



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education  
Advanced Subsidiary Level and Advanced Level

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**MARINE SCIENCE**

**9693/01**

Structured Questions

**For Examination from 2008**

SPECIMEN MARK SCHEME

**1 hour 30 minutes**

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**MAXIMUM MARK: 75**

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This document consists of **5** printed pages and **1** blank page.



- 1 (a) sun;
- (b) zooplankton/krill;
- (c) 18%;; (1mark for correct working) [2]
- (d) 0.072;; (1mark for correct working) [2]
- (e) heat/respiration;  
faeces/undigested food/uneaten/inedible components; [2]
- (f) Any 2 of:  
captures light energy;  
for use by plants;  
ref. to converting light energy to chemical/potential energy that is then available to the rest of the food chain; [2]
- (g) (from X to Y) **rapid** increase/from 12 to 34/ in biomass;  
increased photosynthesis; [2]
- + 2 of:  
  
increasing level of light;  
temperature increasing;  
increase in nutrients; [2]
- [Total: 14]**
- 2 (a) relationship between two organisms;  
(symbiosis) both organisms benefit;  
(parasitism) parasite gains benefit, host is harmed; [3]
- (b) Any 4 of:  
  
host is coral;  
(zooxanthellae) within tissues;  
reference to mutualism;  
provide coral with nutrients;  
(named nutrient) carbohydrate/glucose;  
with oxygen;  
remove carbon dioxide;  
remove phosphate; [4]
- (c) tissues contain chemosynthetic bacteria;  
these metabolise hydrogen sulphide;  
provide nutrients for tube worms; [3]

**[Total: 10]**

3 (a) 56.5%;;

(b) 910;;

(c) 2 of:

some species not correctly identified;  
some species missed/counted several times;  
possibly different survey methods;  
data collection not repeated;

[2]

(d) (i) overall general fall to 2002;  
most rapid fall in 1998;  
starts to increase in 2002;

[3]

(ii) 3 of:

increase in predation;  
over fishing/collection;  
major storms;  
other valid reason;

[3]

[Total: 12]

4 (a) Any 4 of:

ref. to earth's surface as plates;  
ref. to plates moving;  
ref. to plate boundary;  
ref. to all named boundaries (convergent, divergent, collisional, transform);  
ref. to any 1 consequence of plate movement, e.g. volcanoes, earthquakes,  
mountain formation;

[4]

(b) spatial relationship of current continents;  
related fossils on continents;  
similar rock formations on current continents;

[3]

(c) 2 plates pulling apart;  
hot magma fills gap;  
accumulates to form new ocean floor on ridge;

[3]

[Total: 10]

- 5 (a) (i) no light for photosynthesis;  
bacteria can metabolise hydrogen sulphide;  
animals feed on bacteria;
- (ii) 1 – ocean water passes into rock through cracks;  
2 – water is heated by magma;  
3 – superheated water at high pressure with high mineral content;  
4 – minerals deposited and build up to form chimney; [4]
- (b) line continues at low level to vent;  
immediate rise to near top of graph at vent;  
falls gradually to original level; [3]

[Total: 10]

- 6 (a) hurricane/typhoon; [1]
- (b) (i) 26 °C; [1]
- (ii) E; [1]
- (iii) evaporation; [1]
- (iv) falls; [1]
- (c) Any 3 of:  
death/injury;  
damage to homes/buildings;  
damage to infrastructure;  
loss of power supplies;  
destruction of crops;  
spread of disease;  
financial costs;  
loss of employment; [3]

[Total: 8]

7 (a) 3 of:

dissolves in soil water;  
run off into rivers into sea;  
taken in/used in photosynthesis/used in protein synthesis by phytoplankton/algae;  
passes along food chain to fish;

[3]

(b) (i) 15 correct plots;;; – 1 each incorrect  
correct line joining all plots;

[4]

(ii)  $0.12 \mu\text{mol}/\text{dm}^3$  per year;

[2]

(iii) some fertiliser remains in soil and run off continues;

[1]

(iv) year of above normal rainfall carries phosphates from soil to sea;

[1]

[Total: 11]

