Version 1.0

General Certificate of Education (A-level)
June 2012

Environmental Studies ENVS1

(Specification 2440)

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 events which all examiners participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students'' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for standardisation each examiner analyses a number of students' scripts: alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, examiners encounter unusual answers which have not been raised they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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Environmental Studies

June 2012 **ENVS1**

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

Question 1

<table>
<tr><th></th><th>Answers</th><th>Mark</th></tr>
<tr><td>1</td><td>
<table>
<tr><th>Definition</th><th>Letter</th></tr>
<tr><td>Factor related to soil that affects living organisms</td><td>C</td></tr>
<tr><td>Factor related to human activity</td><td>A/G</td></tr>
<tr><td>Process of succession on bare rock</td><td>H</td></tr>
<tr><td>The specific conditions within which a species can survive</td><td>D</td></tr>
<tr><td>The role an organism plays in its environment and how it makes use of its resources and responds to other species</td><td>B</td></tr>
</table>
; ; ; ; ;
</td><td>5</td></tr>
<tr><td>Total</td><td></td><td>5</td></tr>
</table>

Question 2

	Answers	Mark
2(a)	Reduced land use conflict**;** qualified impact on house prices**;** less aesthetic/visual impact**;** less noise (pollution)**;** less (terrestrial) wildlife damage/habitat loss**;** more reliable wind energy supply/higher wind speeds [**A** more energy/ power/electricity generated]**;**	MAX 2
2(b)	All factors are ascribed monetary values**;** if costs > benefits the project will not be supported/not go ahead**;** [**A** converse]	2
2(c)	Grid/table produced/grid drawn**;** used as part of environmental impact assessment/EIA**;** all aspects (biological/social/physical)/impacts are identified**;** quantified**;** actions/factors are given a value for magnitude **and** importance**;** each pair of values multiplied**;** total scores compared**;**	MAX 3
2(d)(i)	Provides habitat**;** eg substrate for algae, barnacles etc development of food web**;** provides shelter from predators/wave impact**;** restricts human activities**;** eg fishing, dredging	MAX 2
2(d)(ii)	MNR(Marine Nature Reserve)**;** SAC(Special Area of Conservation)**;** SPA(Special Protection Area)**;** Natura 2000**;** SSSI(Site of Special Scientific Interest)**;** Ramsar Site**;** MCZ(Marine Conservation Zone)**;** [**A** valid international designation] [**A** where full name given - allow incorrect spelling if meaning unambiguous] [**R** Heritage Coast/landscape designations]	MAX 1
Total		**10**

Question 3

	Answers	Mark
3(a)(i)	Outside the range of tolerance**;** little liquid water**;** long periods of dark/short growing season**;** shallow soil/few areas of soil/lack of soil nutrients/fertility**;** low temperatures**;** permanent ice/snow cover**;** animal damage**;** eg trampling, removal for nesting material, grazing few pollinators/seed dispersal agents**;** isolation/difficulty of colonisation**;**	MAX 2
3(a)(ii)	Few food species available/simple food chains**;** reduced variety of organic matter (for decomposers)**;** few habitats/niches/reduced structural complexity**;** eg breeding sites, shelter reduced stability of ecosystem/populations fluctuate more**;**	MAX 2
3(b)	Correct reference to ozone/O_3 depletion**;** correct reference to global climate change/climate warming/enhanced greenhouse effect**;** named other pollution issue/pollutant**;** eg sewage, oil, litter [**R** incorrect link between global climate change and ozone depletion] qualified tourist impacts**;** eg disturbance, trampling, sea bed damage introduction of alien species/pathogens**;** impacts of fishing/hunting**;** eg overfishing, by-catch	MAX 3
3(c)	<u>Antarctic Treaty</u>**;** commercial exploitation/mining banned**;** hunting/fishing/collection of plants controlled**;** visitors restricted to particular sites/zoning/visitor numbers restricted**;** no onshore tourist facilities**;** careful location and design of research facilities**;** education/conservation encouraged/research permitted/controlled**;** wastes/contaminants must be secure/unable to become dispersed/leaks prevented**;** waste/litter removed from Antarctica/import of waste banned**;** alien species prevented from entering/removed/no dogs**;** military activity is banned**;** no nuclear testing**;** other valid example**;**	MAX 3
Total		**10**

Question 4

	Answers	Mark
4(a)	Site identification**;** designation of protected areas/named designation**;** monitoring of condition of designated areas**;** enforcement of wildlife law/prosecute offenders**;** research/advice/education**;** site management/named management practice**;** grants/named schemes**;** eg Environmental Stewardship, Woodland Grants Scheme, Energy Crops Scheme [**A** correct answer even if incorrect organisation named]	MAX 2
4(b)	Funding/financial support (for environmentally beneficial farm management)**;** [**A** grants/subsidies] points awarded/points targets set (for farm features that benefit wildlife)**;** example of habitat features/management techniques**;;** example of habitat features eg in-field trees, field margins, hedgerows, meadows, woodlands, traditional orchards, buffer strips, dry stone walls, beetle banks, ponds/wetlands example of management techniques eg hedge laying, coppicing, infrequent trimming of hedges, reducing pesticide use, reducing inorganic fertiliser use, organic farming, not cultivating under the canopy of trees, wetland restoration, biological corridor benefit to named taxon**;**	MAX 4
4(c)(i)	Campaign/raising public awareness/education/advice**;** lobbying (of government/industry)**;** raising money**;** scientific research**;** funding conservation organisations/reserves**;** community co-operation/multi-agency co-operation**;**	MAX 2
4(c)(ii)	RSPB is a UK-based organisation (WWF is international)**;** RSPB has particular focus on birds (and their habitats) (WWF all wildlife)**;** RSPB buys/manages reserves (WWF supports other organisations)**;**	MAX 2
Total		**10**

Question 5

	Answers	Mark
5(a)(i)	Soil formed from the remains of organisms**;** decomposers/detritivores**;** break down dead organisms/forms humus**;** organic sorting/mixing/aeration/improve structure**;** release nutrients/nutrient recycling**;** weather/erode/break up bedrock/parent material**;**	MAX 1
5(a)(ii)	Vegetation/soil biota reduces rate of runoff**;** vegetation reduces wind erosion**;** vegetation reduces impact/damage due to rain**;** root binding/slope stabilisation**;** humus binds soil together**;**	MAX 1

Question 5 continued

	Answers	Mark
5(b)	**Water:** role of water**;;** solvent for chemical reactions transport within organisms mineral uptake required for photosynthesis structure of cells/organisms habitat/medium for organisms/cells anomalous expansion specific heat capacity/temperature regulation albedo transparency allows light penetration (allow only once see similar mp in light) acts as a carbon sink **Temperature:** importance of temperature range**;;** suitable for stable biological molecules/enzymes warm enough for chemical/metabolic reactions liquid water **Ambient gases:** role of gases**;;** O_2 for (aerobic) respiration O_2 forms O_3 (ozone) N_2 for nitrogen fixation/proteins CO_2 for photosynthesis greenhouse gases gaseous water for hydrological cycle atmospheric pressure allows liquid water (allow **1 mark** if all of O_2, CO_2, photosynthesis and respiration mentioned but not clearly linked) **Light/solar radiation:** importance of radiation**;;** source of energy for photosynthesis/conversion to chemical energy ozone layer protection from UV radiation vision/directional stimulus photolysis of water transparency of water allows light penetration (allow only once, see above) **Geology:** importance of geology**;;** mass controls gravity/gravitational pull retention of atmosphere source of minerals magnetic field protects from solar wind **Position in solar system:** importance of position**;;** distance from sun controls temperature larger planets protect from asteroids/comets moon controls tides/axis of rotation	MAX 6

Question 5 continued

<table>
<tr><th></th><th>Answers</th><th>Mark</th></tr>
<tr><td></td><td>Quality of Written Communication

<table>
<tr><th>Mark</th><th>Descriptor</th></tr>
<tr><td>2</td><td>All material is logically presented in clear, scientific English and continuous prose. Spelling, punctuation and grammar are almost always correct. 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 and continuous prose. Minor errors occur in spelling, punctuation and grammar. Technical terminology has been used effectively, and is usually accurate. 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. Spelling, punctuation and grammar contain many errors.</td></tr>
</table></td><td>2</td></tr>
<tr><td>Total</td><td></td><td>10</td></tr>
</table>

Question 6

	Answers	Mark
6(a)	Evergreen allows year round photosynthesis/growth**;** competition for named resource/same resources**;** [**R** space]	2
6(b)(i)	Food supplies/pollination/seed dispersal/habitat provision**;** [**R** relationships which are not between individual species] named example of symbiotic relationship**;** eg lichens, coral, root nodules, parasites, epiphytes [**A** algae as plants]	MAX 1
6(b)(ii)	Kills/inhibits/repels detritivores/decomposers/soil biota**;** slower decomposition/fewer rhododendron leaves broken down**;** inhibits growth of other plant species**;**	MAX 2
6(c)(i)	invertebrate diversity increases to 5.8/up to pH 6.7/6.8**;** invertebrate diversity decreases from 5.8/after pH 6.7/6.8**;** [**A** allow **1 mark** if increase and decrease described but no values or incorrect values quoted] % organic matter decreases to 36%/up to pH 6.2–6.4**;** % organic matter increases from 36%/after pH 6.2–6.4**;** [**A** allow **1 mark** if decrease and increase described but no values or incorrect values quoted] as invertebrate diversity is high, % organic matter is low**/**negative correlation**;**	MAX 4
6(c)(ii)	Use of Tüllgren funnel**;;;** soil sample placed below light/light above soil sample distance/time under lamp invertebrates move away from light/heat/drying conditions [**R** movement due to gravity] mesh/grid/sieve collected (in water/preservative/named preservative/killing fluid) max 3 species/taxa identified/named/number of different species counted**;** abundance/population size/number of each species**;** $D = \frac{N(N-1)}{\Sigma n(n-1)}$ / Diversity index**;** example of standardised technique/sampling method**;** eg sampling repeated for mean/statistical test, reliability/identify anomalous results, random/systematic sampling**,** soil taken at same depth, same volume/mass max 2	MAX 4

Question 6

	Answers	Mark
6(d)	Managed as a plagioclimax/succession/climax prevented**;** regular burning/cutting/grazing**;** [**A** mowing] [**A** tree removal] [**R** coppicing/pollarding]	2
Total		**15**

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