



## **2010 Geography**

### **Higher – Paper 1**

#### **Physical and Human Environments**

#### **Finalised Marking Instructions**

© Scottish Qualifications Authority 2010

The information in this publication may be reproduced to support SQA qualifications only on a non-commercial basis. If it is to be used for any other purposes written permission must be obtained from the External Print Team, Centre Services, Dalkeith.

Where the publication includes materials from sources other than SQA (secondary copyright), this material should only be reproduced for the purposes of examination or assessment. If it needs to be reproduced for any other purpose it is the centre's responsibility to obtain the necessary copyright clearance. SQA's External Print Team, Centre Services, at Dalkeith may be able to direct you to the secondary sources.

These Marking Instructions have been prepared by Examination Teams for use by SQA Appointed Markers when marking External Course Assessments. This publication must not be reproduced for commercial or trade purposes.

## Instructions to Markers: General Notes

### Procedure before Markers' Meeting

You are asked to make yourself familiar with the question paper and the marking instructions. Marking of scripts at this stage should be only tentative and none should be finalised or returned. Please note any point of difficulty for discussion at the meeting.

### Marking

- 1 The maximum mark for Paper 1 is 100. Markers are encouraged to use the whole range of marks and to give a high assessment for an answer of high quality.
- 2 The total marks assigned by you for each complete question should be entered in the outer right-hand margin of the answer book. When a question consists of more than one part, the marks assigned to each part **MUST BE SHOWN SEPARATELY** in the column provided on the inner right-hand side of the book.

It is of great importance that the utmost care should be exercised in adding up the marks. Where appropriate, all summations for totals and grand totals must be carefully checked. Where a candidate has scored zero marks for any question attempted "0" should be shown against the answer.

The **TOTAL** mark for the paper should be recorded in the box at the top right-hand corner on the front cover of the script.

- 3 It is helpful in later procedures if points receiving marks are clearly indicated. In general a mark should be awarded for a correct statement.
- 4 All mistakes **MUST** be underlined in red pen. A wavy line (~~~~~~) should be used for something that is not quite right, a single line (-----) for mistakes which, though not very serious, are undoubtedly wrong, and a double line (=====) for gross blunders. These corrections are valuable when borderline cases and appeals are being considered. Where a page shows neither a correction nor a mark, a red tick **MUST** be placed at the bottom right-hand corner.
- 5 The marker should take the candidate's answers strictly as they are written; no attempt should be made to read into answers ideas which the candidate may have intended to convey but which have not been successfully conveyed. A caret ( $\lambda$ ) should be used to indicate an important omission. A question mark (?) should be used to indicate that the marker cannot understand the meaning intended. The letter "R" should be used to indicate that the candidate is repeating something already stated in the answer.
- 6 Care should be taken that no credit whatsoever is given to irrelevant parts of answers, however accurate the irrelevant passages may be. Irrelevant passages should be square-bracketed [ ].

It should be noted, however, that a fact or argument which is irrelevant in one candidate's answer may be made quite relevant by another candidate who has the ability to connect it to the question.

## Section A

### Question 1: Atmosphere

- (a) Award a maximum of 2 marks for describing/explaining the greenhouse effect. Award 1 mark for correctly identifying a greenhouse gas and up to 3 marks for its sources. Do not credit physical factors.

Human factors

- Carbon Dioxide: from burning fossil fuels – road transport, power stations, heating systems, cement production and from deforestation (particularly in the rainforests) and peat bog reclamation/development (particularly in Ireland and Scotland for wind farms).
- CFC/PFCs: from aerosols, air-conditioning systems, refrigerators, polystyrene packaging etc.
- Methane: from rice paddies, animal dung and belching cows.
- Nitrous oxides: from vehicle exhausts and power stations.
- Sulphate aerosol particles and aircraft contrails: global ‘dimming’ – increase in cloud formation increases reflection/absorption in the atmosphere and therefore cooling.

**NB There were 6 man-made greenhouse gases included in the Kyoto protocol (Carbon Dioxide, Methane, Nitrous Oxide, Hydrofluorocarbons, PFCs and Sulphur Hexafluoride). Many more powerful than CO<sub>2</sub>.**

**10 marks**

- (b) A maximum of 4 marks for describing/explaining any one impact.

**Award up to 2 marks for specific named examples.**

**Answers may include:**

Melting of the ice sheets/glaciers

- A rise in sea level with subsequent migration as islands and coastal areas are submerged. Loss of plant and animal habitats in these areas eg impact on polar bears which could lead to a loss of tourism/more problems in settlements as the bears scavenge instead of hunting on the ice.
- New transportation routes across the Arctic Ocean ie the North West Passage with resulting benefits to trade/previously ice bound coastal settlements.
- Extension of mineral exploitation into the Arctic with positive and negative consequences.

Changing rainfall/temperature patterns

- Higher or lower rainfall/temperature and maybe more extreme weather depending on where you are with resulting increasing/decreasing crop yields, more floods/drought/hurricanes/tornadoes etc.
- Extension or retreat of vegetation (and associated wildlife) by altitude as well as latitude – growing vines/sunflowers in Scotland, spread of malaria, the loss of the Cairngorm Arctic habitat etc.
- Change in ocean currents (El Nino/La Nina).
- Change to the Atlantic Conveyor – disruption of the thermohaline circulation.

**10 marks**

## Question 2: Lithosphere

**A sequence of diagrams, fully annotated, could score full marks in either part (a) or part (b). Avoid credit for any repetition of processes.**

**Assess out of 7**

**(a) Conditions and processes which encourage the formation of scree slopes.**

- Steep and bare rock faces with lines of weakness/well-jointed carboniferous limestone.
- Cold climate where temperatures often fall below freezing point at night.
- The two factors above allow physical weathering to take place in the form of freeze-thaw action/frost shattering, where water collects in the rock fractures, freezes and expands by about 9% exerting great pressure on even the hardest rock.
- Repeated freeze-thaw action splits the rock into large sharp fragments which break off and are moved downhill by gravity to accumulate at the base of steep slopes as a scree or talus slope as large heaps of rock debris.
- Up to 1 mark for a correctly named example.

**7 marks**

**(b) Processes involved in formation of a corrie.**

**Assess out of 9. Maximum 7 marks if no annotated diagram(s).**

**Corries**

- Snow accumulates in mountain hollows when more snow falls in winter than melts in the summer.
- North/North-east facing slopes are more shaded so snow lies longer.
- Accumulated snow compresses into neve and eventually ice.
- Plucking, when ice freezes on to bedrock, fractures it and incorporates it into the glacial ice.
- Abrasion, when the angular rock within the glacial ice grinds away the valley sides and floor, over-deepening the hollow along with rotational movement of glacier.
- Glacier moves downhill due to gravity.
- Rotational movement not so powerful at corrie edge, allowing rock lip to form which traps water as ice melts, leaving a lochan.
- Up to 1 mark for a correctly named example.

**9 marks**

### Question 3: Population Geography

- (a) **Max 5 marks for description.**  
**No more than 2 marks should be awarded for numbers of migrants calculated from the map.**  
**Max 8 for explanation.**  
**Answers which make no reference to immigration on map Q3, max 5.**

Answers could include points such as

Description	Explanation
The largest number of migrants come from Poland (124,000)	Due to the expansion of the EU in 2005 and freedom of movement for workers
The second highest source was India (about 100,000)	Possibly due to Commonwealth links or people who already have family in the UK's large Indian sector
A large proportion (48,000) came from Australia	Due to the lack of a language barrier and the increasing trend towards young people travelling for work experience

Credit should also be awarded for references to relevant push and pull factors.

**10 marks**

- (b) **Answer will depend on migration studied.**  
**A developed answer will refer to both advantages and disadvantages for the country.**  
**Award a maximum of 3 marks if answer is not authentic.**  
**From Mexico into California, answers may include:**

**For Mexico**

Advantages	Disadvantages
<ul style="list-style-type: none"><li>• The pressure on resources and jobs was lessened.</li><li>• The birth rate was also lowered as most migrants were of childbearing age.</li><li>• Money was often sent back to the families left behind, which helped to stimulate the economy – it is Mexico's biggest source of foreign income (\$6 bn per year).</li><li>• When migrants return, they can bring back new skills, which can be used in the donor country.</li></ul>	<ul style="list-style-type: none"><li>• The active population left, creating a burden on the economy.</li><li>• Those most educated left creating a 'brain-drain'.</li><li>• Families are divided as males leave.</li><li>• Death rate increases as an elderly population is left.</li><li>• In the long term this creates dependency upon money sent back to home villages.</li></ul>

**For California**

<b>Advantages</b>	<b>Disadvantages</b>
<ul style="list-style-type: none"><li>• The short-term labour gap was filled – migrants filled jobs Americans did not want.</li><li>• Mexican culture has enriched the border states with language, food and music.</li><li>• Increased population leading to increased taxation levels.</li><li>• Labour costs reduced – agricultural sector benefits from this.</li></ul>	<ul style="list-style-type: none"><li>• Migrant workers feel discriminated against and socio-economic problems have ensued.</li><li>• When recession hit in the 1980s unemployment rose and racial tension was exacerbated.</li><li>• Ghettos developed in the poorest districts.</li><li>• TB has increased along the border.</li><li>• Illegal migration costs the USA millions of dollars for border patrols and holding centres.</li></ul>

**6 marks**

#### Question 4: Urban Geography

- (a) Assess out of 6, awarding up to 2 marks for accurate 6 figure grid references.

The following characteristics may be noted

- Densely packed, irregular street pattern.
- Transport centres eg bus station and railway station.
- Bridging points across River Ouse.
- Historical buildings eg The Minster, Castle.
- Important buildings eg information centre, churches and Town Hall.
- Evidence of inner ring road.
- Route convergence.

6 marks

- (b) Assess explanations out of 7 marks. Maximum of 2 marks for specific map evidence/description.

The advantages of the residential location and environment may include:

Area B (suburban housing area – Rawcliffe).

- Access to A19 for commuting to CBD.
- Near park and ride for commuting, and National cycle route.
- Modern design of cul-de-sacs and crescents for privacy and preventing through traffic, and roundabouts at access points.
- Services including a church for local use.
- Near industrial estate GR593553 for employment.
- Tourist facility to east ie Nature Reserve, and caravan site.
- Attractive environment ie small lake, on edge of town near farmland.

Area C (commuter village – Copmanthorpe).

- 6km from centre of York for shopping, work and entertainment.
- Nearby sliproad onto A64, ideal for commuters.
- Small, quiet village with a few services eg post office, public house, church.
- Leisure facility to north ie golf course.
- Environmentally attractive with Ebor Way going through the village and Askham Bogs Nature Reserve to the north.
- Surrounded on three sides by farmland.

7 marks

- (c) Assess out of 7 with a maximum of 2 marks for specific map evidence.

**Candidates should be able to demonstrate an understanding of the issues which arise when ‘urban’ land uses invade a previously ‘rural’ area.**

Land uses which would conflict with further expansion would include

- National walking and cycle trail.
- New shopping centre – expansion may be restricted.
- Leisure facilities eg racecourse, golf course.
- Various farms eg White House farm.
- A64 bypass.
- Accommodation including Manor Hotel, caravan and camping site GR600476.

Other land uses include forestry, small villages, college, university, electricity transmission lines.

7 marks

## Section B

### Question 5: Hydrosphere

- (a) The explanation should include 8 points, all of which could be included in a well annotated diagram.

A maximum of 4 marks should be given for river processes eg corrosion, corrosion/abrasion and hydraulic action. Max 2 for mere list of processes. Credit should not be given for development into ox-bow lakes. Answers without diagrams should be marked out of 6.

Points could include

- Development of pools and riffles (differences in speed and depth).
- Erosion on the outside (concave bank) of bends due to faster flow.
- Helicoidal flow removing material.
- Deposition on the inside (convex bank) due to slower flow.
- Formation of point bars.
- Migration of meanders downstream.

**8 marks**

- (b) Assess out of 6 marks, awarding up to 2 marks for map evidence (grid references or names). For full credit physical and human factors must be included.

The physical factors may have included

- The close proximity of a tidal limit to York, GR594445.
- A low lying floodplain around or below 10 metres in height.
- Tributaries joining the River Ouse eg River Foss (605510).
- Global warming may cause extreme weather events (eg rainfall).

The human factors may have included

- Home building on a flood plain.
- River straightening.
- Man-made strengthening and narrowing of river banks.
- Facilities deliberately located on floodplain eg racecourse, caravan and camping site.
- Land use changes in catchment.
- Increased run-off from the 'urbanised' environment.

**6 marks**

## Question 6: Biosphere

**Award up to 6 marks (1 per stage) for correctly named and located plant species.  
Award a maximum of 2 for purely descriptive points taken from the graph.**

**Credit can be given for factors not shown on the graph such as shelter.**

Students may answer this question using the headings on the graph or the more usual progression from strandline to climax vegetation.

- **Plant cover increases** – the amount of sand showing through the dune decreases as more of the ground is covered by vegetation. Little cover in the pioneer stage, more in the building stage and complete cover in the climax stage unless disturbed by animals/humans/storms etc.
- **Soil moisture increases** – rain/fresh water is trapped with added humus/plant cover and longer rooted plants drawing water up from the water table. Xerophytic plants found in the drier strandline (sea sandwort, sea rocket, saltwort) and embryo dune (sea or sand couch, lyme grass, frosted orache). On the yellow dune Marram grass has long rhizomes to spread through the sand. Dune slacks at or near the water table have hydrophytic species like reeds, rushes and flag iris.
- **Organic matter content increases** – decaying pioneer species adding humus to the sand. In the fore-dune more plants stabilise the sand adding humus (sea bindweed, sea holly, sand sedge, and marram grass) changing the sand to a sandy loam and from the sandy colour of this and the yellow dune to the grey dune.
- **pH decreases** – shells (CaCO<sub>3</sub>) producing alkaline conditions on shore, more neutral pH by the climax stage as plants decay and add acid to the soil. The grey dune plants include sand sedge, sand fescue, bird's foot trefoil, heather, sea buckthorn and grey lichens. In the climax stage a range of plants from heathers to birch, pine or oak woodland can grow depending on the final pH value of the soil.
- **Salinity decreases** – Increased distance from the sea and salt water/tides/spray increases the amount and variety of plant species that can cope with the conditions.

**14 marks**

## Section C

### Question 7: Rural Geography

- (a) **Candidates may answer this question in one or two parts.  
Award a maximum of 6 for either part (i) or (ii).**

Answers could include the following

- (i) Mechanisation increases the efficiency on a farm enabling the farmer to plough, sow, spray, etc more quickly, covering larger areas. It also speeds up harvesting and results in the product being delivered to markets fresher and at a higher premium (eg Bird's Eye peas). It also allows for a smaller work force and therefore lower wage bills for the agribusiness usually involved in these farms. It allows for the use of satellite technology/computers to control the application of fertilisers to particular areas of fields to improve yields (yet decrease the cost and waste) as only the required amounts are delivered to each segment according to the soil quality there.
- (ii) **People in the environment** – this leads to depopulation and derelict buildings, deserted rural villages (eg on the Great Plains).  
**Farm sizes** – increasing 'agribusiness' type farming with amalgamated farms, larger fields, fewer hedgerows or boundaries to allow for machinery and increase yields.  
More or larger buildings for storage of machinery.  
**Pollution** – air and water pollution from machinery itself (exhaust fumes/noise/accidents with diesel) and run-off from over application of fertilisers.

**8 marks**

- (b) **Award a maximum of 4 for any one change.**

For EU Policies eg Single Farm Payment

This payment has replaced the existing support schemes to farmers like the arable area payment scheme and includes other entitlements like the set-aside entitlement.

The total payable to the farmer is calculated using the historical payments made to the farm from 2000 to 2002. The farmer gets a single payment based on these calculations. To continue to receive this payment the farmer must keep the land in 'good agricultural and environmental condition – this includes an obligation to keep land in set-aside. Penalties will be made if these conditions are not met – government inspectors will visit to check!

For Genetically Modified food/genetic engineering

Scientists manipulate the genes of plant cells by adding/deleting DNA. The first commercial genetically engineered food was the Flavr Savr tomato – by adding a fish gene it had a longer 'shelf-life'. Since then the developments have concentrated on four main crops – oilseed rape, cotton, maize and soya bean. These crops have been made herbicide resistant (they can tolerate the herbicides that will kill the weeds) and/or pest resistant (they produce a toxin that kills the pest that would normally eat them). This technology has also been used to improve the taste, nutrition or drought-resistance of the crop. Ethical concerns, health risks, environmental concerns eg cross-pollination to produce 'superweeds' have led to these crops being limited in area (although that is still estimated at 1 million square kilometres).

**6 marks**

### Question 8: Industrial Geography

Allow up to 4 marks across both sections of the question for reference to specific named examples *within* the area chosen.

Answers which do not refer to named areas should be marked out of 12.

- (i) Answers will depend on the chosen area. For the industry in the question.
- Increased competition from overseas markets, particularly NICs.
  - Increased competition leading to falling prices and profits.
  - Falling customer demand for the product as new technology takes over.
  - Cheaper labour from countries such as India.
  - Improved (and cheaper) transport and communication means that products do not need to be manufactured near to the market.
  - Ending of government incentives to encourage new industries.
  - Modernisation of plants in order to compete can result in redundancies.
  - Rationalisation of company leading to overseas plants being closed.
- 8 marks**
- (ii) Again, answers will depend on the area chosen but will include effects such as:
- Associated service and supply industries close.
  - Cycle of economic decline sets in.
  - Depopulation, particularly amongst young people and young families.
  - Leading to further service closures.
  - Areas in decline find it difficult to attract new investment as area becomes run down.
  - Rise in cases of depression.
  - Rise in crime rates in area.
- 6 marks**

**Total 14 marks**

[END OF MARKING INSTRUCTIONS]