoring ;  idea of, (identify for) helping to police illegal trade ;	<b>2</b>	e.g. monitoring movements / population size / longevity / distribution