

A-LEVEL ENVIRONMENTAL STUDIES

ENVS1: The Living Environment
Mark scheme

2440
June 2014

Version: 1.0 Final

Mark schemes are prepared by the Lead Assessment Writer 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 associates 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 associate understands and applies it in the same correct way. As preparation for standardisation each associate 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, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

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.

Further copies of this Mark Scheme are available from aqa.org.uk

Environmental Studies

June 2014

ENVS1

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

AO = Assessment Objective

Question	Answers	Mark	AO / Spec. Ref.	
1	Technique	5	AO3 3.1.5	
	Practical Application			
	Light trap; [A named example of trap/UV]			Sampling night-flying moths
	Beating tray			(Sampling invertebrates/small animals) on bushes or trees; [R vegetation unqualified]
	Pitfall trap			(Sampling animals) on ground/soil surface/leaf litter; [R organisms in soil]
	Mark-release-recapture			Estimating (animal/mobile) population size; [A density]
	Tüllgren funnel; [A description] [A Baermann funnel]	Laboratory-based method of sampling invertebrates that are able to move through soil		
Total		5		

Question	Answers	Mark	AO / Spec. Ref.
2(a)(i)	needed for <u>photosynthesis</u> ; climate/temperature control/heat absorption/acts as greenhouse gas; raw material for carbonaceous structures; eg coral reefs, exoskeletons, shells	Max 2	AO1 3.1.1
2(a)(ii)	<u>energy</u> for photosynthesis; photolysis; (converted) to heat; vision; enables sense of time/periodicity; energy for hydrological cycle/winds/ocean currents; energy for nitrogen/carbon/biogeochemical cycle; synthesis of vitamin D;	Max 2	AO1 3.1.1
2(b)	reduced concentration of/absorbed carbon dioxide/CO ₂ ; increased concentration/released oxygen/O ₂ ; (oxygen enables) formation of ozone/O ₃ layer;	Max 2	AO1 3.1.1
2(c)	(evapo)transpiration/evaporation;	1	AO1 3.1.2
2(d)	new food species; different range of tolerance/adapted to different conditions; source of new genes/new characteristics/GM/hybridisation (to improve existing food species); biological pest control; source of natural pesticides; improve nutrient supply; eg green manures, legumes pollination/seed dispersal; named examples;;	Max 3	AO1 3.1.2
Total		10	

Question	Answers	Mark	AO / Spec. Ref.
3(a)(i)	67840;	1	AO3 3.1.5
3(a)(ii)	individuals are mobile; catching/marketing does not adversely affect; the population size is not affected significantly by immigration or emigration; the members of the population mix freely/not territorial; all members of the population are equally likely to be caught; large enough population size/density for <u>accurate estimate</u> ;	Max 2	AO3 3.1.5
3(b)	individual deaths are greater proportion of population/leave smaller population (for recovery); small gene pool; problem of small gene pool/lack of genetic variability/more vulnerable to environmental change; problems of inbreeding/genetic disease/recessive gene/allele; few breeding individuals/reduced breeding/hard to find a mate; scarcity increases attraction to poachers/hunters; [R ref to mutations]	Max 3	AO2 3.1.2
3(c)	appropriate male:female ratio; healthy/disease free; immune to (local) diseases; young/long reproductive life ahead; genetically diverse population/not closely related; named example of survival skill; eg find food, avoid predators, avoid poisonous food, establish territories	Max 2	AO2 3.1.2
3(d)	less food for carnivores than herbivores (per unit area); <u>energy lost</u> in food chains/from trophic level to trophic level; live at lower population densities/have large <u>territories</u> ;	Max 2	AO2 3.1.2
Total		10	

Question	Answers	Mark	AO / Spec. Ref.
4(a)(i)	<p>named change;;;; consequential benefit/named taxon that benefits;;;;</p> <p>Marginal features eg remove hard bank/add soft bank vegetation, nest sites reduce bank slope reduce turbid drainage access for ducks, otters, water voles islands undisturbed habitat nest sites/roosting sites buffer strip reduce soil erosion, run off</p> <p>Flow rate/depth/meanders eg habitat diversity vegetation diversity, submerged/floating/emergent animal diversity related to plants breeding sites eg good for trout turbulence – oxygenation/aeration substrate type for attachment/burrowing – gravel/silt</p> <p>Associated habitats eg marsh/bog habitat – species diversity introduction/planting eg reedbeds, lilies</p> <p>Control of invasive/dominant/exotic species eg competitor/predator/disease vector</p>	Max 4	AO2 3.1.4

Question	Answers	Mark	AO / Spec. Ref.
<p>4(a)(ii)</p>	<p>named feature/activity that increases amenity value but doesn't damage wildlife value;; how wildlife value is retained, linked to feature;;</p> <p>Aesthetics habitat diversity plant/animal/species diversity indigenous species species chosen for ecological value landscaping increased habitat diversity</p> <p>Public activities walking, picnics, (controlled) boating eg sailing, rowing boats, (controlled) fishing, named educational activity, dog walking low physical impact, speed restrictions, fishing gear/bait restriction, dogs on lead/waste cleared</p> <p>Amenity features footpaths, car parks, buildings, seats, information boards, information centre natural materials, vegetation eg car park surface, turf roof</p> <p>Removal of undesirable features litter, invasive/non-indigenous species</p> <p>[A unqualified feature unlikely to damage wildlife value] [R two examples which are very similar]</p>	<p>Max 3</p>	<p>AO2 3.1.4</p>
<p>4(b)</p>	<p>all potential impacts (biological/social/physical) are identified/assessed; factors are quantified/given a value/1–10; for magnitude and importance; <u>each pair</u> of values multiplied; multiplied scores totalled; total scores <u>compared</u>;</p> <p>[R totalling of unmultiplied scores]</p>	<p>Max 3</p>	<p>AO1 3.1.4</p>
<p>Total</p>		<p>10</p>	

Question	Answers	Mark	AO / Spec. Ref.
5(a)	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;	2	AO1 3.1.3
5(b)(i)	<i>Balanus</i> competes with <i>Chthamalus</i> for food/space/named resource; [R habitat] <i>Chthamalus</i> is inhibited from settling/reproducing by <i>Balanus</i> / <i>Balanus</i> grows more vigorously/ <i>Balanus</i> carries disease; [A <i>Balanus</i> predated <i>Chthamalus</i>] niche overlap/niche exclusivity/competitive exclusion;	Max 2	AO2 3.1.3
5(b)(ii)	<i>Chthamalus</i> is exposed to acid rain for longer/less protected by sea water/higher up the intertidal zone; [A food species of <i>Chthamalus</i> affected more]	Max 1	AO2 3.1.3
5(c)	random/systematic; quadrats; [A description of quadrat] suitable size of quadrat; eg 10 cm x 10 cm number of samples for representative results/reliability/validity/ statistical test; count individuals in each quadrat; [R % cover/abundance scale] calculate mean number per quadrat/unit area; [R counting if area not defined] [R references to mark-release-recapture/Lincoln Index]	Max 3	AO3 3.1.5

Question	Answers	Mark	AO / Spec. Ref.
5(d)	barnacles killed by/unable to settle because: fresh water; osmotic effect; pesticides; toxic; fertilisers; growth of algae/toxic; sediment/suspended solids/high turbidity; covers barnacles; velocity of water leaving pipe; prevents settling; installation/maintenance of pipe; causes physical damage/trampling; <u>low</u> pH/pH outside range of tolerance; (low pH) denatures enzymes/proteins/dissolves exoskeletons; pipe made of toxic metal/named toxic metal;	Max 2	AO2 3.1.3
Total		10	

Question	Answers	Mark	AO / Spec. Ref.
6(a)	(females) killed <u>before</u> they can reproduce; reproduction rate lower than death rate/death rate higher than birth rate;	2	AO2 3.1.3
6(b)	when sharks are fished: less predation of other predatory fish; more predation of small fish;	2	AO2 3.1.3
6(c)	safe area to breed/protect shark nursery; protects sharks' prey/food; no habitat damage by fishing boats; [A numerical estimate of reduction in risk of being caught]	Max 2	AO2 3.1.3
6(d)	bycatch; ghost fishing; named cause of habitat destruction/change; named pollutant; named consequence of climate change; qualified food chain change/less food/more predation; impact of <u>introduced</u> species/predator/competitor; disease;	Max 1	AO1 3.1.2

Question	Answers	Mark	AO / Spec. Ref.								
6(e)	recreation/aesthetics/education/tourism; <u>economic</u> benefit to <u>local</u> community; food/fisheries; medicinal importance; biomimetics; other named resource; coastal erosion protection; CO ₂ absorption/carbon sequestration/climate regulation; one named example/explanatory point per reason;;; <i>Quality of Written Communication</i>	Max 6	AO1+ QWC 3.1.2								
	<table border="1"> <thead> <tr> <th data-bbox="292 860 440 938">Mark</th> <th data-bbox="440 860 1195 938">Descriptor</th> </tr> </thead> <tbody> <tr> <td data-bbox="292 938 440 1162">2</td> <td data-bbox="440 938 1195 1162">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 data-bbox="292 1162 440 1352">1</td> <td data-bbox="440 1162 1195 1352">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 data-bbox="292 1352 440 1507">0</td> <td data-bbox="440 1352 1195 1507">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.	2
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Total		15									

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