Version 1.0

General Certificate of Education (A-level)
June 2011

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 candidates' 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 candidates' 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.

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Environmental Studies

June 2011 **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>Description</th><th>Term</th></tr>
<tr><td>Number of deaths per unit time/year</td><td>Mortality rate ;</td></tr>
<tr><td>Movement of individuals into or out of a population</td><td>Migration [A immigration <u>AND</u> emigration] ;</td></tr>
<tr><td>(Mean) number of individuals that an ecosystem/area can support indefinitely/sustainably [R number of species]</td><td>Carrying capacity ;</td></tr>
<tr><td>Greatest number of individuals or biomass that can be taken from a population without causing long-term decline</td><td>MSY/ Maximum Sustainable Yield ;</td></tr>
<tr><td>Effect that changes with change in population size/number in a given area</td><td>Density dependent factor ;</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)(i)	(Weak flyer therefore): restricted dispersal/flying range to get to new habitats**;** vulnerable to predators**;** [**A** reference to being outcompeted for food by stronger flyers] (narrow range of tolerance therefore): vulnerable to small environmental changes or cannot adapt to environmental change**;** few suitable habitats available**;** [**R** any reference to disease]	MAX 2
2(a)(ii)	The role an organism plays in its habitat/ecosystem/community/description of role**;** how it makes use of resources/example of resource use/interaction with other species/example of interaction**;** [**A** reference to niche overlap/niche exclusivity/competitive exclusion]	2
2(b)(i)	SSSI/ LNR/ NNR/ Ramsar/ SAC/ SPA/ correct full name**;** [**A** National Park] [**R** AONB/Green Belt/Nature reserve/Country Park]	1
2(b)(ii)	Plant colonisation/new plant species grow**;** sediment build-up**;** open water reduced/shallower/loss of (aquatic) habitat**;** changed conditions out of damselfly's range of tolerance**;** qualified effect of <u>changed</u> biotic factor on damselfly, eg lack of food resources/increased predation**;** qualified effect of <u>changed</u> abiotic factor on damselfly, eg deoxygenation/acidification**;**	MAX 5
Total		**10**

Question 3

	Answers	Mark
3(a)(i)	(International) trade has been banned/restricted**;** [**R** hunting banned] makes trade illegal/unprofitable/lowers demand**;** reduction in poaching/hunting (linked to sales/demand/declining markets)**;** Appendix 1 bans **AND** Appendix 2 restricts**;**	1 MAX 1
3(a)(ii)	To prevent extinction**;** moral/ethical/stewardship**;** ecological eg food chain/species interdependence reasons**;** educational/scientific/medical research**;** aesthetic/recreational reasons**;** qualified economic benefit eg income from tourism**;** [**A** keystone/flagship species] [**R** unqualified reference to biodiversity]	MAX 2
3(b)(i)	Increased mortality when moving between fragments**;** fewer available mates/reduced mating success**;** increased inbreeding/fragmented/reduce gene pool/reduce gene flow**;** available resources restricted (to smaller area)**;** limits potential food supply/increased competition for food/habitat/other named resource**;** greater risk of events causing local extinctions, eg disease/natural disasters**;** difficulty of recolonisation**;**	MAX 2
3(b)(ii)	Biological corridor/allows movement/links habitats/reserves**;** allows interbreeding (between subpopulations)/gene flow/recolonisation/ access to more resources/named resource**;**	2
3(b)(iii)	Increased edge effects/vulnerability to external factors**;** named abiotic edge effect eg more wind penetration, more drying, reduced shade, named pollutant**;** named biotic threat eg invasive species/predators/humans**;** harder to patrol/protect/mark boundaries**;** increased likelihood of dispersal out of protected areas**;** increased risk of fragmentation**;**	MAX 2
Total		**10**

Question 4

	Answers	Mark
4(a)	Reasons**;;** eg visual/aesthetic impact, noise, habitat loss, harm to flying animals, radio interference, stroboscopic effect, NIMBYism, perception of depressed house prices, impact on tourism [**R** expensive to set up and maintain/payback times] [**R** damage/harm to wildlife without explanation]	2
4(b)(i)	Planning application/permission needed/restrictions or conditions on developments**;** information made available to public**;** Local Planning Authority**;** (strict controls in) named designated area eg National Parks/AONBs/ Green Belt/SSSI/SAC**;** appeal process**;** require EIA (Environmental Impact Assessment)**;** [**A** Leopold Matrix] public inquiry process**;**	MAX 4
4(b)(ii)	Named impact/biological/physical/social impact**;** site is surveyed/sampled**;** reference to Leopold Matrix**;** magnitude of impacts estimated/measured**;** modifications to reduce impacts proposed**;** alternatives suggested**;** compare with outcome if development does **not** proceed**;** report produced/summary document**;**	MAX 4
Total		**10**

Question 5

	Answers	Mark
5(a)(i)	Density is declining/negative trend/population is reducing**;**	1
5(a)(ii)	Harvesting/mortality greater than reproduction/recruitment**;** overfishing/overharvested/increase in predation/increase in disease/decrease in food supply**;** [**A** population is becoming more dispersed/spread out] [**A** reasoned explanation for fluctuations]	MAX 1
5(b)	Population size**;** population change/growth rate**;** (mean) mass of individuals/biomass**;** birth rate**;** fecundity of females/gestation period**;** death rate/natural mortality/number hunted/harvested**;** immigration/emigration**;** survival rate of young**;** recruitment to adult population**;** age of sexual maturity**;**	MAX 2
5(c)	Evolution of photosynthetic organisms producing oxygen as a waste product**;** oxygen forms ozone due to UV/photolysis/combination of monatomic and diatomic oxygen/O + O_2**;**	2
5(d)	Type of interdependence**;;** named taxon/group of organisms**;;** eg pollination eg birds, bees/insects, bats seed dispersal eg seeds in faeces/on fur/buried by named animal feeding relationship eg named predator/prey/parasite/grazer nutrient supply decomposers/detritivores/soil fertility habitat provision/change relevant example eg birds nesting in trees/mangroves reducing turbidity/elephants maintaining waterholes [**A** named life-support service/provision of O_2/removal of CO_2/climate control]	4
Total		**10**

Question 6

<table>
<tr><th></th><th>Answers</th><th>Mark</th></tr>
<tr><td>6(a)(i)</td><td>Environmental Stewardship Scheme/ESS;
ELS Entry Level/HLS Higher Level/OELS Organic Entry Level;
named scheme in Wales/Northern Ireland/Scotland;
[A schemes being phased out eg Environmentally Sensitive Areas/ESA/Countryside Stewardship Scheme/CSS]</td><td>MAX 1</td></tr>
<tr><td>6(a)(ii)</td><td>Methods of creation or management of habitat;;
eg
trees, hedgerows, field margins/headlands, fallow land, coppice, wetlands, scrapes, grassland, crops for wildlife
[A named scheme if not credited for 6(a)(i)]

How wildlife diversity is increased;;
eg
increase niches, food supply, provision of resources such as nesting sites, reduction of disturbance, maintenance of plagioclimax, shelter, how named taxon benefits</td><td>4</td></tr>
<tr><td>6(b)(i)</td><td>Systematic sampling; [R random]
transect perpendicular to bank (into field); [A ‘across’]
use of quadrats;
continuous/interrupted/regular spacing (of quadrats);
percentage cover/abundance/named abundance scale;
[A counting/density if clearly related to particular species]
transect repeated to increase reliability/calculate mean/statistical test;
[R increase accuracy]
timing of sampling/different seasons;

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. Minor errors occur in spelling, punctuation and grammar. 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>
</table>
</td><td>MAX 4

2</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
</table>

Question 6 continued

	Answers	Mark
6(b)(ii)	Collecting tray/sheet/net placed under vegetation**;** vegetation shaken/knocked**;** invertebrates identified/counted**;** correct ref to standardised technique eg fixed size of 'tray', number of knocks**;** repeat sampling process to increase reliability/calculate mean/statistical test**;** [**R** increase accuracy] repeat in different weather conditions/seasons/time of day**;**	MAX 4
Total		**15**

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