



2008 Geography

Higher – Physical and Human Environments

Paper 1

Finalised Marking Instructions

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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 (λ) 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 – Lithosphere

(a) Map evidence of Coastal Features

Areas A and B (Erosion)

- The shape of the coastline – both Area A (chalk) and Area B (limestone) are made of harder rocks, less easily eroded and therefore they jut out into the sea as headlands.
- Name evidence eg Natural Arch, The Pinnacles, Old Harry, Tilly Whim Caves, Peveril Point, indicating a headland/cave/arch/stack coastline.
- Off the headland at 054825 are small islands, indicating stacks or stumps.
- Symbol evidence with cliffs and steep slopes all round Durlston Bay and along south coast of area B.
- Wave-cut platform off Peveril Point at 042786.

Area C (Deposition)

- The shape of the coastline – Area C (sands and clays) of softer rocks, more easily eroded and therefore cut back into as a bay.
- Name evidence eg Dunes at 038855, Studland Bay, Little Sea (lagoon).
- Symbol evidence with sand symbol along Studland Bay and sand, heath, marsh and lagoon in 0284, 0384, landward of Studland Bay.

Assess out of 12 with a maximum of 8 for either part. Credit should be given for mention of terms discordant coastline (running N-S along East of extract) and/or concordant coastline (running E-W along South of extract). Up to 3 marks for appropriate map evidence (names and/or grid references) in each of part (i) and (ii). Max 6 if no reference to OS map.

12 marks

(b) Formation of coastal features

Stack

- Candidates should refer to the processes of coastal erosion in their answer ie hydraulic action, corrasion (abrasion), solution (corrosion) and attrition.
- The terminology in the question ‘various stages in the formation of’ should encourage candidates to start their answer with a line of weakness in a headland and progress this through cave and arch formation to stack formation.

Sand Bar

- Candidates should refer to the processes of coastal deposition and transportation in their answer ie wave movement up and down beaches and longshore drift.
- The terminology in the question ‘various stages in the formation of’ should encourage candidates to start their answer with wave movement and progress this through longshore drift and spit to bar formation.

Assess out of 8 with up to 4 marks for appropriate erosion or deposition processes. A sequence of diagrams, fully annotated, could score full marks. If no diagram – assess out of 6.

8 marks

Question 2 – Biosphere

Strandline: Sea Sandwort; Sea Rocket; Saltwort

- These are all salt-tolerant (halophytic) species and can withstand the desiccating effects of the sand and wind. Some can even withstand periodic immersion in sea water. The presence of these plants leads to the further deposition of sand and the establishment of Sand Couch Grass and Lyme Grass. The high pH figures can be attributed to a high concentration of shell fragments. (CaCO₃).

Embryo Dune: Sea/Sand Couch; Lyme Grass

- These dune pioneer species grow side (lateral) roots and underground stems (rhizomes) which bind the sand together. These grassy plants too, can tolerate occasional immersion in sea water. Some species found on the strandline are, of course, also found on the embryo dunes (Sea Rocket and Sea Twitch).

Fore Dune: Sea Bindweed; Sea Holly; Sand Sedge; Marram Grass

- A slightly higher humus content (from decayed plants), and lower salt content (further from the sea) allows these species to further stabilise the dune and allow the establishment of Marram Grass which becomes a key plant in the build up of the dune.

Yellow Dune: Marram Grass; Sand Fescue; Sand Sedge; Sea Bindweed; Ragwort

- Both the humus content and the acidity of the soil have increased at this location. Marram can align itself with the prevailing wind to reduce moisture loss; it can also survive being buried by the shifting sand of the dune. In fact, as sand deposition increases the Marram responds by more rapid rhizome growth (up to a staggering 1 metre a year). It is xerophytic, and so is better able to survive the dry conditions of the dune than other plants. This allows it to become the dominant species on the Yellow Dune. It also has long roots which help to bind deposited sand and anchor it into the dunes as well as access water supplies some distance below.

Grey Dunes and Slacks: Sand Sedge; Sand Fescue; Bird's Foot Trefoil; Heather; Sea Buckthorn; Grey Lichens (eg *Cladonia* species)

- As a result of an increase in organic content (humus), greater shelter and a damper soil a wider range of plants can thrive here. Marram dies back (contributing humus) to be replaced by other grasses, sand fescue and sand sedge. As a result of leaching and the build up of humus the soil is considerably more acidic again supporting a wider plant community. In the wetter slacks, close to the water table, several water-loving (hydrophytic) species may survive; various reeds and rushes; cotton grass; alders and small willow trees.

Climax

- In some areas heathland may dominate with a range of heathers being prominent, whilst in the shell rich areas of the Western Isles machairs may develop. Eventually trees such as birch, pine or spruce could establish a foothold.

Assess out of 16 allowing up to 6 marks for the names of particular plant species at appropriate locations across the transect (max 1 per location). Avoid over crediting the same explanatory factors (eg shelter, humus content, salinity, pH, distance from the sea, proximity to the water table). Suggest a maximum of 4 marks for any one plant's (probably Marram Grass) 'adaptations'.

16 marks

Question 3 – Population Geography

(a) Changes in Total Population

Stage 1

- Total population fluctuates but population growth is low, as high Death Rate (DR) due to wars, famine and epidemics is balanced by high Birth Rate (BR).

Stage 2

- Rapid population growth as DR falls due to medical advances eg vaccinations, improved water supply and sanitation and marked decrease in Infant Mortality Rate (IMR).
- BR remains high due to lack of contraception and family planning, children seen as an ‘economic asset’ and parents wanting many children as an ‘insurance policy’ for being looked after in old age until IMR is seen to fall.

Stage 3

- Despite rapidly falling BR, continued rapid population growth as DR continues to fall, with continued improvements in medicine and standards of living.
- BR falls due to the awareness of family planning and that smaller families are needed with decrease in IMR; children now seen as an ‘economic liability’.
- Population growth levels off at end of stage 3 as BR and DR reach similar low levels.

Assess out of 10, awarding maximum of 4 for description and a maximum of 8 for explanation. Credit can also be given (up to maximum 2 marks) for role of migration in influencing total population change.

10 marks

(b) Stage 5 problems caused by low birth rate/declining (and ageing) population

- Need to maintain an active population large enough to allow levels of taxation to remain constant or raise retirement age.
- Need to ensure there are no future shortages in workforce – need to recruit immigrant labour/ease access for asylum seekers. This can lead to civil unrest/ethnic tension.
- Need to sustain demand for particular products or services eg toys, schools, maternity hospitals, which if affected could lead to higher levels of unemployment.
- Ageing population gives increased cost of pension provision and unpopular decisions for government about how pensions should be funded.

Assess out of 8.

8 marks

Question 4 – Urban

(a) Answers will vary according to the city studied but may include:

Site

- Flat land.
- Inside a large river meander.
- Early functions eg religious, defensive, trading site.
- Bridging point on river.

Situation

- Easily accessible to major settlements.
- Accessible to ports.
- Major route focus.
- Accessible to airports.

Answers which only mention site or situation should be marked out of 6.

Maximum of 4 marks for answers which fail to relate to a named city.

8 marks

(b) Answers will vary according to the city studied but may include:

- Ring road around city centre.
- Use of roundabouts to improve flow.
- Pedestrianised areas in the centre.
- Park and ride schemes.
- One way systems.
- Parking restrictions and fines.
- Multi-storey car parks.
- Bus lanes/improved public transport.

Answers should be assessed out of 10 with a maximum of 6 for either description or explanation.

Credit specific named examples within the chosen city up to max of 3.

Maximum of 5 marks for answers which fail to relate to a named city.

10 marks

Section B

Question 5 – Atmosphere

(a) Physical factors

- Solar activity: variations in solar energy and sun spot activity.
- Changes in the earth's orbit and tilt: Croll-Milankovitch Cycles, 'wobble and roll'.
- Volcanic eruptions: dust particles reduce temperatures by shielding the Earth from incoming insolation.
- Ice cap/sheet melting: reduction in albedo effect.
- Changing oceanic circulation – El Nino/La Nina.

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's: from aerosols, air conditioning systems, refrigerators, polystyrene packaging etc
- Methane: from rice paddies, animal dung, belching cows – even flatulent termites!
- 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.
- Atomic bomb – linked to cooling.

Award up to a maximum of 8 marks for either physical or human factors. A maximum of 2 for describing/explaining the greenhouse effect and a maximum of 4 for any one gas and its sources.

14 marks

Question 6 – Hydrosphere

(a) Diagrams should include the key processes within the global hydrological cycle:

- Precipitation.
- Evaporation/Transpiration.
- Condensation.
- Infiltration/Run-off/Melting.
- Storage ie ice, ground water, ocean.

A fully annotated diagram could score full marks. If no diagram mark out of 4.

6 marks

(b) Differences could include:

Interception

- Rural – there is a longer ‘lag time’ between the rainfall and peak discharge in the rural hydrograph because vegetation (eg woodland) will intercept precipitation and store/absorb it thus preventing the water reaching the soil/ground water/river quickly.
- Urban – concrete/tarmac/buildings will channel precipitation to gutter/drains and straight into the sewer/river system with a correspondingly shorter ‘lag time’.

Surface run-off

- The rising limb is much steeper in the urban hydrograph because natural water courses will overflow and drain into marshy areas/fields on the flood plains in times of flood whereas urban water courses will be lined and embanked to contain and speed up the flow of water.

Storage

- The falling limb on the urban hydrograph is much steeper due to the lack of infiltration/percolation/underground storage of water. In rural areas water will continue to flow into the river many hours after the rainstorm through underground and through flow via the soil and rocks. The return of the river to the base flow will therefore be much slower with a more gentle falling limb.

Mark explanation of differences out of 8. (Award a maximum of 2 marks for any description of the differences between the hydrographs).

8 marks

Question 7 – Rural Geography

(i) System matches to associated diagram

Intensive Peasant Farming

- Traditionally high labour input although this is beginning to decline as poorer farmers are forced off the land.
- Small capital input although this is increasing with amalgamation of uneconomic holdings and increased use of machinery.
- Small parcels of land but this is also increasing with amalgamations.
- Large output due to intensive nature of system with maximum use of land available.

Commercial Arable Farming

- Labour force small and declining with increased use of large machines as agribusiness takes over from family farms.
- High input of capital, used for machinery, irrigation, pesticides, fertilisers and infrastructure.
- Very large areas of land required for effective operation of large farm machinery.
- Large output is related to huge area involved rather than particularly high output per hectare.

Shifting Cultivation

- Small labour force due to subsistence nature of system which is unable to support a large population.
- Very low input of capital related to subsistence nature of system.
- Land area is large as cultivators move from area to area within forest.
- Very low output as only a tiny proportion of land area required is cultivated at any one time.

Assess out of 6

6 marks

(ii) Changes in farming practices

Intensive Peasant Farming

- The use of mini-tractors (rotavators) and small mechanised rice-harvesters instead of draught animals – less labour-intensive.
- The widespread adoption of higher yielding/faster maturing new varieties of rice – the impact of the ‘Green Revolution’.
- Amalgamation of small uneconomic holdings/consolidation of fragmented fields as a result of land reform.
- The formation of farming co-operatives has provided farmers with several benefits, easier access to machinery, cheaper credit facilities, bulk purchasing of inputs and improved marketing opportunities.
- Greater use of modern pesticides and fertilisers, coupled with new seed varieties and improved irrigation systems has meant a shift from subsistence farming towards more commercial farming with small surpluses for sale.

Commercial Arable Farming

- Amalgamation of farm holdings as family farms are taken over by agribusiness.
- Part-time farming and co-operatives have increased, with greater use of contractors for harvesting.
- Diversification of crops eg away from wheat to eg sunflowers as crop/market demands change.
- Increase in organic farming reflecting change in market demand.
- Increased use of more carefully managed irrigation systems.
- Increased awareness of avoidance of soil erosion by employing a variety of soil conservation methods.

Shifting Cultivation

- Area of rainforest for shifting cultivators has been constantly reducing due to logging, cattle ranching, mineral extraction, HEP etc
- Population increases put more pressure on limited land.
- More indigenous people have been forced into more inaccessible (and often less fertile) areas, on to reservations or have moved to city living.
- Cultivated areas have to be returned to sooner after shorter fallow period leading to overworked soils which suffer a decline in fertility.
- Previously cultivated areas abandoned due to soil erosion and silting up of rivers.

Credit must be awarded for changes in farm practices not for mere description of the farming system. Avoid credit for description of farming system.

Maximum of 2 marks for references to causes and/or impacts of change.

Maximum of 7 if no named area.

8 marks

Question 8 – Industrial Geography

(a) Old Industrial Landscape

Air – pollution from coal burning factories, railway engines and houses. Smoke, dust, soot and smog discolouring buildings and affecting the health of the people living in close proximity to their work. (High incidence of lung diseases like bronchitis).

Water – untreated effluent and sewage from the buildings entering the local streams with resulting damage to ecosystems.

Land – subsidence and land slippage due to mining and waste tipping with little control/health and safety laws. (Aberfan).

Buildings – closely packed communities of housing/factories/transport. High population densities and overcrowding leading to poor environmental quality – little greenery or open space. Tall, brick factories with metal gratings over windows, chimneys etc – poor visual quality.

Mark out of 6 ensuring that both description and explanation of the environmental impact have been covered.

6 marks

(b) New Industrial Landscape location factors could include both physical and human factors:

Physical factors

- Flat land for easy construction of large low factory buildings.
- Room for future expansion; space for car parking and storage.

Human factors

- Proximity to markets ie large urban areas.
- On edge of urban area for cheaper land costs/rent and proximity to labour force in housing estates/suburbs.
- Close to other modern industries that supply components or provide a market.
- Close to motorways/main roads-easy access for deliveries/work force.
- Close to airports ie for foreign executives.
- Close to ports for export/import.
- Close to universities ie source of highly skilled employees and possible partners in research projects.
- Government and EU incentives/grants.

Mark out of 8 ensuring that both description and explanation are covered for full marks.

Credit specific named features/location within the chosen area up to a maximum of 2 marks.

8 marks

[END OF MARKING INSTRUCTIONS]