



**General Certificate of Education
June 2010**

Environmental Studies 1441

ENVS1

Unit 1 The Living Environment

Mark Scheme

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

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Set and published by the Assessment and Qualifications Alliance.

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Instructions: ; = 1 mark / = alternative response A = accept R = reject

Question 1

	Answers		Mark
1	Use of Technique		5
		Technique	
	Collection of aquatic invertebrates	B	
	Record changes in the species along an environmental gradient	A	
	Quantitative assessment of the numbers of different species and their relative abundance in an area	F	
	Collection of moths at night	G	
	Estimation of the population size using mark-release-recapture	C	
Total			5

Question 2

	Answers	Mark
2(a)	The role an organism plays in its habitat/ecosystem/community; How it makes use of resources/responds to other species/eg of interaction/competition;	2
2(b)(i)	Large, so a lot of food in one animal/could be slow moving/worth more money; ground feeding/dwelling so easier to kill/catch; large family size so a lot of individuals in one place; limited to low altitude so less likely to escape hunters/more accessible;	MAX 2
2(b)(ii)	Both ground dwelling/feeding; therefore would compete for same resource(s)/use different resource(s) in different parts of the island; drill may outcompete/dominate Preuss's monkey (because larger size/larger group); human pressure eg drill hunted out of some areas; have different altitude ranges/ranges overlap;	MAX 2
2(b)(iii)	Different ecological niches/habitats/positions in the canopy; reduced competition for food/other <u>named</u> resource; social avoidance;	MAX 2
2(c)	Increases availability of/reduces competition for (named) resource/exploit new resources; prevention of isolation of populations/avoid inbreeding/larger gene pool; allows recolonisation/avoidance of natural disaster; enlarges protected area/decreases fragmentation/prevents islandisation;	MAX 2
Total		10

Question 3

	Answers	Mark
3(a)(i)	Oxygen/O ₂ /ozone/O ₃ ;	1
3(a)(ii)	Carbon dioxide/CO ₂ ;	1
3(b)	<p>Funding/financial support (for environmentally beneficial farm management); [A grants/subsidies]</p> <p>points awarded/points targets set (for farm features that benefit wildlife);</p> <p>examples of habitat/plant features that are encouraged under the scheme;; eg in-field trees, field margins, hedgerows, meadows, woodlands, traditional orchards, buffer strips, [A dry stone walls if related to species such as mosses and lichens]</p> <p>examples of techniques used to maintain feature;; eg hedge laying, coppicing, infrequent trimming of hedges, reducing agrochemical use (to encourage diversity), not cultivating under canopy of trees, wetland restoration, timing of mowing/grazing [A qualified ref to reduction in intensive farming]</p> <p>example of aesthetic impact of plants on landscape; eg purple heather, autumn colours, wildflowers</p>	MAX 5
3(c)	<p>Conserve/protect landscape/cultural heritage; [A scenery]</p> <p>promote understanding/quiet outdoor recreation/public access to the countryside;</p> <p>maintain rural economy;</p> <p>conserve wildlife;</p>	MAX 3
Total		10

Question 4

	Answers	Mark
4(a)(i)	Environmental Impact Assessment/EIA; [A Leopold Matrix]	1
4(a)(ii)	Threat of extinction/maintain biodiversity; moral reasons/ethical/stewardship; ecological reason; eg species interdependence, nutrient recycling education/scientific research/medical research; aesthetic/recreational reason; qualified economic use; biomimetics;	MAX 2
4(a)(iii)	SSSI/SAC/NNR/LNR/(IUCN)Red (data book) listing/BAP listing/Species Action Plan/Species Recovery Programme/CITES; [R SPA, Ramsar, Country Park, National Park]	1
4(b)	Green Belts cannot be developed/prevent urban expansion; therefore enables brownfield development/clearance/treatment;	2
4(c)(i)	The maximum/mean/greatest population; [A ref to more than one species] an area supports indefinitely/sustainably/without damage/over-exploiting resources;	2
4(c)(ii)	Availability of named resources;; eg food, nesting site, territory, mates, shelter, water, light (for plants) [R space/habitat (unqualified)] predation; disease;	MAX 2
Total		10

Question 5

	Answers	Mark								
5(a)	<p>Pitfall traps: covered container/rim level with surface/baited; preservative in traps/checked frequently; random/systematic/stratified sampling/sample in representative areas; same number of traps/size of area/methodology/set period of time (for each coppice stage); many traps used for mean/average/reduce effect of anomalies/ statistical analysis; repeat/sample at different times/seasons; count number of different species/species richness; count the number of each species (n);</p> <p>Simpson's Diversity Index/D = $\frac{N(N-1)}{\sum n(n-1)}$; [A other valid formula]</p>	MAX 4								
5(b)	<p>Management practices prevent/halt/deflect succession/climax/maintain plagioclimax; different species supported at different stages; most competitive species dominate/smaller/least competitive excluded; example of how outcompetes; eg by shading, deeper roots greater uniformity/homogeneity (at climax); fewer niches; change in abiotic factors/named abiotic factor;</p> <p><i>Quality of Written Communication</i></p> <table border="1"> <thead> <tr> <th>Mark</th> <th>Descriptor</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>All material is logically presented in clear, scientific English and continuous prose. Technical terminology has been used effectively and accurately throughout. At least half a page of material is presented.</td> </tr> <tr> <td>1</td> <td>Account is logical and generally presented in clear, scientific English. Technical terminology has been used effectively and is usually accurate. Some minor errors. At least half a page of material is presented.</td> </tr> <tr> <td>0</td> <td>The account is generally poorly constructed and often fails to use an appropriate scientific style to express ideas.</td> </tr> </tbody> </table>	Mark	Descriptor	2	All material is logically presented in clear, scientific English and continuous prose. Technical terminology has been used effectively and accurately throughout. At least half a page of material is presented.	1	Account is logical and generally presented in clear, scientific English. Technical terminology has been used effectively and is usually accurate. Some minor errors. At least half a page of material is presented.	0	The account is generally poorly constructed and often fails to use an appropriate scientific style to express ideas.	MAX 4+2
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0	The account is generally poorly constructed and often fails to use an appropriate scientific style to express ideas.									
Total		10								

Question 6

	Answers	Mark
6(a)	Shallow water; warm [R hot]/stable temperature/range of approximately 25 – 29 °C; high light levels (for algal photosynthesis); clear water/low turbidity; constant salinity; hard substrate (for polyp attachment); low tidal range/infrequent exposure/mainly submerged; pH should not be acidic;	MAX 3
6(b)	Restricts trade/exploitation; reduces profits/demand/markets (for dealers/poachers/collectors);	2
6(c)(i)	Increased turbidity/suspended solids/ reduces light levels; reduces photosynthesis; sediment settles on coral; restricts feeding/breeding; water chemistry altered (eg by agrochemicals/oil/industrial pollution)/ change in pH; toxic effects/eutrophication/excess algal growth; temperature change; correct ref to coral bleaching/change in rate of algal photosynthesis;	MAX 4
6(c)(ii)	Identify individuals causing most damage (eg photographers); fines/ 'name and shame'/offending divers banned; introduce permits/licences for divers/boats/restrict number of divers; [R ban diving] education/publicity; patrol/wardens/rangers/guides; 'no dive'/boat exclusion zones/space zoning; time limits/restrictions/time zoning; short fins (less damaging to coral); no gloves (discourages touching); fixed mooring buoys/anchor points/no anchoring;	MAX 3
6(d)	Rich/biodiverse wildlife; moral/ethical; (qualified) aesthetic value; fisheries/fish nurseries/breeding grounds; coastal erosion protection; medicines/future resources; economic benefit of tourism/recreation/jobs; CO ₂ absorption/store/carbon sequestration;	MAX 3
Total		15