



**General Certificate of Education (A-level)
June 2013**

Environmental Studies

ENVS1

(Specification 2440)

Unit 1: The Living Environment

Final

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.

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

Question 1

	Answers	Mark													
1	<table border="1"> <thead> <tr> <th>Feature of Planet Earth</th> <th>Importance of feature</th> </tr> </thead> <tbody> <tr> <td>(sun)light/solar radiation/solar energy [R UV light] [R unqualified reference to sun]</td> <td>The energy source for photosynthesis</td> </tr> <tr> <td>Oxygen/O₂</td> <td>The ambient gas made available by the development of photosynthetic organisms</td> </tr> <tr> <td>Ozone/O₃/triatomic oxygen</td> <td>A gas that absorbs biologically harmful UV radiation</td> </tr> <tr> <td>Water/H₂O</td> <td>The main solvent for the chemical reactions in living cells</td> </tr> <tr> <td>Carbon dioxide/CO₂/methane/CH₄/H₂O [A Sulfur and nitrogen oxides/SO₂/NO₂]</td> <td>A gas that is released by volcanic activity and organisms, which helps to control atmospheric temperature</td> </tr> </tbody> </table>	Feature of Planet Earth	Importance of feature	(sun)light/solar radiation/solar energy [R UV light] [R unqualified reference to sun]	The energy source for photosynthesis	Oxygen/O₂	The ambient gas made available by the development of photosynthetic organisms	Ozone/O₃/triatomic oxygen	A gas that absorbs biologically harmful UV radiation	Water/H₂O	The main solvent for the chemical reactions in living cells	Carbon dioxide/CO₂/methane/CH₄/H₂O [A Sulfur and nitrogen oxides/SO ₂ /NO ₂]	A gas that is released by volcanic activity and organisms, which helps to control atmospheric temperature	<p>;</p> <p>;</p> <p>;</p> <p>;</p> <p>;</p> <p>;</p>	5
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Total		5													

Question 2

	Answers	Mark
2(a)	Colonisation/immigration/establishment; habitat/abiotic conditions changed by organisms/succession; new niches/new habitats/more inter-species relationships; named examples of resource becoming available;; eg food, shelter from wave action, shelter from predation, substrate climax community reached/all niches occupied; [A evolution/speciation]	MAX 4
2(b)(i)	Less shading (by algae)/more light to coral; (reduced algal cover so) coral better able to feed/release gametes; increase coral population/growth/reproduction rate; coral can eat starfish eggs; less plankton leading to fewer larvae/adult Crown of Thorn starfish; (fewer CoT) to predate coral;	MAX 2
2(b)(ii)	Humans remove/cull Crown of Thorns(CoT); stop fishing/eating <u>Wrasse</u> ; stop collection of <u>Tritons/(Triton) souvenirs</u> ; increase numbers of (CoT) predators; less predation of coral by CoT; introduce algae predators/control algae; provide resources/food for coral;	MAX 2
2(c)	Medicinal discoveries/biomimetics; fisheries/food; protection from erosion; climate control/carbon sink/absorbs CO ₂ ; (economic) tourism; education/recreation/aesthetic/ethical/moral;	MAX 2
Total		10

Question 3

	Answers	Mark
3(a)(i)	Protection from urban sprawl/expansion/encroachment (into the countryside)/ribbon development; stop urban areas from merging/formation of conurbations; prevent loss of character of urban areas/historic towns; encourage regeneration of brownfield sites; reduce congestion; [R areas for recreation/wildlife]	MAX 2
3(a)(ii)	Shortage of development land/increases cost of land/development; reduction of urban green spaces/overcrowding; loss of brownfield/derelict sites for wildlife; development spread beyond Green Belt/leapfrogging; increased transport/commuting distances;	MAX 2
3(b)	Urban expansion possible without loss of green areas; green corridors/wildlife in urban areas closer to green areas; easier human access to green space raises conservation engagement; transport/infrastructure can avoid green areas; important areas for wildlife can be prioritised for protection;	MAX 2
3(c)	Planning application/permission needed; Local Planning Authority; information made available to the public; require EIA (Environmental Impact Assessment); [A Leopold Matrix] Public Inquiry process; appeal process; zoning; conditions put on development/activity; named designated area; eg National Parks, AONBs, Green Belt, SSSI, SAC	MAX 4
Total		10

Question 4

	Answers	Mark
4(a)(i)	C/change in light intensity from the edge of the woodland;	1
4(a)(ii)	Environmental gradient/change with distance/direction;	1
4(a)(iii)	Avoid biased sampling; [A description/example of sampling] data more likely to be representative/reliable/more valid;	2
4(b)(i)	Only collects ground dwellers/not suitable for some species; eg burrowing, flying, large biased toward most active species; trap/bait may (selectively) attract/repel; predators may eat trapped animals; some may escape from the trap;	MAX 3
4(b)(ii)	Same container type/size used; same covers used/same height of cover; same bait/killing fluid; same number/density of traps; area surrounding trap treated/disturbed in same way; traps left for the same length of time; traps set at same time; same distribution of traps; eg systematic/evenly distributed or random	MAX 3
Total		10

Question 5

	Answers	Mark
5(a)(i)	Decline in population size/abundance of mammal species; decline in species richness/number of mammal species; direct exploitation; [A migration only once] eg hunting, eradication habitat change; eg drainage, named pollutant/source of pollution, climate change, predation, competition, disease habitat destruction; eg farmland, mining, urbanisation	MAX 2
5(a)(ii)	Less stable; valid reason/example; eg populations/ecosystems more vulnerable to change, local extinction, population crashes, collapse of or change to food chain or web, loss of niche, loss of interdependent species	2
5(a)(iii)	Less competition/fewer competitors; less predation; less vulnerable to disease; more food supply; wider range of tolerance/can occupy many/new niches/generalists; mouse can outcompete other species;	MAX 2
5(b)	Strategy based on information from graph;;; 1. increase mammalian diversity/species 2. reduce <u>density</u> of (young) infected ticks/number of ticks that are infected 3. reduce risk of being bitten by an infected tick/dilution effect Strategy based on information from diagram;;; 4. increase population of non-mouse hosts 5. reduce proportion of mammals that have infected ticks 6. reduce risk of being bitten by an infected tick/dilution effect (credit once only) 7. reduce mouse/host/carrier population/culling 8. introduce/increase predator/competitor/disease 9. reduce number of mice that carry infected ticks 10. reduce tick population 11. introduce/increase predator/competitor/disease (credit only once) 12. reduce transfer/infection of <u>bacteria</u>	MAX 4
Total		10

Question 6

	Answers	Mark								
6(a)	Change in population size; impact of change on other species; change in conservation strategy; change in exploitation/MSY/hunting quotas; change in threat to humans;	MAX 2								
6(b)	<p>Less dangerous to undertake/less risk to <u>humans</u>; less stressful for bears/capture not necessary; mark/identification does not come off; do not have to wait for marked individuals to mix; many bears can be sampled by one trap; unnecessary to catch any bear more than once; 'trap happy' or 'trap shy' individuals do not affect results; (DNA) enables accurate/reliable identification/counting of individuals; other genetic information available; cheaper/less expertise/less time consuming;</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. 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> </tbody> </table>	Mark	Descriptor	2	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.	1	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.	0	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.	MAX 5
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6(c)(i)	Estimation of the number of bears an area/lake can support; to identify individual feeding patterns/problem individuals; inform management of fish populations;	MAX 1								
6(c)(ii)	<p>Known quantity/number/species of fish eaten; known concentration of mercury in fish; range of mercury concentrations/intakes;</p> <p>sample hair at same time after feeding; comparison of fish intake and hair mercury content; control experiment with fish with no mercury;</p> <p>reference to mass/sex/age of bears; wild bear hair sampled and compared;</p> <p>replicates (for mean/reliability);</p>	MAX 3								

Question 6 continued . . .

	Answers	Mark
6(d)	Climate change/warmer weather/less harsh (abiotic) conditions; increase in named resource/less competition for named resource;; eg food, den sites less predation/disease; mothers' milk more nutritious/cubs born heavier/with more fat; changed human activities; eg reduced hunting, increased conservation [A correct reference to impact of changed number of adult bears eg reduced killing of young bears, greater protection, competition]	MAX 2
Total		15

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