

**MARK SCHEME for the May/June 2009 question paper
for the guidance of teachers**

9693 MARINE SCIENCE

9693/01

Paper 1 (AS 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, which would have considered the acceptability of alternative answers.

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- 1 (a) (i) a group of organisms that share similar characteristics and can interbreed; [1]
- (ii) group of interbreeding organisms of the same species; [1]
- (iii) all of the plants and animals/organisms living in a specific area; [1]
- (iv) community of animals, plants and bacteria with the physical and chemical environment/
reference to biotic and abiotic; [1]
- (b) (i) three of:
(chemosynthetic) bacteria;
energy source is from chemical reactions;
(photosynthesis) energy source is light;
reference to chlorophyll;
reference to product; [4]
- (ii) three of:
high water temperatures;
high pressures;
no light/need chemical energy source;
toxic chemicals/named example;
low pH/very acid; [3]
- [Total: 11]**
- 2 (a) salinity increases; [1]
- (b) three of:
run off;
volcanic activity;
erosion;
upwelling;
precipitation;
atmospheric dissolution;
photosynthesis;
respiration;
pollution/named example; [3]
- (c) (i) four of:
start at 28/29 °C; (allow reverse points if start from 1000m)
no change;
large fall;
small fall;
1 reference to correct figures from chart; [4]
- (ii) thermocline; [1]

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(d) (i) correct plots;;; -1 each incorrect
line; accept smooth or straight line [4]

(ii) (large) fall;
from 34.9 to 34.4/by 0.5; [2]

[Total: 15]

3 (a) (i) animal that kills/hunts **and** eats other animals;
any named predator from food web; [2]

(ii) feeding position/level in a food chain;
named example; (such as e.g. cod are carnivores/feed on zooplankton) [2]

(b) (i) 5; [1]

(ii) one of:
disease;
pollution;
fishing;
reference to changes in food supply/owtte; [1]

(c) not dependant on one source/alternative food available if normal prey population falls; [1]

(d) (i) three of:
rises to 1980;
small fall to 1990;
(larger) fall to 2000;
1 correct reference to numbers
(e.g. from 100 000 in 1960 to 400 000 in 1980); [3]

(ii) two of:
cod numbers less than pollock/ora;
population of cod rises as pollock does/falls as pollock does;
peaks in numbers occur at same time; [2]

(iii) has other sources of food/feeds on other prey;
less caught;
reference to quotas;
reference to global warming consequences; [1]

[Total: 13]

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- 4 (a) (i) three of:
 sediment covers coral polyp;
 plus any two of:
 prevents feeding;
 less light can reach zooxanthellae;
 reduced/little photosynthesis; [3]
- (ii) carbon dioxide dissolves in sea water;
 sea water becomes acidic;
 dissolves coral skeleton; [3]
- (b) (i) 40%; [1]
- (ii) 30%; [1]
- (c) (i) concrete;
 steel; [2]
- (ii) two of:
 readily available;
 long lasting;
 attractive to marine organisms;
 non toxic/owtte;
 strong/sturdy/owtte; [2]
- (d) three of:
 create new habitat for marine organisms;
 reference to tourism/fishing/diving;
 prevent erosion of shore;
 dissipate energy of waves;
 protect anchorages;
 reference to research/owtte; [3]

[Total: 15]

- 5 (a) area between high and low water (marks)/area submerged at high tide and exposed at low tide; [1]
- (b) erosion/description;
 sand moved by action of waves/wind/rain/owtte;
 sedimentation/description;
 sand/other material deposited by waves/wind/owtte; [4]
- (c) need to be able to resist wave action/cling to rocks/live under shelter/holdfasts/tough shells;
 tides exposes organisms to air/need adaptations to survive drying out;
 changes in temperature;
 changes in salinity;
 exposed to predators for part of day/need to hide/camouflage;
 only organisms adapted to these conditions will survive; [4]

[Total: 9]

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- 6 (a) four of:
 caused by gravitational pull (mainly) from the moon;
 reference to sun;
 moon's gravity pulls on the Earth, pulling the ocean waters toward the Moon;
 creates a bulge of water/pulls water;
 bulge on the exact opposite side of the Earth as the Earth is pulled toward the Moon and away from the water;
 reference to high and low tides; [5]
- (b) (i) vertical difference/difference in height between the highest high tide and the lowest low tide; [1]
- (ii) three of:
 alignment of Sun and Moon;
 geomorphology;
 wind;
 air pressure
 size of body of water/depth of water; [3]
- (c) (i) 13.2 metres; [1]
- (ii) 12 hours 21 minutes; R – 12:21 [1]
- (iii) 0.7 to 1.0 (m); [1]

[Total: 12]