2010 Managing Environmental Resources

Higher

Finalised Marking Instructions

Managing Environmental Resources
Higher

Section A

Question 1

(a)	(i)	C/hybrid – lowest CO2 emissions/does not rely solely on crude oil. A/petrol – least resources used in car production.	1
	(ii)	Life cycle analysis/assessment. **Not** EIA.	1
	(iii)	Landfill Tax/Renewables Obligation/Congestion Charge/Environment Act (1995).	1
(b)	(i)	Park & ride/congestion charges/local Agenda 21.	1
	(ii)	Use car less/use public transport/cycle/use car pools/low engine capacity car/ LPG car. (any two)	1
(c)	(i)	20 million tonnes.	1
	(ii)	Increase/doubling of emissions/detailed description of trend (1 mark) due to increase in demand for more flights/availability of cheaper flights (1 mark).	2
	(iii)	Decrease − as more trees planted they use up more CO_2/more efficient use of fuel/ less flights due to environmental concerns. Increase – more flights irrespective of such initiatives. Stay the same as same aviation use and planting trees in balance with CO_2 emissions. (any one)	1

Question 2

(a) (i) Wheat – increasing; grass – increasing; barley – decreasing; potatoes – the same; oil seed rape – increasing. 1
Not set-aside. (any three)

(ii) 1 Sourcing energy from biofuel/use of renewables being encouraged/farmers can make more profit from this crop. 1

2 Sugar cane/straw from wheat/barley/oats/willow/trees. **Not** wood. 1

(iii) Increased biodiversity because set-aside provides new ecosystems/habitats/ sources of food for wildlife. **Not** impacts on soil/soil recovery/crop rotation. 1

(b) (i) Land/soil/plants/minerals/air/water or moisture.
Not temperature/rainfall/sunlight. (any two) 1

(ii) Oil. **Not** nitrogen. 1

(iii) Stage – Monitoring growth – crop most likely to be infected during growth period/adding fungicide reduces loss of crop/improves crop yield at this time. 1

(iv) Harvest delayed/delays on next cycle/knock on effect on re-ploughing/new crop growing season shortened/smaller crop yield/harvest more difficult due to wet soil making use of machinery difficult. 1

(c) Increase in agricultural leachate causes decrease in biodiversity. 1

(d) Monitor waste/contain waste products/provide buffer zones/reduce use of artificial fertiliser/prevent leachage/reduce emissions. (any two) 1

(e) No pesticides – no bioaccumulation/impact on wildlife populations/food chains.
No artificial fertiliser – less risk of eutrophication/reduces water pollution.
Addition of natural fertiliser – improves soil structure. (any two) 2

Question 3

(a) (i) 1 Tolerant of fast flow/high oxygen concentration.

2 Tolerant of salinity/changes in salinity or salt levels. (both) 1

(ii) Slower flow rate so plants able to hold onto river bed/silt/sand deposits/improved rooting potential. 1

(b) (i) Density independent − it is a natural disaster so independent of the number of organisms in a population. 1

(ii) Homeostasis. 1

(c) (i) Roundworm/blackfly nymph/freshwater shrimp. (one only) 1

(ii) Leech, caddis fly larva, stonefly larva. **No** additions. (all three) 1

(iii) Both live in stream/freshwater.
Both eaten by trout/both eat blackfly nymph.
Only caddis eats roundworm/only stonefly eats mayfly nymph. any three = 2
2/1 = 1 2

(iv) Algae, mayfly, stonefly, trout, heron/kingfisher in pyramid. 1

(v) Movement/undigested waste/heat or respiration. (any two) 1

(d) A species which by its presence or absence shows the level/changes in the level of an abiotic factor. 1

(e) (i) Fewer or damaged trees/slower river flow/increased flooding/damage or pollution from visitors. (any two) 1

(ii) 1 Plant more broad-leaved trees/maintenance of river banks.

2 Provide hides/trails/guided tours/education facilities/information centre/ CCTV. 1

(f) (i) Beetle larva. 1

(ii) Similarities – both have 6 legs/jointed legs/both have tails.
Difference – water scorpion has one tail, stonefly larva two tails at end of abdomen. 2

Question 4

(a) (i) Photosynthesis – CO_2 taken in by plants to make sugar/starch/food or energy conversion light to chemical energy.
E – decomposition. all three = 2
F – humus formation. 2/1 = 1 2

(ii) Feeding/eating/consumption. **Not** digestion. 1

(b) (i) Z 1

(ii) Use clean pH meter inserted into the soil (1 mark) and read off number from pH scale (1 mark).
Or Add distilled water to soil sample and test with pH paper/universal indicator (1 mark) and compare colour with pH chart (1 mark).
Or Add barium sulphate, distilled water and soil indicator, shake (1 mark) and compare colour with pH chart (1 mark). 2

(iii) 65/66 %. 1

(c) (i) Increase in greenhouse gases/CO_2 in air/enhancement of greenhouse effect (1 mark).
Increase in temperatures/global warming increased (1 mark). 2

(ii) Peat is a non-renewable resource/finite/rate of extraction exceeds that of formation/not considering future generation's needs. 1

(iii) Destruction of habitats/ecosystem/loss of flora & fauna/affects soil hydrology or drainage. 1

(d) NNR/part of NP/LBAP/SSSI/SPA/NSA/SAC. **Not** NP. 1

Question 5

(a) (i) Label + scale on y axis – must be exact as given in table.
Key + labels on x axis – must include zero + at least 2 other points on scale.
Data for habitats 1 & 3 added – accuracy of each column must be checked. 3

(ii) Percentage cover was given as an average so must have been more than one quadrat sample in each habitat. **Not** 3 samples taken. 1

(iii) Track would have lots of bare ground present. 1

(iv) Habitat 3 – mixed native trees/Scots Pine/largest number of other species/highest leaf litter. 1

(v) Combination of mixed plantation and semi natural woodland/Native Scots Pine planted/Access provided by maintained bridle track.
(all three 2 marks, any two for 1 mark) 2

Question 6

(a)	(i)	Greenfield to industrial. 1 mark Industrial to brownfield/brownfield to multi use. 1 mark	2
	(ii)	Glaciation/agricultural revolution/river valley location/urbanisation/highland clearances. (any two)	1
	(iii)	Greenfield areas are semi natural/farmed locations free of urbanisation and brownfield sites are derelict industrial areas.	1
	(iv)	Housing/business/recreation & leisure/industrial/transport/educational. (any 3)	1
	(v)	Communications/transport links/energy.	1
	(vi)	Cinema/shops/swimming pool/parks/cycling/walking. **Not** nature park.	1
	(vii)	So that the impact of the new development on the ecosystem can be monitored.	1
	(viii)	Museum/visitors centre/photographs.	1
(b)		Town centre – easy access/public transport/less car use/less pollution/many other facilities. Out of Town – car parking/covered in/other large scale facilities/room to expand.	2

Question 7

(a)	(i)	608.6.	1
	(ii)	Shape of river valley/landscape gives high head of water/area of high rainfall. **Not** natural screening. (any two)	2
	(iii)	Avoids visual pollution/noise.	1
(b)	(i)	Environmental Impact Assessment/EIA. **Not** Life Cycle assessment.	1
	(ii)	Statutory – SNH/SEPA/LA/FC. Voluntary – RSPB/SWT/Ramblers.	2
	(iii)	Conflict over building work/access/noise…must be during construction. Resolution as appropriate.	1
(c)		Ethical – destruction of natural habitat/scenery/need to provide more renewable energy Economic – large investment/expense in building the dam.	2
(d)	(i)	Boating/canoes/leisure trips/sightseeing/fishing…must be water based.	1
	(ii)	Pollution from tourist transport/litter problem/oil pollution from leisure boats/ travel chaos/erosion at edge of loch.	1
	End of Section A	**Total**	**80**

Section B

Question 8A

Discuss initiatives supporting sustainable development under the following headings:

(a) the role of **one** statutory organisation; 5
(b) Local Biodiversity Action Plans (LBAPs); 5
(c) recycling schemes. 5

(a) Candidate may select from the following:

SNH

- SNH is a statutory organisation working for the Scottish Government for sustainability.
- Provides advice on nature and landscape protection for future generations.
- Grants/regulates on status/designations given to areas of Scotland in need of protection.
- Provides funds/grants to support landowners/farmers/communities to adopt more sustainable practices/support endangered species/protect habitats.
- Carries out research which monitors endangered species/provides information to guide government to more sustainable action eg climate change effects.
- Advises/takes action to support/enhance biodiversity for future generations.

SEPA

- SEPA is a statutory organisation working for the Scottish Government for the protection and improvement of the environment/sustainability.
- Many roles linked to the monitoring of the environment eg pollution levels.
- Monitoring includes:
  − aquatic environments − the water quality of rivers, lochs, coastal waters
  − air quality
  − contaminated land
  − waste management
  − radioactive substances.
- Involved in integrated pollution prevention and control.
- Provides advice/takes action to support the above.
- Provides statistical information/data to guide government to more sustainable actions eg target setting.

(b) LBAPS vary depending on the local authority or group of local authorities.

- Duty of public organisations/LAs to protect/enhance biodiversity within their local area.
- Involves partnership between local/national organisations to make LBAP.
- Involves partnership between statutory/voluntary/local businesses/landowners to make LBAP (specific examples acceptable).
- Protection given to both habitats/ecosystems and specific species in a given area.
- Example(s) of a habitat/species linked to sustainability/for future generations.
- Use of habitat action plans/species action plans as protection measures.
- Explanation of why habitat/species may be under threat/in need of protection.
- Origin of BAPs and LBAPs in Earth Summit/International Convention on Biodiversity/Think Global, Act Local principle.

(c) Recycling schemes linked to sustainability include.
- Recycling linked to saving natural resources so that future generations do not suffer.
- Kerbside collections with different bins for recyclable rubbish.
- Description/exemplification of such collections linked to sustainability.
- Local authority dumps where recyclable rubbish is dumped by category.
- Description/exemplification of categories linked to sustainability.
- Composting schemes at local or personal level.
- Description of composting linked to sustainability.
- Recycling linked to businesses – plastic bags/recycling bins at superstores.

Question 8B

Discuss sustainability in relation to energy issues under the following headings:

(a) sources and uses of energy in ELDCs compared to EMDCs; 5
(b) waste incineration; 5
(c) domestic practices. 5

(a) Sources compared.
- More renewable in ELDCs, more non-renewable in EMDCs.
- Examples of renewables used in ELDCs linked to sustainability/not finite.
- Examples of non-renewables used in EMDCs linked to sustainability/finite.
- Efforts to change the balance by EMDCs using more renewable energy/nuclear energy rather than fossil fuels. (any 2)

Uses of energy compared.
- Main uses in ELDCs – to meet domestic needs – cooking/heating/lighting.
- Main uses in EMDCs – to meet needs of industry/businesses/transport/as well as domestic needs. (any 2)
- Greater demand on resources particularly non-renewables in EMDCs linked to sustainability/future generations meeting their needs.
- Examples of energy efficiency measures in EMDCs in transport/industry/domestic/ businesses. (any 1)

(b) Waste incineration.
- Waste incineration is the burning of biomass to produce energy.
- Biomass includes – organic domestic waste, waste wood products such as bark, chips.
- Biomass such as trees can be replaced … so sustainable.
- Example of sustainable production of biomass – willow coppicing.
- Specially designed incinerators/IGCC power plants, max energy, low pollution.
- Local use of energy from biomass – heat water.
- Not sustainable as it produces greenhouse gases/CO_2/impacts on global warming.
- Sustainable as it reduces waste to landfill/an alternative as we are running out of landfill sites.
- Use of alcohol from biomass/sugar/rapeseed oil as an alternative energy source for transport.

(c) Domestic practices

Sustainable measures may include:

- Switching off appliances when not in use + example.
- Switching off remote controls + example.
- Use of energy efficient light bulbs as they use less energy.
- Insulation in the home + example.
- Reduce water use + example.
- Use of renewable sources − wind generator, solar panels.
- Family related activities to reduce car use.

Question 9A

The Land Reform (Scotland) Act 2003 established a statutory right of responsible access to land and inland waters.

Describe the impacts on the environment arising from the Scottish Access Code and the responsibilities incurred by both users and stewards. 15

- The Scottish Access code established a right to the **responsible access** to land and inland waters under the **Land Reform (Scotland) Act 2003**.
- Access is **available to all** for outdoor recreation, crossing land, and some educational and commercial purposes.
- **Scottish Outdoor Access Code** was created by **SNH** after consultation with all interested shareholders, chiefly landowners, countryside users and recreational managers.
- User groups include ramblers, hill walkers, rock climbers, skiers, mountaineers, mountain bikers, orienteers, horse riders or everyday walkers such as dog walkers and people going to work.
- The three key principles for responsible access apply to both the public and land managers: respect the interests of other people, care for the environment, take responsibility for your own actions.
- Impacts arising from the code for users.
  - Take responsibility for your own actions – take litter home with you/do not dump litter.
  - Respect people's privacy – keep a sensible distance from houses, farmyards.
  - Use a path or track and keep gates shut.
  - Avoid unnecessary erosion by keeping to the path.
  - Respect property – avoid damage to fences/walls/historic buildings, no graffiti.
  - Care for the environment – do not disturb wildlife, leave the environment as you find it
  - Keep your dog under proper control – do not take it through fields of calves and lambs, and dispose of dog dirt.
  - Take extra care if you are organising an event or running a business and ask the land owner's advice.
  - Follow advice/signs from land managers. Respect requests for reasonable limitations on when and where you can go.
  - Help land managers and others to work safely and effectively.
- Impacts from the code for land managers
  - Land managers (landowner, farmer, crofter, tenant, forester, fishery owner, land agent, contractor, public or voluntary body) also have responsibilities.
  - Must respect access rights of users when managing land and water.
  - Should act reasonably when asking people to avoid land management operations/ muirburn/culls/recreational shoots.
  - Maintain fencing for livestock.
  - Provide direction signs/warning signs where appropriate.
  - Maintain stiles/footpaths/gates.
  - Work with the local authority and other bodies to help integrate access and land management.
- eg provision of litter bins/public facilities/seats/moorings.

Question 9B

Describe the reforms associated with the Common Agricultural Policy (CAP) and the implications on the scale and diversity of Agricultural land use in Scotland. 15

- The basic principles on which the Common Agricultural policy were built was set out in the Treaty of Rome which was signed by the 6 original member states of the European community in 1957.
- The **objectives** of the CAP as follows:
  - to **increase productivity**, by promoting technical progress and ensuring the optimum use of the factors of production, in particular labour
  - to ensure a **fair standard of living** for the agricultural Community
  - to **stabilise markets**
  - to **secure availability** of supplies
  - to provide consumers **with food at reasonable prices**.
- From the mid 1960s − 1970s **financial assistance** was provided for the restructuring of farming:
- This resulted in **more farm investment/increase in farm size/improved management** and **improved technology skills**.
- By the 1980s, the CAP's **financial incentives led to massive overproduction**/ accumulation of notional 'butter mountains' and 'wine lakes' as a result of buying up surplus produce to maintain prices.
- The focus on production and the **use of chemicals and heavy machinery** led to **concerns about environmental degradation**.
- Such measures had a **high budgetary cost**, distorted some world markets, did not always serve the best interests of farmers and **became unpopular with consumers and taxpayers**.
- In 1992 important reforms were agreed which involved reducing support prices and **compensating farmers by paying them direct aids**.
- Several **rural development measures were introduced**, notably to **encourage environmentally sound farming**.
- Production limits/**quotas helped reduce surpluses**. Farmers had to look more to the market place, while receiving direct payments/income aid, and to respond to the public's changing priorities.
- CAP entered a new phase with agreement in 1999 on the so-called '**Agenda 2000**' **reforms**. These reforms reinforced the move to make farmers more reliant on the market and **improved incentives to farm in an environmentally sensitive way**.
- This included **a comprehensive rural development policy** encouraging many rural initiatives
- **Encouraging farmers to diversify**, to improve their product marketing and to otherwise restructure their businesses.
- These reforms **replaced production subsidies with a scheme of direct payments** linked directly to compliance with a set of standards on food safety, animal rights and environmental concerns.
- The most fundamental new element is the new 'Single Farm Payment' The budget available to the CAP was set out for the period 2000 to 2006, thus allowing farmers to plan ahead with more certainty. The budget was also capped to reassure taxpayers that CAP costs would not escalate.

Summary of impacts on scale and diversity of land use:

- Larger farms created.
- Increased use of fertilisers/pesticides so more crops grown/greater range of crops.
- Emphasis on quality products – Scottish beef.
- Introduction of set aside/arable land left fallow.
- Impacts on crofting.
- More environmentally friendly production methods.
- Greater control of fertiliser/pesticide use.
- Supply geared to local markets.
- Introduction of new crops – rape seed oil.
- End of set aside.

End of Section B **Total 30**

[END OF MARKING INSTRUCTIONS]