

MARK SCHEME for the May/June 2013 series

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 should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2013 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

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Mark schemes will use these abbreviations

- ; separates marking points
- / alternatives
- **R** reject
- **A** accept (for answers correctly cued by the question)
- **I** ignore as irrelevant
- **ecf** error carried forward
- **owtte** alternative wording (where responses vary more than usual)
- **AVP** alternative valid point
- **ORA** or reverse argument
- **underline** actual word given must be used by candidate (grammatical variants excepted)
- () the word / phrase in brackets is not required but sets the context
- **Max** max indicates the maximum number of marks

| Question | | Further Information | Mark |
|------------------|---|--|-------------|
| 1 (a) (i) | place / area / region / where an organism / plant / animal / species lives; | A – environment | [1] |
| (ii) | (all of) the different species / owtte; living in the same habitat / place / area / region; | R – refs to single species A – specific name of a habitat | [2] |
| (b) (i) | 3 of: particle size on sandy shore is <u>larger</u> / particle size on muddy shore is <u>smaller</u> ; overlap in particle size; sandy shore has greater range of particle size; comparative data reference e.g. largest sand particle is 2.0, largest mud particle is 0.2; sand particles are 10 times larger / ora;; | A – coarse v fine | [3] |

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|--------------|--|--|-------------|
| (ii) | <p>any 3 of:</p> <p>(sea) water carries (suspended) particles / sediment;</p> <p>(these) sediments are fine / small (mineral) particles / grains;</p> <p>(and) organic remains / named example;</p> <p>(muddy) shores are not exposed to erosion / little wave action;</p> <p>(muddy) shores (often) have little slope;</p> <p>water moving very slowly;</p> <p>sediments / particles are deposited / sink / settle;</p> <p>(so) (sediment/silt / particles)/ build up / accumulate (to form mud);</p> | | [3] |
| (iii) | <p>4 of :</p> <p>rocky shores (more) stable (substrate) / ora / owtte;</p> <p>(rocky) not washed / blown / away / disturbed / ora;</p> <p>stones/rocks provide a (firm) surface for attachment / owtte (of organisms) / ora;</p> <p>example of organism / species; e.g. seaweed / molluscs / sea anemones;</p> <p>provide shelter / protection for organisms / ora;</p> <p>reference to more habitats / different places to live / niches e.g. rock pools;</p> <p>sandy shore only suitable for burrowing organisms;</p> | <p>I – refs to particle sizes</p> <p>A – sand eroded</p> | [4] |
| | | Total for question | [13] |

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| Question | | Further Information | Mark |
|------------------|---|--|-------------|
| 2 (a) (i) | decreases / - (symbol); 2.4 mg per dm ³ / falls from 12.4/5 to 10.0; | At – 2.4 – 2.5 | [2] |
| (ii) | 4.6 mg per dm ³ ; | A – 4.7 – 4.9 | [1] |
| (iii) | plots;; line; line labelled / key; | – 1 each incorrect A – dot to dot / line of best fit +/- ¼ square | [4] |
| (iv) | fresh water higher at all temperatures / is always higher / lower at same temperature; reference to difference at particular temperature e.g. at 0°C difference is 3.0 / 11.4 to 14.4; <u>greatest</u> difference at 0°C / <u>smallest</u> difference at 35°C; | tolerance of 0.2 | [3] |
| (b) | any 5 of: as depth increases, oxygen concentration falls / ora oxygen enters water from air; by mixing at surface / owtte / ref. wave action / wind; surface water / low depth has higher / more oxygen / ora; high / most / more light at surface / owtte / ora; (large amount of) phytoplankton / plants / algae / producers (at surface) / ora; (more) photosynthesis (at surface) / ora; (more) oxygen produced (at surface) / ora; in deep water oxygen used up in <u>respiration</u> ; | | [5] |
| | | Total for question | [15] |

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| Question | | Further Information | Mark |
|----------|--|--|------|
| 3 (a) | <p>any 4 of: (produces own food) by photosynthesis; (producer) provides food / energy for (primary) consumers / herbivores / other animals; ref. to light (energy); to chemical energy; in carbohydrate / CHO / named; carbon dioxide and water; reference to oxygen; kelp (is a producer);</p> <p style="text-align: right;">max. 3</p> | <p>R – produces / makes energy A – named (marine) example</p> | [4] |
| (b) | <p>any 3 of: (predator) kills <u>animals</u> for food / kills and eats <u>animals</u>; prey are <u>animals</u> eaten / food <u>animals</u>; reference to change in numbers i.e. more prey, increase in predators / ora; from Fig 3.1, named e.g. is predator / named e.g. is prey;</p> | R – organisms | [3] |
| (c) | <p>any 4 of: sheepshead eat / prey on lobsters / abalones; cod eat / prey on lobsters / sea urchins; (less cod and sheepshead) more lobsters / sea urchins / abalones; more food / prey <u>for sea otters</u> / owtte; (so) more sea otters; sea urchins / abalone eat kelp; less kelp / abalones cause less sea otters;</p> | <p>A – answers which refer to cod or sheepshead only A – no overall change if given with a logical argument</p> | [4] |
| | | Total for question | [11] |

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| Question | | Further Information | Mark |
|----------|---|---------------------|------|
| 4 (a) | any 3 pairs of: fit between continental / or named coastlines; indicates one continent in past; distribution of types of rocks / mountain ranges; indicates one continent in past; magnetic stripes on sea floor; indicates movement of sea floor / new magma not magnetic when hot / magnetic when cool; matching fossils in Africa and South America / different continents; indicate one land mass | A – refs to Pangaea | [6] |
| (b) | any 3 of: plates are moving towards each other / colliding / meeting; convergent (plate boundary); one plate moves / is forced under the other / owtte; trench formed at contact point of two plates | A – subduction | [3] |
| (c) | any 4 of: convergent plate (boundaries); plates lock together / owtte tension / pressure build up; idea of one plate moves / slips suddenly / owtte / <u>underwater</u> earthquake / landslide; energy released; displacing large volumes of water; generates (tsunami) wave with very long wavelength / fast moving; large height (near shore); | | [4] |
| | | Total for question | [13] |

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| Question | | Further Information | Mark |
|------------------|---|----------------------------|-------------|
| 5 (a) (i) | any 3 of: (total) amount of biomass / carbon / organic material; produced by plants/algae/phytoplankton / producers; reference to photosynthesis / chemosynthesis; reference to / rate / timescale e.g. per day/month/year; reference to unit area; | | [3] |
| (ii) | any 3 of: temperature; nutrient / named e.g.; light level; concentration of carbon dioxide; pH; | | [3] |
| (b) (i) | 12 metres; | A 12 – 13 | [1] |
| (ii) | productivity higher in spring / lower in winter; more light / ora; more photosynthesis / ora; increased temperature / warmer / ora; increased growth rate / reproduction / ora; increased nutrient / named e.g. (availability) / ora; faster growth / reproduction; | max. 2 for factors alone | [4] |
| | | Total for question | [11] |

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| Question | | Further Information | Mark |
|------------------|--|----------------------------|-------------|
| 6 (a) (i) | draining away / flow of water from the land (surface); carrying nutrients / minerals / nitrates / phosphates / other named / pesticides / herbicides / sewage / oil; into sea / river / watercourse / lake; caused by rain / snow melt / irrigation water / owtte; | I leaching | [3] |
| (ii) | any 3 of: example of pollutant / excess nutrients / excess nitrates / phosphates / other named / pesticides / herbicides / insecticides / sewage / oil / heavy metals / named example; absorbed / taken up by marine organisms; passed through food chain; toxins / poisons toxic / death; algal bloom; carries sediments; block light to producers / corals; | A – bioaccumulation | [3] |
| (iii) | carries nutrients / minerals / e.g. calcium* / other named e.g. / fertiliser; increased photosynthesis / productivity / growth / reproduction / for shells* / bone* / skeletons*; | * linked mark | [2] |
| (b) | any 4 of: removed when used to make coral / shells / skeletons / bones; removed by sinking to sea bed; removed by being incorporated into limestone rocks; ; added in runoff; added by upwellings (from deep water); added when organisms die; | | [4] |
| | | Total for question | [12] |