UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Advanced Subsidiary Level and GCE Advanced Level

MARK SCHEME for the May/June 2008 question paper

9693 MARINE SCIENCE

9693/01 Paper 1 (Structured Questions), 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.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

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1 **(a)** **(i)** Sun/light; [1]

(ii) phytoplankton – krill – minke whales/penguins - killer whales [1]

(iii) transfer of energy from each trophic level;
transfer of biomass from each trophic level; [2]

(iv) pyramid with 5 levels;
each level named; [2]

(b) killer whales have other food sources/examples and will eat more of these; [1]

(c) **(i)** 3.5%;;
correct working scores 1 [2]

(ii) as heat/respiration;
in faeces/waste products;
some parts not eaten; [3]

(d) 3 of:
fall in productivity;
low light levels in winter/spring/autumn;
photosynthesis reduced;
less phytoplankton/producers;
reduced numbers of primary consumers/krill/zooplankton;
effect on one named human food/fish/squid; [3]

[Total: 15]

2 **(a)** use of light energy/owtte;
to form organic molecules/named examples;
using carbon dioxide and water,
reference to chlorophyll; [3]

(b) 4 of:
replacement of communities/species;
over time;
reference to changes in populations;
(idea of) serial changes in environment;
reference to competition;
(for) light/nutrients/space;
(1 example) Bacteria, Tevnia, Rifta, Mussels;
at hydrothermal vents; [4]

[Total: 7]

3 **(a)** **(i)** (process **1**) runoff;
(process **2**) uptake/absorption; [2]

(ii) to make protein/amino acids; [1]

(iii) bacteria; [1]

(iv) harvesting of fish/removal of fish/fish eaten; [1]

(b) **(i)** 3 of:
increases;
waste/excretion from fish;
decreases;
as converted to nitrite;
1 correct reference to numbers from graph; [3]

(ii) nitrite falls;
(nitrite) converted to nitrate;
nitrate increases;
1 correct reference to numbers from graph; [3]

(iii) rapid plant growth/algal bloom/used up as protein; [1]

[Total: 12]

4 **(a)** 4 of:
fringing reef on volcanic island;
land sinks/ subsidence;
barrier reef forms;
island sinks below sea level;
atoll formed; [4]

(b) drilling;
geomorphological analysis;
carbon dating; [3]

(c) 3 of:
prevents erosion of land;
provides anchorages/protection for harbours;
provides new habitats;
increases fishing areas;
reference to tourism/diving; [3]

[Total: 10]

5 (a) (i) suitable scale on *y*-axis;
axes labelled;
correct plots;;
4 plots correct = 2
2/3 plots correct = 1 [4]

(ii) maximum 2 from each section × 3

runoff;
weathering of rocks;
salts dissolve in water, washed into sea;

dissolution;
metals in dust;
carbon dioxide to form bicarbonate;

evaporation;
increases concentration of ions;
under water volcanic activity;
release sulphate and chloride ions;
dissolve in sea water/rain water;

(other valid reasons) [6]

(b) (i) 6.4; [1]
parts per thousand; [1]

(ii) 4 of:
salinity falls;
low temperatures;
reduced evaporation of water;
increased runoff from land/freshwater;
heavy rain/dilution;
(other valid reasons) [4]

[Total: 16]

6 (a) (i) 32; [1]

(ii) 6.4% per year;
1 mark for correct working [2]

(iii) starfish is predator/coral is prey/owtte;
coral begins to increase when starfish reaches minimum level;
as coral increases, starfish increases;
reference to time lag/maximum number of predators when coral level falling; [4]

(iv) 4 of:
quadrats;
random sampling;
suitable area;
over time;
count;
repeat;
find mean; [4]

(b) reference to interrelationship/live together;
reference to host;
one suffers;
one benefits;
tuna and nematodes/other named examples [4]

[Total: 15]