MARINE SCIENCE	**5180/02**
Paper 2	**October/November 2017**
MARK SCHEME	
Maximum Mark: 60	

Published

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This document consists of **8** printed pages.

Question	Answer	Marks	Guidance
1(a)(i)	blue crab **AND** swordfish ;	1	in either order
1(a)(ii)	32.7 ;	1	
1(a)(iii)	1407.4 ; tonnes ;	2	
1(b)(i)	ref. to an <u>overall</u> decrease ;	1	**I** increase at end do not credit detailed description, overall trend is required
1(b)(ii)	*any 2 of:* decrease in stocks ; disease ; idea of, increased predation ; lack of food ; idea of, lack of reproduction ; (stock) migration ; (barracuda) habitat destroyed ; idea of, <u>over</u>fishing / <u>over</u>exploited / <u>over</u>harvesting ; decrease in fishing effort / lower demand / less fishing expeditions ; catch / boat / area, restrictions ;	2	**I** pollution **I** no more barracuda left (e.g. barracuda caught at young age)
1(c)(i)	3287 ÷ 376.9 ; 8.72 / 8.7 ;	2	correct answer, with no working shown, gains both marks

Question	Answer	Marks	Guidance
1(c)(ii)	higher value (per tonne in 2012) / it increased ; difference of 1.67 (thousand dollars per tonne) ;	2	**ORA**
1(c)(iii)	<u>increase</u> in demand / insufficient supply to meet demand ;	1	**A** high demand **I** insufficient supply unqualified **ECF** from **1(c)(ii)**
1(d)	*method:* trawl(ing) / long-line / gill net / basket trap ; *where:* (trawl net dragged along) sea, floor / bed / bottom **OR** along substrate; *why:* (flounders) live on sea floor / **AW** ;	3	

Question	Answer	Marks	Guidance
2(a)(i)	reasonable, ruled straight line, **not** extrapolated ;	1	
2(a)(ii)	value consistent with final graph ± ½ small square ; evidence on Fig. 2.1 of how value was derived ;	2	line up from 19 and across to *y* axis
2(a)(iii)	(measure the length of each fish and) add, lengths / values / readings, together ; divide (total) by the number of fish ;	2	
2(a)(iv)	difference in length / 42 – 12 / 30 ; ÷ 14 = 2.14 ;	2	correct answer, with no working shown, gains both marks **ECF** for wrong length

Question	Answer	Marks	Guidance
2(a)(v)	*any 3 of:*	3	**I** pollution, over fishing climatic change and predation if unqualified
	a food / (named) nutrients ;		
	b temperature ;		
	c stocking density / **AW** ;		**A** stress
	d disease / parasites / example of ;		
	e oxygen (concentration of water) ;		
	f salinity ;		
	g pH ;		
	h idea of, attacking / eating, each other ;		
	i idea of, build-up of waste products ;		
	j size / volume, of tank ;		
2(b)(i)	315×4560 **OR** $1\,436\,400$;	3	correct answer, with no working shown, gains full marks
	$\div\,25$;		
	$= 57\,456$;		

Question	Answer	Marks	Guidance
2(b)(ii)	*any 2 of:* fish may move out of area / emigration ; fish may move in to area / immigration ; idea of, fish reproduction ; idea of, death / predation ; idea of, tag affects the fish ; idea of, mixing is not random / fish do not mix with the rest ; issue with the practical method ;	**2**	 **A** births e.g. more visible to predators or directly harms fish e.g. qualified human errors such as fish counted twice / samples not representative / tag lost

Question	Answer	Marks	Guidance
3(a)	idea of, (number / range, of) different species in a habitat / area ;	**1**	**A** answer in terms of genetic or habitat level biodiversity
3(b)(i)	*any 2 of:* presence of an exoskeleton / external skeleton / chitin skeleton ; jointed limbs / **AW** ; antennae ; compound eye ; **AND** <u>marine</u> example ;	**3**	**I** carapace, chelipeds, cephalothorax

Question	Answer	Marks	Guidance
3(b)(ii)	spicules / spines / spikes ; tube feet ; 5-fold symmetry / penta radial ; marine example ;	4	**I** functions **A** cucumber unqualified

3(c)	*min 1 of:* **Use lettered ticks**
	  a asexual reproduction ;
	  b by budding ;
	  c further detail of asexual reproduction ;
	
	max any 6 of:
	  d sexual reproduction ;
	  e release of gametes / eggs and sperm ;
	
	  f fertilisation / fusion of gametes / formation of zygote ;
	
	  g development of larva ;
	  h (larva) planktonic / free floating stage / planula ;
	  i settlement on / attaches to a suitable
	       substrate / rock / surface ;
	  j deposition of / secretes, calcium carbonate / corallite ;
		7	**A** by fragmentation
			e.g. intra-tentacular or extra-tentacular (budding), (genetically) identical / only one parent / no male and female
			
			R if egg or medusa is settling
			
			I coralline

Question	Answer	Marks	Guidance
4(a)(i)	*any 2 of:* idea of, used to, find direction of travel / plot course / **AW** / travel in set direction ; points to north ; magnetic ;	**2**	**A** idea of, triangulation **A** shows which way is north and south
4(a)(ii)	to, detect / avoid, other ships / obstacles / see in the fog ; by, transmitting / sending out, waves / pulses / signals **+** that bounce back / are reflected ;	**2**	**R** fish shoals **I** impulses
4(a)(iii)	to find, depth / (shoals of) fish / underwater obstacles / coral ; by, transmitting / sending out (sound) waves / pulses (into water) **+** that bounce back / are reflected ;	**2**	**A** to determine ice thickness **I** impulses

Question	Answer	Marks	Guidance
4(b)	*any 9 of:* 1 no need for, (expensive) fishing, craft / gear / equipment / fuel ; 2 low capital investment (unless intensive operations) / less expensive setting up costs ; a (aquaculture) provides, a predictable / guaranteed / all year / on demand, yield ; b fish of, known / guaranteed, quality ; c idea of, reach marketable size faster / harvest more often / faster method / quicker / grow faster ; d ref. to sustainability of wild stocks / prevents, extinction / overfishing / overcatching ; e does not disrupt, food chains / webs / habitats ; f lower health risk to consumers / safe to eat / fish are free from environmental contaminants ; g (aquaculture) provides job opportunities ; h enables greater profit / makes more money / greater income ; i high(er) yield / more fish ; j ref. to safety of harvesting fish (in aquaculture) / less risk ; k no need to import fish (from other countries) ; l brings down cost of fish ; m can target particular, species / size / sex / age **OR** species is guaranteed ; n can use, selective breeding / genetic, engineering / modification ;	9	**ORA** for all about harvesting wild stocks **I** cheaper **A** preserves biodiversity **A** easier / easy, to harvest **A** no bycatch