

CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Advanced Subsidiary Level

MARK SCHEME for the October/November 2013 series

9693 MARINE SCIENCE

9693/01

Paper 1 (Structured), maximum raw mark 75

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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Page 2	Mark Scheme	Syllabus	Paper
	GCE AS LEVEL – October/November 2013	9693	01

- 1 (a) (i) any 2 of (difference and linked explanation):
 (difference) more lobsters (in reserve) / ora;
 lobsters not fished / ora;
- (difference) less sea urchins (in reserve) / ora;
 more eaten by increased lobsters / ora;
- (difference) more algae (in reserve) / ora;
 less sea urchins to feed on sea weed / ora; [4]
- (ii) (predator) animal which kills and eats / feeds on other animals;
 lobster;
 (prey) animal eaten / for food by animal / predator;
 sea urchin;
 (trophic level) feeding position in a food chain / owtte;
 Sea urchins at second level / lobsters at third level; [6]
- (b) (i) x axis label – time / of year / week / month / seasons with arrow or increasing numbers;
 y axis label – number(s) / relative number / population size with arrow or increasing numbers; [2]
- (ii) any 1 of:
 (line A) – predators number falls when prey falls / ora;
 predator numbers mostly below prey numbers / owtte;
 predator numbers lag behind prey / owtte; [1]
- [Total: 13]**
- 2 (a) 89.89 / 89.9 / 90 (5) ;;
- allow 1 mark for correct working $8900 / 9900 \times 100$ [2]
- (b) number between 6 and 10 [1]
- (c) any 3 of:
 as heat; I respiration
 excretion / in faeces / waste products;
 death / decay;
 some parts of organisms not eaten / owtte;
 movement; [3]
- [Total: 6]**

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- 3 (a) (i) March; [1]
- (ii) lower (net primary) productivity with increasing depth.
light decreases with depth;
reference to photosynthesis; [3]
- (b) (i) (similarity) both release energy / biomass / make food / owtte;
R produce / create energy [1]
- (difference) (photosynthesis) uses light (solar energy);
(chemosynthesis) uses chemical (s) (energy); [1]
- (ii) reference to extreme environment;
few species can survive this environment / conditions / need special adaptations / owtte;
- any one of:
very high temperature;
high pressure;
toxic chemicals; [3]
- [Total: 9]**
- 4 (a) any 4 of:
water at suitable temperature / 22°C to 25°C; A 16°C–35°C / warm water
supply of calcium (carbonate);
presence of Zooxanthellae;
food supply;
suitable salinity;
suitable depth of water / shallow water;
suitable pH;
lack of sediment in water / clear water / reference to light;
substrate for attachment / owtte;
oxygen supply; [4]
- (b) any 2 of:
species / type of coral;
light levels / night–day length;
lunar cycle;
water movement / currents / owtte;
pH;
salinity; [2]
- (c) (i) mix sperm and eggs / oxygenate; I fertilisation [1]
- (ii) allow fertilised egg / zygote to develop / grow / owtte; [1]

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- (d) any 3 of:
 absorb wave energy / owtte;
 prevent damage to coastal property e.g. flooding / owtte;
 prevents damage to anchorages / harbours / owtte;
 reduced need for breakwaters / owtte;
 protection of ecosystems / e.g. prevent erosion / owtte; [3]

[Total: 11]

- 5 (a) (i) any 3 of:
 A close to mean;
 B above mean **and** C below mean;
 B highest v C lowest;
 correct reference to figures e.g. A approx. 5 times C; **R** direct quote of figures [3]

- (ii) any 5 from:

(sea B)
 high(er) temperature / hot climate;
 high (er) level of / more evaporation;
 less / low rainfall; [max 3]

(sea C)
 high influx of fresh water;
 high(er) / more rainfall;
 low(er) temperature / cold climate;
 less / little evaporation; [max 3] [5]

- (b) any 4 of:
 gases released by volcano;
 2 examples of gases – carbon dioxide / sulphur dioxide / hydrogen chloride / hydrogen sulphide;;
 dissolve in atmospheric water;
 enter sea water when rains / precipitation;
 form new compounds / substances / named example;
 ref. to chemicals from magma; [4]

[Total: 12]

Page 5	Mark Scheme	Syllabus	Paper
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- 6 (a) (i)** correct label; [1]
- (ii)** any 3 of:
flat expanse / owtte;
of ocean floor / sea bed;
at great depth / owtte;
covered with sediment / detritus; [3]
- (iii)** any 3 of:
(upward movement of) molten material / lava / magma;
solidifies to form new crust;
reference to mantle convection;
reference to build up of sediment covering uneven rock surface; [3]
- (b) (i)** any 3 of:
reference to convergent;
tectonic plate boundaries;
reference to subduction zone;
plates collide;
build up of pressure / strain;
sudden slippage / owtte;
release of stress / tension / stored energy / owtte; [3]
- (ii)** any 2 of:
release of tension / energy at plate boundary;
causes movement of sea bed;
displacement of large volume of water / owtte;
very large ocean wave / owtte, moving at high speed; [2]
- (c) (i)** appropriate use of graph paper;
suitable scale and axes fully labelled;
plots; [3]
- (ii)** increased depth, increased wavelength / ora;
wavelength changes little at great depths / ora; [2]

[Total: 17]

Page 6	Mark Scheme	Syllabus	Paper
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7 (a) (i) (phosphorus) DNA and bone; **A** ATP [1]

(ii) (magnesium) chlorophyll; [1]

(b) any 5 of:

reference to solubility / dissolving in water;

reference to rainfall;

reference to run off into fresh water;

reference to rivers carrying to sea;

reference to reservoir of nutrients in surface layers of sea;

reference to uptake by algae;

reference to algal / plant protein*; ***A** anywhere, once only

reference to fish eating algae / uptake into food chains;

reference to conversion of plant proteins* into fish protein*;

[5]

[Total: 7]