SCOTTISH QUALIFICATIONS AUTHORITY

2005 Managing Environmental Resources

Advanced Higher

Finalised Marking Instructions

These Marking Instructions have been prepared by Examination Teams for use by SQA Appointed Markers when marking External Course Assessments.

2005 Managing Environmental Resources

Advanced Higher

Marking Instructions

SECTION A

Question 1

(a) Full marks (2) requires the following 4 components:

- sensible and linear scales for x axis (year) and y axis (area planted, ha)
- labelling of both axes and overall title
- accurate plotting of each set of points (broadleaved and coniferous)
- sets of points joined up to form 2 labelled line graphs (using straight lines).

½ marks deducted for any of the above that are incorrectly done and/or absent.

(2 marks)

(b) (i) *Coniferous planting trend:* High initially and rising up to 1989 and then falling very sharply and continuing on a downward trend.

(1 mark)

` (ii) *Broadleaved planting trend:* very low initially (1985) and picking up steadily thereafter with big surge between 1989 and 1993 – continuing on an upward trend.

(1 mark)

(c) Broadleaved planting areas exceed land planted with coniferous trees.

(1 mark)

(d) (i) 1990 (1991 also acceptable)

(1 mark)

(ii) Based on the very significant reduction in areas planted between 1989 and 1991.

(1 mark)

(e) (i) UK attempting to become more self-sufficient in silviculture (forestry) production – cf rely on imports of timber from abroad.

(1 mark)

(ii) Mention 3 of the following to get full marks:

- loss of natural habitats – clearing, ploughing & planting – heather moor land etc
- die back of undergrowth (ground cover) vegetation (loss of light etc)
- disruption of local ecosystems and food chains
- decrease in indigenous (fauna and flora) species populations.

(3 marks)

(f) Broadleaved planting trends in recent years have increased significantly and continue to do so with almost 40x increase from 1985 to 2001; at same time amount of new coniferous planting has decreased markedly and WGS therefore appears to have been successful – very successful in achieving its aim.

(2 marks)
(13)

Question 2

(a) (i) Examples could be drawn from tree cover reduction from farming method changes, non-native species introduction, changes in favour of acid loving species because of industry induced acidification, changes to species cover because of nitrification from industry, changes in species because of intensive farming regimes, changes in species because of use of herbicides.

Or any other valid answer
1 mark for each correct response

(2 marks)

(ii) A valid vegetation change caused by human intervention is stated and this change is linked to an identified human activity.

(2 marks)

(b) (i) The technique of identifying individual species from the visual characteristics of the pollen using appropriate microscopy methods is stated and the quantities found in the sample/s used to determine the species cover of the area of survey.

(2 marks)

(ii) The science of dating events and cyclic weather patterns by studying growth rings in trees, harvested wood and timber is stated with reference to age and growth conditions.

(2 marks)

(c) The four main steps are stated as in the teaching guidelines as follows:

- description of site
- evaluation of site
- management objectives
- prescriptions and work programme.

½ mark for each correct response.

(2 marks)

(d) (i) One body could be drawn from Forestry Commission, Millennium Fund, Scottish Wildlife Trust, Local Authority, Scottish Natural Heritage or any other valid awarding body.

(1 mark)

(ii) Dependant on the awarding body chosen, a valid use of funds is explained. Conditions imposed by the award should be stated.

(2 marks)

Question 3

(a) 1 mark for each stage as follows:

- precipitation (over land and sea)
- transpiration
- evaporation
- percolation in soil/runoff.

(4 marks)

(b) Gaseous emissions such as SO_2 and oxides of nitrogen (NO_x) are released from industrial activity such as burning of coal in power stations (1 mark). These gases then dissolve in precipitation and are oxidised (1 mark) to form acids sulphurous/sulphuric nitrous/nitric that fall to earth as acid rain (1 mark).

(3 marks)

(c) Answer will vary depending on industrial process chosen. An example of how marks would be allocated is given below.

For a coal-fired power station gaseous emissions such as SO_x and NO_x could be removed from the system via a process of scrubbing (1 mark). The gaseous emissions would be sprayed with a water mist to dissolve the gases, forming an acid (1 mark) and this neutralised with alkali in the form of solid particles or as a liquid (1 mark).

(3 marks)

(d) The term relates to the approach required to manage environmental pollution from processes covered by Integrated Pollution Control (IPC) (1 mark). Essentially, the operators of the process concerned, must show that they have utilised the best available *techniques* to minimise the pollution potential of the process. This needn't mean investment in the most expensive technology as factors such as the manner in which a process is operated (eg staff training etc) would be considered (1 mark). Any solution should not be so prohibitively expensive as to make it unviable for the operator (1 mark).

(2 marks)

Question 4

(a) National Parks listed could include any of the following (1 mark for each):

- Brecon Beacons
- Norfolk Broads
- Peak District
- Lake District
- Exmoor
- Dartmoor
- Snowdonia
- Pembrokeshire Coast
- Yorkshire Dales
- North York Moors
- Northumberland.

(2 marks)

(b) Examples of site legislation could include (1 mark):

- National Parks etc Act (1949)
- National Heritage (Scotland) Act (1991)
- Town and Country Planning (Scotland) Acts (1947, 1972, 1991).

Examples of species legislation could include (1 mark):

- Badgers Act (1991)
- Birds Directive (1979)
- Habitats Directive (1992)
- Wildlife and Countryside Acts (1981, 1985).

(2 marks)

(c) Answers could include any of the following (1 mark for each):

- Park Ranger service
- improved public (land and/or water) access
- visitor Centre facilities
- provision of information boards, leaflets etc.

(2 marks)

(d) Statutory conservation organisation (1 mark):

- Scottish Natural Heritage (SNH)

Possible non-statutory conservation organisations are (1 mark):

- Scottish Wildlife Trust (SWT)
- National Trust (for Scotland) (NTS)
- Royal Society for Protection of Birds (RSPB)

(2 marks)

(e) Answer could include reference to the following:

- land ownership and conservation management activities – eg tree planting, path maintenance
- consultation with Planning Authorities and Government on topical issues – planning, access, land management…
- raising public awareness of local issues.

(2 marks)

(f) Sources of funding could include the following (1 mark for each):

- private and public donation
- National Lottery and other grant funding
- membership fees
- sponsored events

(2 marks)
(12)

SECTION B

Question 5

(a) There are many good reasons for nature conservation. Candidates are not expected to refer to all of the following, but should mention a representative range and explain simply their relative significance. Good students will show an appreciation of the different types of justification (scientific, ethical etc).

Scientific Reasons:

- maintenance of gene pool and ecosystems diversity – long term sustainability arguments
- maintenance of food chain/ecosystem stability – likely knock-on negative impacts if one part of system is lost/damaged
- need for continued scientific understanding and research – future policy implications etc
- educational awareness opportunities – especially important for future generations.

Economic Reasons:

- many (rare) animal and plant species have high economic value – medical, silvicultural application etc
- ecotourism value – if rare species die out, tourism revenue likely to fall dramatically.

Ethical and Emotional Reasons:

- intrinsic value of species – loss of which would cause drop in human 'quality of life'
- ethical and moral responsibility – human race has duty not to obliterate other species
- aesthetic and cultural value of species – a rich (bio) diversity adds to human quality of life

(10 marks)

(b) Answers to this could be wide ranging in terms of content and approach used. Any discussions that show an accurate appreciation and understanding of the interaction (positive or negative) between human activity and the natural environment will be given credit. Suitable issues/examples used in answer could include the following:

- realisation that ecosystems and nature do evolve over time – ie extinctions have occurred regularly in the (geological) past
- general agreement that global biodiversity levels are under threat due to (more intensive) human activity occurring over the last – 50 years, but very difficult to obtain absolute figures
- some human activity – eg regeneration of natural woodland. Artificial restocking of indigenous populations – can lead to positive impacts on local ecosystems and biodiversity
- many human activities however continue to cause problems and have varying scales and intensities of negative impact
- problems due to agriculture and land improvements – loss of natural habitats (including deforestation), pesticides and fertiliser use, soil erosion and exhaustion...
- problems due to silvicultural production – introduction of non-native species, disruption of local ecosystems…
- problems due to non-sustainable harvesting of renewable resources – fisheries, timber…
- problems due to land and water pollution – from industrial, transport, domestic and agricultural sources
- problems due to atmospheric pollution – acid rain and climate change especially important
- problems due to hunting and poaching activities – causing potential extinction of rare species.

(15 marks)

Question 6

(a) Responses should include some of the following items. 1 mark should be awarded for each valid item up to a total of 10 marks.

Woodlands: Origins; successionary pattern; woodland type; age structure; flora and fauna; indicator species; woodland layers; broad-leaved mixed or coniferous; human impacts; natural regeneration; any other valid items.

Grassland: Origins; successionary pattern; grassland type; flora and fauna; indicator species; soil conditions; human impacts; grazing regimes; livestock; other grass management; any other valid items.

Moorland: Origins: successionary pattern type: health cycle; flora and fauna; indicator species; muirburn; human impacts; game management; impact of game management on other species; any other valid items.

Wetland: Origins; successionary pattern; type; flora and fauna; indicator species; human impacts; water levels; soil conditions; grazing; any other valid items.

Coastal/Marine: Origins; type; flora and fauna; successionary pattern; indicator species; human impacts; pollution; resource use; erosion and change; any other valid items.

(10 marks)

(b) Responses should include some of the following items. 1 mark to be awarded for each valid item and 2 marks for discussion of the contribution to biodiversity.

Woodland: Non-intervention; natural regeneration; planting; composition of species; incorporation of other features such as rides, glades, clearings, ponds, timber and wood extraction with minimal disturbance; any other valid techniques.

Grassland: Grazing, mowing and burning; effects of livestock; fertiliser regimes, herbicide regimes acidity regulation; physical management; re-sowing and planting; ant other valid techniques.

Moorland: Muirburn, cutting and grazing; effects of livestock; impacts of game management; water management; control of invasive species; reinstatement; any other valid techniques.

Wetland: Control of water levels; nutrient status of water; runoff; structure and composition of flaura and forna; waterway clearance; shape and edge effect; any other valid techniques.

Coastal/Marine: Erosion control; dune management; sand and shingle management; structure and composition of flora and fauna; fisheries and resource management; pollution control, oil, sewage; any other valid technique.

(15 marks)

Question 7

(a) The approach to this answer could be broad-ranging. A good answer would be expected to include:

- definition of sustainable development
- scope of sustainable development to include social, economic and environmental elements
- sustainable concerns becoming more integrated into government legislation via things like the landfill directive, national waste strategy, (local) agenda 21
- examples of how sustainable development may influence environmental policy.

(15 marks)

(b) The approach to this answer could be broad-ranging. A good answer would be expected to include:

- getting involved in local authority initiatives to minimise waste (recycle)
- protecting local natural habitats
- purchasing goods that have been manufacturing in a way that environmental resource consumption has been mislaid
- consider using public transport, less car trips
- ensure homes are more energy efficient

(10 marks)

Question 8

The approach to this answer could be broad-ranging. A good answer would be expected to include:

- mention of Acts of Parliament/Regulations implemented specifically to reduce pollution (eg Environmental Protection Act 1990)
- formation of SEPA has improved enforcement of environmental law by having a single body (more consistency in approach). SEPA can charge for some of its regulatory activities
- economic instruments include: Landfill tax
  Car tax (variable depending on engine size)
  Fuel tax
  Incentives to use 'green' power.

(25 marks)

[END OF MARKING INSTRUCTIONS]