

MARK SCHEME for the May/June 2012 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.

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

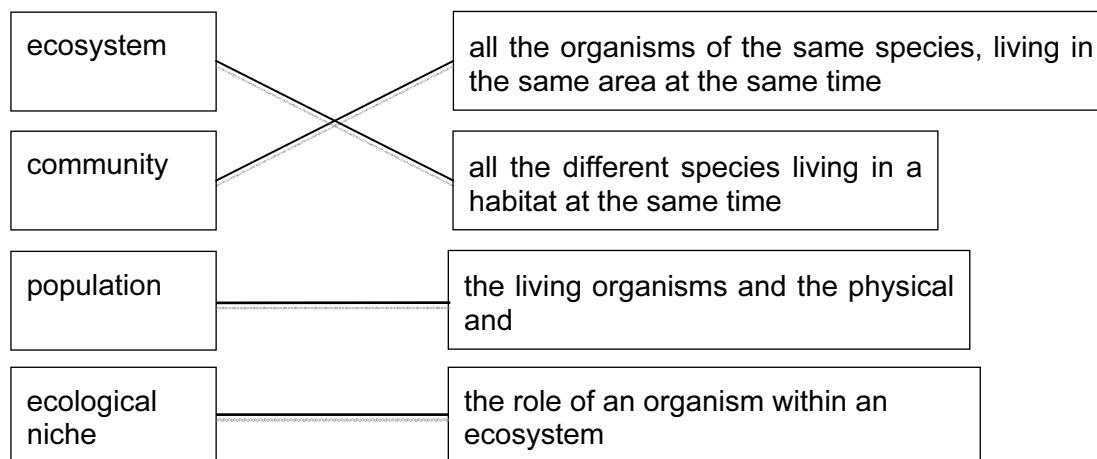
- Cambridge will not enter into discussions or correspondence in connection with these mark schemes.

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1 (a)



4 correct = 2

1/2 correct = 1

R more than one line per box

[2]

(b) (i) (producer) (organism / plant / bacterium) that produces its own food / organic material / energy / owtte by photosynthesis / chemosynthesis; [1]

(primary consumers) animal that feeds on / eats plants / producers (material);
1 examples [1]

(ii) any 1 of:
whelks;
barnacles;
prawns;
blennies;

[1]

(iii) population of barnacles falls / owtte;
blennies lose food source;
consume more barnacles;
OR
population of barnacles increase / owtte;
less zooplankton eaten by prawns / more zooplankton;
more food for barnacles;
OR
population of barnacles increase / owtte;
less food for gulls;
gulls eat more blennies;
OR
population of barnacles increase / owtte;
more worms for blennies;
blennies eat less barnacles;

A references to no change with reason;
if 2 ideas given mark 1 which gives most marks

[3]

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- (iv) any 2 of:
disease;
competition;
(for) food / nutrients qualified;
reproduction; 1 refs to changing populations of other organisms [2]

[Total: 10]

- 2 (a) 12705; [1]

- (b) 1 (%);; (if answer incorrect credit 1 mark for working $15\,000/1\,500\,000 \times 100$) [2]

- (c) any 2 of:
reflected from plant / water surface;
wrong wavelength;
water absorbs some light / only reaches surface;
not absorbed by chlorophyll / owtte;
transmitted through algae / producer; [2]

- (d) appropriate shape;
labels;
scale + suitable approximate proportions; if no scale max 2 [3]

- (e) any 4 of:
reference to chemical energy;
from dissolved minerals;
example;
chemosynthesis;
reference to (chemosynthetic) bacteria;
as producers / make food / organic material (for other organisms);
reference to one named organism e.g. Tevnia / Riftia / tubeworms;
reference to symbiotic relationship; [4]

[Total: 12]

- 3 (a)

nutrient	biological use
nitrogen	to make amino acids / proteins;
magnesium	to make chlorophyll;
phosphorus	to make bone / DNA;

[3]

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- (b) (i) (A) uptake / absorption by plants / organisms / owtte;
 (B) (nutrients / detritus) sinking / used in reef building / owtte; [2]

- (ii) movement of deep / bottom (ocean) water to (ocean) surface;
 + any 2 of;
 reference nutrients;
 reference to movement of surface water / currents / wind;
 reference to deflection of deep ocean currents; [3]

- (iii) (1) fishing;
 reference to one positive effect / negative effect;
 (2) run off / dissolution;
 reference to agriculture / chemicals / fertilisers / pollutants washed into sea / dissolve in water; [4]

[Total: 12]

- 4 (a) energy;
 erosion;
 anchorage; [3]

- (b) silt reduces light penetration;
 inhibit the photosynthesis of the (symbiotic) algae / zooxanthellae (in coral tissues) / owtte / ora; [2]

- (c) (i) any 2 of:
 toxic / owtte (materials) ;
 dissolve in water;
 reference to enter food chain / bioaccumulation;
 R pollution
 ovp; [2]

- (ii) any 2 of:
 reference to (new) fishing / diving site;
 reference to increase in (eco)tourism / owtte;
 reference to other businesses benefit / increased spending; [2]

[Total: 9]

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- 5 (a) (i) any 3 of:
 intertidal areas / estuary mouths / littoral zone / or described e.g. fresh and sea water mix;
 shallow water;
 low oxygen (concentration);
 high / wide range of salinity / brackish;
 muddy shore;
 high level of sedimentation;
 tropical / sub-tropical; [3]
- (ii) (A) for support / owtte;
 (B) oxygen absorption; [2]
- (b) (i) 3250 / 1000/ha / 3 250 000; +/- 50 [1]
- (ii) Asia; [1]
- (iii) any 2 of:
 harvested for timber / deforestation;
 destroyed by storms / hurricanes / tsunamis; R localised effects
 removed for tourist developments;
 pollution qualified / e.g. toxic run-off; [2]
- [Total: 9]**
- 6 (a) any 3 of:
 reference to Earth's surface once 1 land mass;
 reference to Earth's crust / lithosphere is made up of plates;
 (plates 'float') on asthenosphere;
 reference to plates are moving / shifting;
 reference to convection currents in magma;
 reference to (because) hot, soft mantle below plate is moving (slowly);
 reference to driven by heat / density / subduction;
 reference to plate boundaries / named; [3]

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(b)

the process of isostasy	
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magnetic stripes on the sea floor	✓
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the erosion of coral reefs	
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the distribution of fossils	✓
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the fit between continental coastlines	✓
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3 correct = 2

1/2 correct = 1

[2]

- (c) (i) any 4 of:
underwater mountain range;
reference to (formed at) divergent / described plate boundary;
magma / lava moves (upwards and spreads);
cools **and** solidifies;
forms new crust / sea floor;
reference to spreading of sea floor;

[4]

- (ii) any 4 of:
(formed at) divergent / described plate boundary;
sea water enter cracks in ocean floor / boundary;
heated by magma;
(sea water) forced (back) up (to sea bed);
carrying (dissolved) minerals;
hot water cools;
minerals (precipitate) and build up;

[4]

[Total: 13]

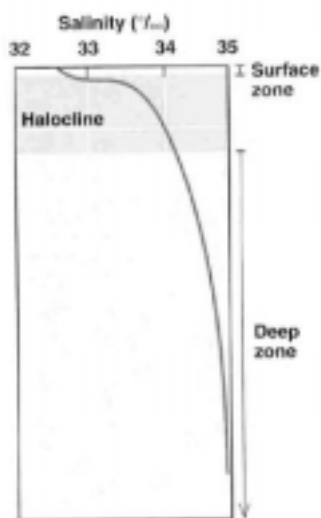
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- 7 (a) any 3 of:
 named gas (dissolves in sea water);
 new compounds formed / named;
 appropriate consequence e.g. pH changed; [3]

(b) (i) (salinity) ↓ ;
 water diluted; [2]

(ii) (sea water) sinks / ↓ ;
 water is cold **and** dense; [2]

- (iii) annotated diagram showing 2 of the following points:
 salinity at surface (stated e.g. low) or shown) v different salinity at ocean bottom (stated e.g. high or shown);
 reference to halocline;
 + any 2 of:
 reference to wind causing evaporation of water;
 leaving saltier water;
 thus increase in density;
 dense water sinks; max 2 [3]



(scores MPs 1 and 3)

[Total: 10]