



2011 Managing Environmental Resources

Higher

Finalised Marking Instructions

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Managing Environmental Resources Higher

Section A

Question 1

- | | | | | |
|-----|------|--|---|---|
| (a) | (i) | Shower/dual flush toilet/water efficient machines
NOT insulated hot water tank | (any two) | 1 |
| | (ii) | Insulated hot water/controlled heating/triple glazing/energy efficient machines/loft insulation/dim night lighting/laundry on site
NOT compost bins | (any three) | 1 |
| (b) | (i) | Natural/renewable | | 1 |
| | (ii) | Life cycle/life cycle analysis | | 1 |
| (c) | (i) | It <u>reduces</u> number of plastic bottles being sent to landfill/reduces waste
and <u>recycles</u> plastic reducing amount of plastic made/less oil/fossil fuel use | 1 mark
1 mark | 2 |
| | (ii) | Crude oil/oil | | 1 |
| (d) | | By replanting/new planting/planting native trees/utilising waste products eg bark chips | | 1 |
| (e) | (i) | Table completed correctly | (11/12 correct = 2 marks,
9/10 = 1 mark) | 2 |
| | (ii) | Agree – most categories met to some extent
Disagree – not enough to satisfy award overall/in water category | | 1 |

Question 2

- | | | | |
|-----|------|--|---|
| (a) | (i) | Non-renewable – will <u>run out eventually</u> /is a <u>finite</u> resource | 1 |
| | (ii) | Landscape destruction/ecosystem/wildlife destruction as a result of extraction processes/pollution damage from leachate/dust/chemicals used in processing/visual pollution | 1 |
| (b) | | Storage of radioactive waste creates long term/unknown threats to the environment
Decommissioning of old power stations problematic/health threats from radioactive leaks or risk of major accidents/security issues
Potential terrorist target/fear of nuclear meltdown/risk of radiation entering food chain/ <u>relatively</u> clean/less fossil fuel use (any two) | 2 |
| (c) | | Large quantity of energy released/large reliable supply/help reduce CO ₂ emissions/meet targets/less dependence upon other countries for energy source/less fossil fuel use/more energy than alternatives
NOT cheap (any two) | 2 |
| (d) | | 28.5 | 1 |

Question 3

- | | | | | |
|-----|-------|--|-------------|---|
| (a) | (i) | Carbon dioxide/methane/CFCs/nitrogen oxides/ozone/water vapour/
sulphur dioxide | (any two) | 1 |
| | (ii) | <u>Reduces greenhouse effect</u> which causes temperature rises/global
warming/climate change or converse | | 1 |
| | (iii) | Kyoto protocol/agenda 21/Earth Summit | | 1 |
| (b) | (i) | More use of technology/more electrical goods used in the home | | 1 |
| | (ii) | SRO/Scottish Renewables Obligation | | 1 |
| | (iii) | Wind/water/wave/tidal/HEP/solar/biomass/specific example of biomass/
hydrogen/geothermal | (any three) | 1 |
| (c) | (i) | Provide local cycle route/walkways/improved walkways/publicity/
incentives/education/special events/increasing parking or congestion
charges | (any two) | 1 |
| | (ii) | Electric charging facilities will be required nationwide to provide battery
charging for newly developed 'electric' transport vehicles | | 1 |
| (d) | | Industry/business will save money as they use less energy | 1 mark | |
| | | Lower energy requirement reduces fossil fuel use/less emissions which is
<u>better for future generations</u> | 1 mark | 2 |
| (e) | | Less disruption to land habitats or wildlife/reduced land use change/reduced
pollution from leachate/methane gases/less unsightly/less smell | (any two) | 1 |
| (f) | (i) | Trees planted use up more CO ₂ from air reducing greenhouse
effect/global warming or reducing greenhouse gases to meet targets | | 1 |
| | (ii) | Forestry commission | | 1 |
| (g) | | RSS/CPS/CEP/Set-aside | | 1 |

Question 4

- | | | | | |
|-----|-------|---|----------------------------|---|
| (a) | (i) | Add fox and hoverfly | 1 mark | |
| | | Add two arrows – grass to meadow pipit and shrew to kestrel | 1 mark | 2 |
| | (ii) | Meadow pipit | | 1 |
| | (iii) | Food – earthworm | Example – badger and shrew | |
| | | Food – rabbit/woodmouse/shrew | Example – fox and kestrel | 1 |
| (b) | | Heat/movement/undigested material | | |
| | | NOT waste or excretion | (any two) | 1 |
| (c) | (i) | pH more than 7/many species of shorter plants or specific species named | (any two) | 1 |
| | (ii) | Soil moisture/temperature/slope/wind speed/nutrients/precipitation/rainfall | | 1 |
| (d) | | Indicator (species) | | 1 |
| (e) | (i) | End of summer/autumn (not winter/autumn/spring) | | |
| | | Plants will flower/seed/be able to germinate/earlier harvesting | (both) | 1 |
| | (ii) | Benefits – Stock levels determine the level of trampling/dung/defoliation | | |
| | | creates new habitats/encourages seed germination/plant growth | (any two) 1 mark | |
| | | Impact – increased biodiversity | 1 mark | 2 |
| | (iii) | £805 | | 1 |
| (f) | (i) | Required for crop pollination/helps maintain biodiversity/for making money/to make honey | | 1 |
| | (ii) | Density dependent | | 1 |
| | (iii) | May kill off bee/other insects/builds up in food chain encourages resistance | (any two) | 1 |
| | (iv) | Insect populations increase | 1 mark | |
| | | because headlands provide more food sources/habitats/increase the stability of food webs/safety | 1 mark | 2 |

Question 5

- | | | | | | |
|-----|------------|---|--------|---|---|
| (a) | (i) | 1 Sand fescue | | | |
| | | 2 Sand couch grass | (both) | 1 | |
| | (ii) | Repeat investigation and average results | | | 1 |
| | (iii) | Same people doing the investigation/same size of quadrat | | | 1 |
| | (iv) | Primary coloniser is sand couch grass which helps stabilise soil/improves nutrient content | 1 mark | | |
| | | Marram further increases these factors enabling other plants to colonise | 1 mark | | |
| | | resulting over time in the climax community/stable community | 1 mark | 3 | |
| (b) | Adaptation | | | | 1 |
| (c) | (i) | Erosion of/reduced stability of dunes/trampling of rare species
NOT litter | | 1 | |
| | (ii) | Maintained grassland area so halts succession/causes change in natural vegetation/fertiliser or pesticides or weed killers may leak onto dunes/scare species away/prevents movement of dunes
NOT trampling | | 1 | |

Question 6

- (a) (i) Geology/history/sparse population/crofting/sea/climate/glaciations/
Highland Clearances/Agricultural revolution (any two) 1
- (ii) Old rocks/limestone bone caves/sandstone mountains/coastal
features/spectacular mountain scenery (not named examples from
map – Canisp, Suilvan)/NSA status/SSSI/Lewisian gneiss (any three) 1
- (iii) National Scenic Area
NOT nutrient sensitive area 1
- (b) Uses small areas of land/organic/sustainable methods/limited use of machinery/
low use of artificial fertilisers and/or pesticides.
any three 2 marks/two or one 1 mark 2
- (c) (i) Long coastline/natural or protected harbours/supply fish to local markets/
large number of lochs/good fish reserves/variety of species of fish
(any two) 1
- (ii) Example 1/2 – selected from:
Water based – sailing/angling/fly fishing/cruising
Wildlife based – whale watching/bird watching/nature reserve/hillwalking
Historical/cultural – stamps/visit settlements/archaeological site/native
woodland
Two examples from each category 2 marks
One example from each category 1 mark 2
- (iii) Economic benefit – money/seasonal jobs for local community
Social pressure – increased traffic/pressure on amenities/litter/footpath
damage/outside buyers buying houses/pressure to provide or extend activities 1
- (iv) Avoid pollution to the area eg litter/avoid damage to wildlife/not influence
way of life 1
- (d) (i) Use renewable energy/waste recycled/use renewable resources/natural
materials – fish/water/plants/sell products locally (any three) 1
- (ii) Use of packaging/transport involved in sending products to international
markets 1
- (iii) Provides jobs in the local area which will keep people in the community/
discourages people from leaving ensuring community survives in future
generations 1
- (iv) Needed to maintain/improve income/standard of living/reduce emigration/
interest in local products 1

Question 7

(a)	Wildlife & Countryside Act 1981/Conservation Act (Scotland) 2004/Land Reform (Scotland) Act 2003/Town and Country Planning Act (date not necessary)		1
(b)	Protection of wildlife/habitats or specific habitat eg wetlands/landscape/ designation of sites/conservation or preservation NOT historic sites	(any two)	1
(c)	Carries out research/role in education/advice service/publications	(any two)	2
(d)	SSSI/NNR/Ramsars/NP/NSA/SAC	(any two)	1
(e)	(i) 76000ha (accept 76) and 9.1		1
	(ii) Trend broadleaved increasing and coniferous decreasing	1 mark	
	Reason more native trees being planted/more harvesting of conifers/ less planting of conifers	1 mark	2
End of Section A			Total 80

Section B

Question 8A

Discuss the positive and/or negative impacts on a named freshwater environment under the following headings:

- | | | |
|-----|--|------|
| (a) | the Scottish Environmental Protection Agency (SEPA); | 5 |
| (b) | recreation and leisure activities; | 5 |
| (c) | agriculture. | 5 |
| | | (15) |

- (a) Named freshwater environment loch/river/stream/canal

- SEPA is the statutory organisation responsible to government.
- SEPA monitors all types of freshwater environment – river, stream, loch, canal.
- SEPA monitors water quality/example eg BOD/discharges to ground water/ surface water.
- SEPA responsible for managing water pollution incidents.
- SEPA provides advice/has educational role.
- SEPA responsible for flood warnings.

5

- (b) Named recreational/leisure pursuits appropriate to freshwater environment – fishing, canoeing, water sports activities, boating, walking, conservation

Positive impacts:

- Environment conserved/protected/enhanced
- Effective management of environment/use of rangers
- Angling monitored
- Controls on use of water for recreation/speed restrictions on boats.

Negative impacts:

- Visual pollution from litter/rubbish
- Pollution from diesel/oil/petrol
- Noise pollution/scare wildlife
- Impacts on freshwater wildlife of pollutants
- Erosion of loch/river banks
- Alien species introduced.

5

- (c) Impact from agricultural as a result of:

- Excess fertiliser run off + description of eutrophication
- Improved drainage + impact
- NVZs/Nutrient sensitive areas
- Drainage of wetland ecosystem
- Removal of vegetation + impact
- Leaching of soil nutrients due to poor management
- Impacts resulting from diversification/reduced fertilisers or pesticides
- Preservation of wildlife corridors.

5

Each section must contain both positive and negative impacts with a maximum of 3 marks for either negative or positive impacts.

Question 8B

Discuss the positive and/or negative impacts on the environment made by:

- | | | |
|-----|--|---|
| (a) | stewards applying the Scottish Access Code; | 5 |
| (b) | farmers reducing land drainage and removal of hedgerows; | 5 |
| (c) | members of voluntary conservation agencies. | 5 |

(15)

- | | | |
|-----|---|---|
| (a) | <ul style="list-style-type: none">• Stewards have responsibilities towards the environment they 'own'.• Stewards include land managers, landowner, farmer, crofter, tenant, forester, fishery owner, land agent, contractor, public or voluntary body.• Stewards must respect access rights in managing land and water and enable access by the public.• Have a duty to maintain established footpaths, gates etc.• Are responsible for control of their stock of animals.• Must give clear warning of dangers eg pheasant shoot and/or lambing season.• May actively encourage access as part of diversification/bring in money.• Economic benefits, from tours, from example. | 5 |
| (b) | <ul style="list-style-type: none">• Draining land usually to provide more land to farmer for other uses.• Removal of hedgerows to extend land area/make it more amenable for mechanisation.• Both involve land use change which may be beneficial to farmer.• Both involve destruction of habitats/food sources for wildlife.• Both reduce biodiversity/may lead to extinctions.• Both may involve conflict with conservation agencies. | 5 |
| (c) | <ul style="list-style-type: none">• Voluntary organisation named eg RSPB/SWT/FoE/WWF + its role.• Income from members supports organisation and aids conservation.• May purchase areas of land to save from development/save for future generations.• Conservation measures used to protect wildlife/habitats described.• Use of volunteers to support organisation/unpaid labour/'police' conservation area or safeguard nesting birds/deal with litter/provide information.• Paid support workers eg rangers, educators + impact.• May build hides/tourist centres + impact.• Carry out campaigns/direct action to raise conservation issues + impact.• Conflicts within the group. | 5 |

Question 9A

Describe the natural cycling of nitrogen in the environment and the impacts that human activities have on it.

(15)

- Essential element/nutrient for living things/needed for animal/plant protein.
- Nitrogen found mainly in the air but not easily sourced by living things.
- Has to be 'captured' by process of nitrogen fixation.
- Nitrogen fixing bacteria present in soil/root nodules/convert atmospheric nitrogen to nitrates.
- Nitrogen added to soil through death & decay of living things/in urine & faeces/ ammonification.
- Nitrification converts organic sources of nitrogen into ammonium compounds.
- Nitrites then converted into nitrates.
- Nitrification carried out by nitrifying bacteria in soil or named bacteria *Nitrosomonas* and *Nitrobacter*.
- Nitrates taken in through plant roots by absorption/assimilation converted to plant protein.
- Protein passed onto animals via food chain/through eating/nutrition.
- Denitrification by bacteria can return nitrogen directly back into atmosphere.

Maximum of 9 points

- Human activities which impact on the nitrogen cycle include addition of fertiliser to crops.
- Fertilisers contain nitrogen and added to encourage plant growth.
- Can be added as artificial fertiliser or natural fertiliser eg manure, dung.
- Some crops help capture nitrogen and naturally restore levels in soil.
- Leguminous crops eg clover, alfalfa, peas & beans capture nitrogen using bacteria in their root nodules.
- Use of excess nitrate fertilisers/cause eutrophication/run off drains into water courses.
- Farmers can manage fertiliser levels to maintain the natural equilibrium.
- Causes acid rain/formation of nitric acid.
- Nitrous oxide added to greenhouse gases.

Maximum of 6 points

Annotated diagrams will be taken into consideration in marking.

Question 9B

Describe soil properties and the factors affecting soil formation.

15

Soil properties include:

- Type of soil/soil particles eg sandy soil, clay soil, loam, peaty soil/named examples eg gley brown earth and podsol.
- Particle content related to property eg large sand particles greater air content, small clay particles and high water retention/description of soil structure.
- Water retention/capillarity related to soil type eg loam retains water but good drainage and little water logging.
- Drainage dependent on soil type eg clay/peaty soil liable to water logging, sandy soil well drained.
- Soil pH varies with soil type eg lime soils alkaline, peaty soils acidic.
- Soil humus content related to fertility of soil.
- Measurement of property described eg water content, pH, drainage.
- Level of soil biodiversity.

Maximum of 8 points

- Soil information linked to geology + example.
- Soil formation linked to relief + example.
- Soil formation linked to rock weathering processes + examples.
- Soil formation linked to climate + example.
- Soil formation linked to organic decay of vegetation + example.
- Soil profile diagram.
- Soil formation linked to impact of soil flora and fauna + example.
- Soil formation linked to agricultural practices + example.
- Soil formation takes a long time.

Maximum of 7 points

End of Section B

Total 30

[END OF MARKING INSTRUCTIONS]