MARINE SCIENCE **5180/02**

Paper 2 **October/November 2016**

MARK SCHEME

Maximum Mark: 60

Published

This document consists of **9** printed pages.

Question	Answer	Mark	Additional Guidance
1(a)	1 236 965;	1	
1(b)(i)	2005;	1	
1(b)(ii)	226 315; tonnes ;	2	 **A** tons / t
1(b)(iii)	344 189 (tonnes);	2	431 312 – 87 123 = 1 mark (**I** any extra stages in calculation)
1(b)(iv)	7.8;	2	**A** 7.815, 7.82;
1(c)	(overall catch has) increased;	1	**I** references to decrease at the end
1(d)	*any two of:* catch non-target species / bycatch / **AW**; catch juveniles / immature fish / young fish /**AW**; catch above MSY / overfishing / overexploitation / unsustainable fishing / too many taken /**AW**; ref. to ghost nets / **AW**, **OR** damage to coral reef;	2	 **A** unwanted species / example of non-target species **I** ref. to endangered species **I** small fish **A** whole stock is taken

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Question	Answer	Mark	Additional Guidance
1(e)	*any four of:* a) idea of, ghost lines / entanglement; b) damage to sea bed / reefs; c) over-catch (some species); d) high by-catch rates; e) change migration patterns; f) cause schools to form in ecologically unsustainable areas / **AW**; g) ref. to rust / paint / toxic materials (entering sea); h) accumulation of predators / increase susceptibility to predation; j) spread of disease;	4	**I** habitats **A** overfishing / catch over MSY / named species (tuna) / whole stock is taken / <u>too</u> many taken
	Total:	15	

Question	Answer	Mark	Additional Guidance
2(a)	16.4 parts per thousand;	2	**A** ppt **A** 16.4 = 1 mark
2(b)(i)	both axes suitable linear **scale**; both **axes** labelled with units; **plots** correct ± ½ square; points joined by straight lines;	4	*x* axis must cover at least half grid bar chart gains mp1,2,3

2(b)(ii)	salinity = 33 (ppt);
	
	depth = 1 (m);
		2	**A** 33–33.2
			
			A 0.8–1.2
			ECF from a candidate's graph

2(b)(iii)	as depth increases, salinity increases; *any one of :* salinity seems to be levelling off with depths greater than 2 m; greater change between 0 to 2 m; credit manipulation, e.g. overall increase in salinity of 16 ppt;	2	**ECF** from a candidate's graph **I** directly proportional

Question	Answer	Mark	Additional Guidance
2(b)(iv)	idea that as salinity increases, density of water increases / **ORA**; therefore more dense / more saline water sinks / **ORA**;	2	**A** saltwater is denser than freshwater
2(c)	*any three of:* evaporation; rainfall / precipitation; inflow of water from sea / ocean; inflow of water from rivers; meltwater from glaciers / **AW**;	3	**A** runoff
	Total:	15	

Question	Answer	Mark	Additional Guidance
3(a)	transfer / modification; of, gene / DNA / allele / genome / genotype;	2	
3(b)	many, nucleotides / bases **OR** polymer of, nucleotides / bases; joined / bonded together / in a chain / **AW**; credit ref. to DNA / RNA;	3	**A** named base(s) BUT must have idea of many **R** ref. to other examples of polymer, e.g. protein

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Question	Answer	Mark	Additional Guidance
3(c)(i)	a) (growth promoting) gene, <u>isolated</u>; b) from different species; c) ref. to adding gene to trout <u>eggs</u>; d) eggs develop into GM / GE trout; e) ref. to method;	4	**A** allele / DNA e.g. injection (<u>gene</u> into egg) / restriction enzymes / ligase / electroporation / vector / virus

Question	Answer	Mark	Additional Guidance

3(c)(ii)	*economic*
	max. five of:
	  a) higher set up costs;
	
	  b) GM trout <u>grow</u> more quickly;
	
	  c) so can get to market quicker;
	
	  d) grow more trout in given time / higher yield;
	
	  e) increased muscle / meat growth;
	
	  f) increased revenue / profit / **AW**;
	
	  g) consumer rejection (so decreased revenue);
	
	  h) fall in price of trout;
	
	environment
	  i) GM fish may escape / released;
	
	  j) competition / description of, with wild stock;
	
	  k) could breed with wild stock;
	
	  l) idea of, food chain / food web effects;
		6	**A** can be produced more quickly
			
			A market flooded / glut / supply greater than demand
			
			I affects / interfere with, ecosystems

	Total:	15	

Question	Answer	Mark	Additional Guidance
4(a)	a) zooxanthellae;	10	**I** algae
	b) mutualistic;		**A** symbiosis
	c) produce carbohydrates / **AW**;		
	d) nematocysts / stinging cells;		**A** cnidoblasts / cnidocytes
	e) associated with food capture;		
	f) defence / protection;		
	g) stomach (cavity);		*needs to be some form of context to award function marks for each part if part is not named*
	h) digestion (of food);		
	i) mesenteries;		
	j) increase (digestive) surface area;		
	k) corallite;		**I** coralline
	l) forms (hard) skeleton;		
	m) of calcium carbonate;		
	n) gonads;		
	o) sexual reproduction / make gametes ;		**A** make eggs / sperm

Question	Answer	Mark	Additional Guidance
4(b)	*any five of:* a) reduction in corals / less coral reef (as a result of mining); b) loss of habitats; c) loss of <u>biodiversity</u>; d) loss of nursery / breeding grounds / shelter; e) migration of fish away from reef; f) interrupts / destroys / affects, food <u>chains</u> / <u>webs</u>; g) pollution / sedminentation; h) suffocation of fish / gill damage (due to sediment); i) loss of fish <u>for a specific reason</u>, e.g. for bait, for aquaria, for food;	5	**I** damage to coral **A** idea of, increased vulnerability to predation, places to hide **A** loss of fish for fishermen
	Total:	15	