



2015 Managing Environmental Resources

Higher

Finalised Marking Instructions

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Part One: General Marking Principles for: Managing Environmental Resources Higher

This information is provided to help you understand the general principles you must apply when marking candidate responses to questions in this Paper. These principles must be read in conjunction with the specific Marking Instructions for each question.

- (a)** Marks for each candidate response must always be assigned in line with these general marking principles and the specific Marking Instructions for the relevant question. If a specific candidate response does not seem to be covered by either the principles or detailed Marking Instructions, and you are uncertain how to assess it, you must seek guidance from your Team Leader/Principal Assessor.
- (b)** Marking should always be positive ie, marks should be awarded for what is correct and not deducted for errors or omissions.

GENERAL MARKING ADVICE: Managing Environmental Resources Higher

The marking schemes are written to assist in determining the “minimal acceptable answer” rather than listing every possible correct and incorrect answer. The following notes are offered to support Markers in making judgements on candidates’ evidence, and apply to marking both end of unit assessments and course assessments.

Part Two: Marking Instructions for each Question

Question			Expected Answer(s)	Max Mark	Additional Guidance
1.	(a)	(i)	Plastic/steel (hoops)/wheels/wood preservative/glue.	1	Any three Not wood
1.	(a)	(ii)	Planter B is made from a renewable resource/planter B is assembled in the UK and only metal from a finite resource/planter B is more sustainable because the parts could be reused. Planter A is unsustainable because it's made of plastic/planter A is sustainable as plastic is recyclable/it lasts longer.	1	
1.	(a)	(iii)	Advantage – wood <u>lasts longer so less need to cut down trees</u> to make more/fewer resources need to be replaced/reduces deforestation.	1	
1.	(b)	(i)	Looks unsightly/gives off (greenhouse) gases/leachate escapes/uses up land/attracts vermin/smells bad.	1	Any two
1.	(b)	(ii)	Reduce/reuse/recycle/or specific example - all cut down on the amount of land/new resources/energy required. Composting or specific example – recycles nutrients so is good for the environment/conserves peat/saves landfill space.	2	
1.	(c)		Life cycle/life cycle analysis/life cycle assessment.	1	
1.	(d)	(i)	Planting <u>more</u> trees/faster growing species.	1	Not replanting

Question			Expected Answer(s)	Max Mark	Additional Guidance
1.	(d)	(ii)	<p>Trees act as a carbon reservoir, absorbing CO₂ a greenhouse gas and storing it/carbon sequestration.</p> <p>and</p> <p>The <u>more trees</u> there are, the <u>more CO₂ will be absorbed</u>/act as carbon sink, reducing global warming/climate change.</p>	2	Both parts required for 2 marks
1.	(d)	(iii)	Laying trails/using signposts/ranger-led walks/public transport links/visitor centres/posters/advertising campaign or example - on web/public facilities/specific local example – performing arts in woodland.	1	Any two
1.	(d)	(iv)	Walking/bird watching/cycling/Go Ape/orienteering/horse riding.	1	Any three
1.	(d)	(v)	<p>1. Increased trampling/footfall could disturb the wildlife and reduce biodiversity/noise impacts.</p> <p>2. Mixed species attract a greater range of wildlife and increase biodiversity/provides new habitats/food sources.</p>	1 1	
1.	(e)		RSPB/SWT/WWF/FoE/John Muir Trust + appropriate contribution to conservation eg own and manage reserves/education/provide rangers/activists/increase public awareness.	1	
				(15)	

Question			Expected Answer(s)	Max Mark	Additional Guidance
2.	(a)	(i)	Greenhouse effect.	1	Not global warming
2.	(a)	(ii)	Carbon dioxide/methane/nitrous oxide/CFC's (halocarbons/fluorinated gases)/water vapour/ozone/HFCs.	1	Any two
2.	(a)	(iii)	Named Industrial process eg burning fossil <u>fuels for energy</u> /specific example – install scrubbers into chimney stacks/use carbon capture techniques/use sustainable resources OR Named industrial process involving transport emissions – install catalytic convertors into vehicle exhausts/reduce vehicle use/ encourage use of public transport or specific example.	2	Any industrial process – 1 mark + example for 2 marks.
2.	(b)	(i)	1°C	1	
2.	(b)	(ii)	Increase – because overall trend is rising. Decrease – because current trend is falling/ increased use of renewables/effect of climate change. Can't tell because we are dealing in small figures/the trend is unclear/uncertainty of future global events.	1	
2.	(c)	(i)	Increased risk of drought/flooding leads to soil erosion, landslip, mudslide or increased risk of rising sea levels leads to flooding/polar ice melts. and Resulting in wildlife loss of habitat/could drive some species out/attract new species/specific example – polar bear.	2	Both parts required for 2 marks
2.	(c)	(ii)	Kyoto Protocol/Agenda 21 or any other acceptable answer.	1	

Question			Expected Answer(s)	Max Mark	Additional Guidance
2.	(d)	(i)	<p>Coal <u>releases CO₂</u> / gases /GHG when burned which <u>increases the greenhouse effect/increasing global temperature/global warming</u>.</p> <p>and</p> <p>Wind power does not produce GHG/classed as a carbon-neutral source of energy once the amount of GHG released during manufacture of the equipment has been “paid back”, no longer adds to the greenhouse effect so lessens global temperature/global warming.</p>	2	
2.	(d)	(ii)	<p>Non-renewable – oil, natural gas, nuclear.</p> <p>Renewable – solar/wave/tidal/geothermal/HEP/ground source heat/biomass</p>	1	
2.	(e)		Fewer emissions from energy generation/ business/transport/more emissions from domestic/agriculture.	1	Any two differences
2.	(f)		Scottish Renewables Obligation/SRO	1	
2.	(g)		Polluter pays Principle.	1	
				(15)	

Question			Expected Answer(s)	Max Mark	Additional Guidance
3.	(a)	(i)	Wildlife and Countryside Act/Conservation Act.	1	Date not required
3.	(a)	(ii)	Is important to get input from as many stakeholders as possible/allows people to express their point of view/allowing for a best-fit outcome/ increases awareness.	1	
3.	(a)	(iii)	<p>LBAPs are designed to protect and enhance local and national priority habitats, species and areas.</p> <p>and</p> <p>How this can be achieved.</p> <p><i>Eg NE Scotland LBAP – red squirrel.</i></p> <ul style="list-style-type: none"> • <i>Ensure that the needs of red squirrels are considered in all planning applications and procedures, nature conservation/ forestry strategies</i> • <i>Identify core areas for red squirrels, grey squirrels</i> • <i>Determine the conservation status of red squirrels, threats to their survival, effects of forestry management on them</i> • <i>Alleviate threat of grey squirrels to red squirrels</i> • <i>Increase awareness of red squirrel issues through education.</i> 	2	<p>Named species or habitat 1 mark</p> <p>Only one example of how it is achieved for 1 Mark</p>
3.	(b)	(i)	Feeds on rabbits and small mammals and preyed on by foxes.	1	Both Not undisturbed habitats unless answer includes forest
3.	(b)	(ii)	Predation (by foxes)/disease (from feral cats)/ competition for habitat/dens/mates/food.	1	Any two
3.	(b)	(iii)	Road kill/shooting/snares/introducing domestic cats/forestry plantations/wind farm construction/urban sprawl/recreational pursuits.	1	Any three

Question			Expected Answer(s)	Max Mark	Additional Guidance
3.	(b)	(iv)	<p>Locate areas for housing away from wildcat's habitat as this brings more domestic cats into the area → reduced gene pool.</p> <p>Neutering/removal of feral or hybrid cats to prevent breeding with wildcat</p> <p>Create wildlife corridors to link separated wildcat populations to improve chance of breeding/Re-introductions</p>	2	
				(9)	

Question			Expected Answer(s)	Max Mark	Additional Guidance
4.	(a)	(i)	Producers carry out photosynthesis/capture sunlight energy <u>and</u> pass energy to consumers.	1	
4.	(a)	(ii)	Shark/tuna/octopus.	1	
4.	(a)	(iii)	Plant plankton competing for light/animal plankton competing for plant plankton.	1	
4.	(a)	(iv)	1%	1	
4.	(a)	(v)	Heat/movement/undigested or indigestible food or example.	1	Not respiration
4.	(b)		Insufficient energy remaining to support another trophic level as energy lost at each trophic level in the food web.	1	
4.	(c)	(i)	Decomposition.	1	
4.	(c)	(ii)	Commensalism.	1	
4.	(d)		Bioaccumulation <u>and</u> pesticides/heavy metals are absorbed by plant plankton. As <u>consumers</u> eat plankton they <u>accumulate toxins</u> in their body/cells. The <u>impact of this builds moving up the food chain.</u>	2	
				(10)	

Question			Expected Answer(s)	Max Mark	Additional Guidance
5.	(a)	(i)	Bottom of slope poor drainage due to gravity/ downward movement of soil water/ waterlogging at base due to high clay content of soil/water from springs.	1	Must provide adequate account
5.	(a)	(ii)	Block diagram – springs not at top of slope/ Table – variation in clay/silt and sand/pH across the profile.	1	Any two.
5.	(a)	(iii)	Repeat sampling <u>and</u> calculate an average for each point.	1	
5.	(a)	(iv)	Same person doing sampling/same equipment used/sampling all done in same time period/same soil depth/soil quantity.	1	
5.	(b)		Tullgren funnel and Fauna in the leaf litter move downwards in response to the heat/increasing soil dryness from the light bulb. The fauna fall into the beaker and can be counted/identified.	2	
5	(c)	(i)	A – beetle B – mite	1	
5.	(c)	(ii)	Similarity – both have segmented bodies/ invertebrate with legs/jointed legs. Difference – centipede has one pair of legs per body segment, millipede has two pairs.	1	Not number of legs
				(8)	

Question			Expected Answer(s)	Max Mark	Additional Guidance
6.	(a)	(i)	Forestry.	1	
6.	(a)	(ii)	Sailing/windsurfing/swimming/canoeing, sea angling/water-skiing/diving/wildlife cruises/ beach activities/subaqua.	1	Any two from the map
6.	(a)	(iii)	Walking/climbing/cycling/bird-watching/ trekking/golf/ <u>visiting</u> museum/monument/ caving.	1	Any two from the map
6.	(a)	(iv)	Presence of a level, fertile coastal belt/raised beaches/climate (eg North Atlantic Drift)/soil fertility/land easily accessed by machinery/ lack of forest.	1	
6.	(b)		Glaciation/clearances/climate change/ deforestation/forestry/rural depopulation/ industrial/agricultural revolution.	1	
6.	(c)	(i)	Advantage – able to stop and take comfort breaks/enjoy the scenery/cheaper. Disadvantage – journey takes longer/ requires more fuel/traffic congestion.	1	
6.	(c)	(ii)	By road – requires more fuel. By road and ferry – requires less fuel for car but fuel also required to run ferries.	2	
6.	(d)	(i)	1. Economics/fishing industry has declined → need to find new employment opportunities. 2. Need to provide services for tourists.	1	Both
6.	(d)	(ii)	Impact – brings in more money/sailors are transient so financial benefits not reliable/ increased noise, waste.	1	

Question			Expected Answer(s)	Max Mark	Additional Guidance
6.	(d)	(iii)	1. Provides sustainable method of meeting local requirements. 2. Provides basis for cheese making/milk based products industry/attracts tourists/good for export.	1	Both
6.	(e)	(i)	SEPA.	1	
6.	(e)	(ii)	MOD has responsibility to <u>clean up the site</u> / restore to similar condition as pre exploitation/ follow the polluter pays principle.	1	
				(13)	

Question			Expected Answer(s)	Max Mark	Additional Guidance
7.	(a)	(i)	Land not previously built on/used for industry/rural/farming area.	1	
7.	(a)	(ii)	May involve demolition of derelict buildings high demolition costs/land might be contaminated from past use/inaccessible areas/planning restrictions/bats present.	1	
7.	(a)	(iii)	Likely to be a floodplain/area likely to flood/reduced chance of getting insurance.	1	
7.	(a)	(iv)	Greenfield sites unaffected/mainly brownfield site/away from the river.	1	
7.	(a)	(v)	Route 1 – runs through town centre/close to the river/congestion. Route 3 – runs through agricultural land/loss of trade to town centre/costly to build/longer route.	1	
7.	(a)	(vi)	Social – provides jobs/attracts larger companies/provides wide range of activities/outlets in one place/recreation. Economic – provides money to local community. Ethical – takes land out of production/out of town development so draws customers away from High Street/large national companies, so money leaves the town/destroys habitats.	2	
7.	(b)		Conflict between – residents and planners/developers + reason – disturbance to households/noise/road traffic increase/pollution increase Resolution – restricted work hours during build/regular clean ups/screening built Competition for business/customers.	2	Conflict groups and reason 1 mark. Resolution 1 mark.
7.	(c)		Roles of SNH – advisory/education/research/working with landowners/provides designations/protection of natural heritage.	1	
				(10)	

Question		Expected Answer(s)	Max Mark	Additional Guidance
8.	A	(a) Phosphate enrichment and Eutrophication; <ul style="list-style-type: none"> Affects freshwater ecosystems or specific example. Phosphate enrichment results from excess detergent/fertiliser. Excess leads to algal blooms run off oxygen deprivation when algae decay and may cause organisms to die (max 2 marks). Through death of organisms and subsequent decay phosphates recycled. <p>At least one mark must be given to phosphate enrichment (max 2)</p>	5	
		(b) Nitrification; <ul style="list-style-type: none"> Process occurring in the soil ecosystem. Involves the conversion of decaying material/excrement into ammonium compounds which in turn are converted to nitrites which in turn are converted to nitrates. Caused by the action of bacteria in the soil/ named bacteria eg Nitrosomonas. Nitrobacter. Nitrates absorbed into plant roots are passed onto consumers/ensure nitrogen recycling/become part of nitrogen cycle. <p>Must mention recycling of nutrients – 1 mark</p>	5	
		(c) Crop rotation and use of leguminous plants; <ul style="list-style-type: none"> Farmers can improve the nitrogen content of soils in a farmland ecosystem. Leguminous plants include peas, beans, alfalfa which contain bacteria present in root nodules of the plants which take in nitrogen and convert it to nitrates/nitrogen fixation. When plants are ploughed back into the soil help to recycle nitrogen. Crop rotation allows a soil deprived of nitrogen to lie fallow/to replenish nitrogen supplies before a new crop is grown. Can help control diseases in soil. <p>Must include crop rotation – 1 mark</p>	5	

Question			Expected Answer(s)	Max Mark	Additional Guidance
8.	(B)	(a)	<p>OR</p> <p>indicator species detecting environmental change in ecosystems;</p> <ul style="list-style-type: none"> • Are used to indicate a change in an abiotic factor in the environment/named factor/level of pollution. • Freshwater invertebrates (named example) indicate differences in oxygen content of water. • Specific example mayfly high O₂/sludge worm low O₂. • Lichens/(specific example) indicates differences in level of SO₂ in air. Identification of specific type of lichen eg crusty/hairy in relation to level of pollution • Change in range of butterfly species/ movement of sea water organisms or specific example an indicator of climate change. 	5	
		(b)	<p>the monitoring of populations in conservation;</p> <ul style="list-style-type: none"> • Examples of organisations involved in species monitoring • Observation/measurement of the number of organisms in a species/specific method of measurement eg longworth traps/ tagging birds. • For organisms close to extinction/ endangered. • For organisms which have been protected or re-introduced to monitor increases in their numbers. • For organisms affected by disease. • As indicators of global warming/climate change. • For alien species. • Examples of species which are being/ have been monitored (at least two for 1 mark). 	5	

Question			Expected Answer(s)	Max Mark	Additional Guidance
		(c)	<p>the role of detritivores and decomposers;</p> <ul style="list-style-type: none"> • Detritivores are organisms which break up decaying material such as wood and create humus which helps improve the quality of soil. • Examples of detritivores include earthworms, woodlice and maggots. • Decomposers chemically break down decaying organic material/specific example of a material by the process of respiration/ respiration described eg by an equation/use of enzymes in decomposition. • Examples bacteria and fungi. • Recycle nutrients eg carbon cycle 	5	

Question		Expected Answer(s)	Max Mark	Additional Guidance
9.	(A)	<ul style="list-style-type: none"> • Description of land prior to human habitation – native flora and fauna post glaciation/an influence on present day landscape eg peat bogs. • Description of early human influences – forest clearances. • Development of settlements/agriculture/ small scale farming. • Agricultural revolution and its impacts on native vegetation/landscape. • The clearances/development of sporting estates/fishing towns. <p>4 marks allocated to this section</p> <ul style="list-style-type: none"> • Impact of mechanisation in agriculture • Industrial revolution and its impacts in changing the landscape. • Impacts of quarrying/mining • Building of canals/ship building • Impacts of hydro-power on the landscape. • Impacts of war and development of post war commercial forestry. • Urbanisation. • Developments relating to transport infrastructure. <p>6 marks allocated to this section</p> <ul style="list-style-type: none"> • Present day agricultural practices. • Conservation of the countryside with examples of how this is achieved. • Reduction of native forest/introduction of alien species/re-introductions of wildlife eg beavers/wolves. • Impacts of increased recreation and tourism. • Brownfield/greenfield sites. • Out of town shopping centres. <p>5 marks allocated to this section</p>	15	

Question		Expected Answer(s)	Max Mark	Additional Guidance
9.	(B)	<p>OR</p> <p>Key Principles</p> <ul style="list-style-type: none"> • Allows responsible access to land and inland waters in Scotland. • Allows access to all for outdoor recreation/ crossing land/some educational and commercial purposes. • Input from all interested parties – land owners, countryside users or named examples and recreational managers working with SNH. • Principles of the access code embedded in legislation/Land Reform (Scotland) Act 2003. <p style="text-align: right;">Any 3</p> <p>Roles and responsibilities – users</p> <ul style="list-style-type: none"> • Take responsibility for action with example - /don't drop litter/take litter home/close gates/keep dogs under control/dispose of dog dirt. • Respect people's privacy – keep a sensible distance from houses/farm dwellings. • Respect property and example – avoid damage to fences/walls/gates/outbuildings/ historical buildings/no graffiti. • Keep to established pathways. • Avoid unnecessary erosion. • Avoid fields with young animals/calves/ lambs. • Follow signs from land managers. • Respect reasonable limitations on access eg lambing season/shoots. • Do not disturb wildlife/care for the countryside/leave as you find it...with a reason. <p style="text-align: right;">Any 6</p>	15	

Question	Expected Answer(s)	Max Mark	Additional Guidance
	<p>Roles and responsibilities – land managers</p> <ul style="list-style-type: none"> • Example of two types of land manager – farmer/crofter/forester/public or voluntary agency or example eg RSPB/SWT. • Respect rights of users to access their land and water. • Maintain footpaths/gates/fences/walls/stiles. • Provide direction signs/warning signs/no go areas where appropriate. • Highlight when muirburn/culls/recreational shoots are occurring. • Work with local authorities/other organisations to help integrate access into land management. • Provide facilities such as litter bins/public facilities/seats/moorings <p style="text-align: right;">Any 6</p>		

[END OF MARKING INSTRUCTIONS]