Version 1.0

General Certificate of Education
January 2011

Environmental Studies 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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Environmental Studies

January 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>Definition</th><th>Letter</th></tr>
<tr><td>All the members of the same species that live in a defined area</td><td>F</td></tr>
<tr><td>The role of an organism in its environment</td><td>E</td></tr>
<tr><td>All the organisms that live in a defined area and their inter-relationships and interactions with their environment</td><td>C</td></tr>
<tr><td>A large climatic region that has characteristic vegetation and soil</td><td>A</td></tr>
<tr><td>All the organisms that live in a defined area</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)(i)	Aesthetic appeal/traditional appearance; maintains traditional skills; harvested product: increases availability of wood/timber/poles/other named products; wood for <u>burning/</u> energy resource/charcoal/(bio)fuel; fodder/food for livestock; management practice: new growth out of reach of grazers; reduces size of trees/prevents trees getting overgrown/maintains height; source of branches for re-planting (poplar, willow); prolongs life of trees/reduces damage to trees (through wind and height); abiotic factors: reduces shade/increases light availability/increase soil moisture; <u>qualified</u> reduction of obstruction, eg street lights, electric wires, damage to buildings; [**R** unqualified reference to plagioclimax] [**R** reference to wildlife benefits]	MAX 2
2(a)(ii)	Litter/waste/dead branches/leaves/old trunks provides food/organic matter for fungi/decomposers/invertebrates/detritivores; cut site/wound provides entry point for fungi; (different stages in the cycle) produce different abiotic factors/microclimate/habitats/niches; named effect of temperature/water on fungi/invertebrates; light stimulates plant growth, affects invertebrates/fungi;	MAX 2
2(a)(iii)	(Fungi) provide source of food (themselves or dead organic matter); provide/modify habitat; decomposer/nutrient recycling; more stable/complex ecosystem/community/food web/species interdependence, eg lichens;	MAX 2
2(b)	Change caused by growth/removal of branches; changing leaf fall/litter/waste; effect on <u>named</u> abiotic factors;; eg light level, interception, wind speed, temperature, soil moisture, nutrient availability, relative humidity [**R** unqualified reference to abiotic factors]	MAX 3

Question 2 continued

	Answers	Mark
2(c)	Local Nature Reserve/LNR/Country Park**;** [**A** Tree Preservation Orders/Site of Importance for Nature Conservation/SINC]	1
Total		**10**

Question 3

	Answers	Mark
3(a)(i)	Outcompete native species for named resource; eg food, light, water, breeding site reference to sharing same niche; pathogen/disease; specific effect that alters habitat/environmental conditions; eg food web, toxins, pH kill essential species eg pollinators/seed dispersal agents; credit other suitable example of named taxon/disease; [**R** unqualified reference to habitats]	MAX 3
3(a)(ii)	Detritivores recycle (plant) nutrients/make nutrients available/breakdown of dead organisms/litter/humus production; increasing surface area for decomposers/make easier for decomposers; organic sorting/soil mixing; increase drainage/aeration/reduce compaction; food source/part of food webs; [**R** unqualified reference to fertility or structure]	MAX 2
3(b)	Count/estimate populations before and after flatworm arrival/during colonisation; identify species of earthworm; random/ stratified/ systematic sampling; sub-sample area multiplied up to whole area; sufficient number of samples to avoid anomalies/provide reliable mean/allow statistical test; individual sample size is representative; **EITHER** digging in quadrats/ defined area; hand sorting; **OR** add water/irritant/ detergent/ formalin/ methanol; flood/saturate/ pour evenly/same dilution/same volume in each quadrat/area/standard sample area; **OR** use of Tüllgren funnels/ description; worms move away from light/ heat/ drying effect; [**R** beating on ground]	MAX 5
Total		**10**

Question 4

	Answers	Mark
4(a)	Aesthetic/landscape impact**;** smell**;** noise (from incinerator or traffic)**;** land take/habitat loss (of incinerator site)**;** ash disposal**;** economic impacts**;** eg house prices affected, impact on jobs transport issues**;** eg congestion, increased traffic volume, new development/widening of roads named pollutant**;;** eg smoke/particles/PM10/dust/NO_x/dioxins/CO [**A** reference to ash]	MAX 4

Question 4 continued

<table>
<tr><th></th><th>Answers</th><th>Mark</th></tr>
<tr><td>4(b)</td><td>
Named designated areas;
statutory planning controls;
public inquiries;
opportunity for public/other bodies to express views;

Environmental Impact Assessment/EIA;
consideration of named environmental impacts;
use of Leopold matrix;

time zoning/ timing of activity restricted;
credit suitable example of time zoning;
space zoning/ development away from sensitive areas;
credit suitable example of space zoning;

cost-benefit analysis;
allocation of monetary value to both costs and benefits;

consideration of site modification; eg landscaping, tree planting, baffle mounds, control of named pollutant/turbid drainage water
consideration of alternative solution; eg land fill, recycling tunnel rather than bridge, railway rather than airport
[R alternative site]

comparison of opposing views and recommendation/decision;

large (single) development rather than many small developments;

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. 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>
</table>
</td><td>MAX 4

2</td></tr>
<tr><td>Total</td><td></td><td>10</td></tr>
</table>

Question 5

	Answers	Mark
5(a)(i)	Threat of extinction; increase gene pool; compensate for high mortality; moral/ethical/stewardship; aesthetic/recreational/tourism reason; educational/scientific research/raising awareness; named ecological reason; eg food chain/pollinator/seed dispersal qualified economic use; eg food/medicine/biomimetics/fibres [**R** unqualified reference to biodiversity]	MAX 3
5(a)(ii)	Lack of suitable habitat/original threat still exists; feeding difficulties; (increased) risk of predation; possibility of decreased agility skills; social exclusion/non-acceptance/courtship problems; inability to establish territory; lack of immunity to local diseases; disease introduction to local populations;	MAX 3
5(b)	How animal activity changes named habitat feature;;; eg creating dams, cutting down trees, reduce river flow, dries up below dam specified impact on carrying capacity/population size of affected species;;;	MAX 4
Total		**10**

Question 6

	Answers	Mark
6(a)	Keeps CO_2/temperature of atmosphere constant/balanced/equilibrium; [**A** correct reference to carbon sequestration/global climate change]	1
6(b)	Reduced protection from wave damage/increased erosion; increased turbidity; overgrazing of seagrass; loss of feeding/breeding areas/habitat for species that move between the ecosystems; impact on food chains/webs; eg fewer grazers, less predation of grazing species, more predation as less protection for small fish, population changes of key species	MAX 2
6(c)(i)	Greater ecological stability; faster recovery after disruption/more resilience to change; (because) there is a greater range of niches/complexity of food webs/more species interactions;	MAX 2
6(c)(ii)	(to monitor changes in) number of species/risk of extinctions/population size; monitor effectiveness of conservation work; to plan future management strategies;	MAX 1
6(c)(iii)	Systematic sampling; eg specified intervals across/upstream number of samples for representative results/reliability/statistical test; timing of sampling to monitor seasonal/diurnal/weather related changes; net placed downstream of sample site/so current flows into net; sediment disturbed (invertebrates flow into the net); defined area/time of substrate disturbance/use of Surber sampler; species/taxa identified/distinguished; individuals counted; (Simpson's) diversity index calculated; no sampling downstream of previously disturbed sites;	MAX 5
6(d)	Population size/population change; (mean) mass of individuals; birth rate; fecundity of females/gestation period; death rate/natural mortality/number hunted; immigration/emigration; survival rate of young; recruitment to adult population; age of sexual maturity;	MAX 4
Total		**15**