SCOTTISH QUALIFICATIONS AUTHORITY

2003 Geography

Higher – Core

Finalised Marking Instructions

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 I is 50. 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 any paper as recorded in the box at the top right-hand corner on the front cover of the script, and as entered on Form Ex6, must be given as a WHOLE NUMBER. Where a fractional mark has been given in a total mark, you must round up the total mark to the next whole number. Thus if the candidate gains, say, 29 ½, the mark 30 should be entered in the box on the front of the script AND ON FORM EX6.

3 It is helpful in later procedures if points receiving marks are clearly indicated. In general a ½ mark should be awarded for a short correct statement with a full mark being awarded for a developed point.

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.

Question 1 – Atmosphere

Description should be able to focus on the marked contrasts in rainfall amounts between a very dry north (with only 250mm per annum) and a much wetter south (where some coastal areas receive up to 3000mm per annum) as shown on the map provided. Candidates could also refer to the graphs and note the variations between the three stations with Timbuktu in the north and Ouagadougou "in the middle" experiencing obvious wet and dry seasons whilst coastal Lagos in the south has a vastly greater annual rainfall total, no dry months and a "twin peak" regime.

Explanations ought to concentrate on the role of the I.T.C.Z. and its associated Tropical Maritime and Tropical Continental air masses. For example, Lagos – on the coast of the Gulf of Guinea – is influenced by warm moist mT air for most of the year which accounts for its much higher annual rainfall total. The twin rainfall peaks can be attributed to the I.T.C.Z. migrating northwards and then southwards again later in the year. Timbuktu, in contrast, lies well to the north of the I.T.C.Z. in January and is under the influence of hot, dry cT air from the Sahara Desert. In May/June the I.T.C.Z. moves north bringing moist mT air and rainfall to Ouagadougou and, to a much lesser extent, Timbuktu which lies closer to its point of maximum extent.

Assess out of 7 allowing up to 4 marks for Description.
Max 4 for any one location **(7)**

Question 2 - Hydrosphere

(a) The following features may be included as part of the evidence:

- Meanders
- Broad, flat flood plain
- Tidal
- Low lying land
- Drainage ditches
- Mudflats at mouth
- Levees/embankments
- Gentle gradient 10m → sea level
- River flows into sea

Up to 1 mark may be awarded for correct grid references.

Assess out of 3 but some reference to the observed features being typical of rivers in their lower stages is essential for full credit. **(3)**

(b) Ideally answers should be based on the concept of differential erosion. The following points may be made:

- Hard rock overlying soft rock
- Soft rock eroded more easily
- Eventually the soft rock is worn away
- This causes undercutting
- There is nothing to support the harder rock which collapses
- The process is repeated and the waterfall move upstream
- Description of erosion processes

A well annotated diagram or series of diagrams can score full marks.

Full marks may also be awarded if an answer deals with waterfall formation due to differential erosion during glaciation ie waterfalls formed from hanging valleys. **(3)**

Question 3A – Lithosphere

A number of influencing factors (eg gravity, rock type and structure, slope angle, vegetation cover, water content and human activity such as deforestation) will probably be common to all the examples illustrated but answers should be able to emphasise the most important ones affecting the slopes selected, eg

A **ROCKFALLS** Frost shattering or exfoliation most pronounced on very steep slopes lacking any soil or vegetation cover – giving rise to talus or scree slope of angular rock fragments at base. Exacerbated where rock is well jointed. Answers should be able to elaborate on climatic conditions encouraging weathering processes and on role of soil and vegetation cover in preventing/slowing down the slope function. Common at higher altitudes. Gradual process.

B **MUDFLOW** Rapid, sudden movement of saturated soil on steep slopes (over 10^{o}). Encouraged by absence or removal of vegetation cover (eg by deforestation) and by a prolonged period of heavy rainfall giving extra "weight" to the soil. Thin soils overlying impermeable bedrock are most easily saturated. Similarly, unconsolidated material like coal bings (eg Aberfan) can be triggered by earthquakes.

C **LANDSLIP** Rotational movement of large slabs of slope producing a curved rupture surface. Most often observed where softer materials such as clay or sandstone overlie more resistant rocks like limestone or shale. Encouraged by torrential rain on steep slopes. Can also be triggered by earthquakes. Found also where the sea undercuts soft boulder clay cliffs (eg Lulworth Cove on the Dorset coast)

D **SOIL CREEP** Slowest of all downhill movements. Almost continuous process occurring mainly in humid climates. Difficult to measure or observe. Takes place on slopes of about 5^{o} even with a vegetation cover. Two main causes which result in repeated expansion and contraction of the soil-

(i) Wet and dry periods:
Heavy rainfall increases volume of soil and, therefore, adds weight to the soil which moves downhill under gravity. Most pronounced in clay which can dry out and contract during a long dry spell

(ii) Freeze-thaw:
Volume of soil can be increased by 9% when regolith freezes due to presence of ice crystals. Particles are lifted at right angles to the slope ("heave"). On thawing regolith contracts, soil particles fall back vertically under influence of gravity and a gradual movement downslope take place

Mark 2 x 3 noting that candidates should be able to both describe and explain the conditions and processes which encourage their chosen mass movements to take place **(6)**
No credit for description of finished product eg terracettes

Question 3B – Lithosphere

Candidates ought to be able to refer to the origins and properties of the different rock types, the role of earth movements and the part played by differential erosion by rivers. Well annotated diagrams could certainly enhance an answer! Some key points to include:

- Chalk – formed from the protective shells of tiny sea creatures deposited in a once extensive, clear and warm sea – is porous and so allows water to pass through it – hence the absence of surface drainage.

- Clay – finely grained, softer rock (composed of rock fragments, such as weathered feldspar crystals from decaying granites, laid down in shallow seas) is more easily eroded but able to hold moisture – impermeable. This explains the abundance of surface water – rivers and artificial drainage ditches – on the flatter clay vale.

- At one time the chalk and clay formed horizontal sediments on the floor of a shallow sea. Later, these were uplifted and tilted (during the Alpine orogeny – 30 million years B.P.) into a series of upfolds (or anticlines such as the Wealden) and downfolds (synclines).

- Once tilted the different sedimentary rocks were affected by differential erosion. In particular, river erosion exploited the differences in hardness and permeability between the clay and the chalk. The chalk anticline was cut through exposing the underlying clay which, being impermeable, was eroded more rapidly and gradually lowered. The porous chalk (often strengthened with hard flints) which allowed water to sink through it was worn away at a much slower rate and nowadays forms the upland area or cuestas. These are characterised by short steep scarp slopes and longer, gentler dip slopes.

- Rainwater flows down through the chalk and accumulates above the clay. Where the water table meets the ground surface at the foot of the scrap a line of springs is formed.

- Dry valleys are thought to have been formed at a time when precipitation was greater than today or, alternatively, during a period of tundra-like climate when the ground would be affected by permafrost. Pore spaces would then have been frozen and so impermeable. Summer snow melt could, therefore, have carved out these valleys.

Note that the question does not require any reference to be made to the human landscape so features such as roads, spring-line settlements, quarries and farms are, therefore, irrelevant!

Assess out of 6 ensuring, for full marks, that the answer explains as well as describes the processes involved in shaping this scarp and vale landscape. **(6)**

Question 4 – Biosphere

Sand Dune Coast Habitat

Strandline: Sea Sandwort; Sea Rocket; Saltwort

- These are all salt tolerant 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.. high (alkaline) pH figures can be attributed to high concentration of shell fragments.

Embryo Dune: Sand Couch; Lyme Grass

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

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

- A slightly higher humus content, and lower salt content allows these species to further stabilise the dune and allow the establishment of Marram Grass (this species cannot tolerate a sand salt content >2%). Marram 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 soil acidity 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 meter per year). It is xerophytic, able to survive the extremely dry conditions of the dune, where many other species cannot and become the dominant species on the Yellow Dune.

Grey Dunes and Slacks: Sand Sedge; Sand Fescue; Bird's Foot Trefoil; Sea Buckthorn; Heather; 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. Marram dies back 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 also considerably more acidic again supporting a wider plant community. In the wetter slacks a range of water loving plants may survive: various reeds and rushes; cotton grass; small willow trees may also establish a foothold.

Climax

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

Derelict Urban Site

Candidates may mention that no two derelict urban sites will be the same. Further, some comment on the high proportion of introduced species (particularly garden 'escapes') found in derelict urban sites might also be noted. Both observations are worthy of credit.

Pioneer phase (0-3 years)

- Oxford ragwort, Buddleia; Dandelion; Groundsel; Knotgrass. Many of the species in the pioneer phase arrive 'on-site' through wind dispersal (eg dandelions). The early species must be able to reproduce very quickly in order to establish a foothold on the new site. Human activity (garden and domestic rubbish) many also significantly affect this early phase.

Tall Herb Phases (4-7 years)

- Possible plant may include Buttercup, Red Clover, Thistle, Garden Lupins, Michaelmas Daisy, Rosebay Willowherb. The vegetation is dominated by tall perennial species with woody stems eg Rosebay Willowherb whose seeds arrive on the wind. It then spreads with the aid of underground rhizomes. These taller plants out-compete the smaller annual plants, which start to be lost during this phase.

Grassland phase (8-10 years)

- Through time smaller grasses fade out to be replaced by the following grasses: Red fescue; Couch; Cocksfoot and False oat grass. Depending upon the precise nature of the site these taller grasses may take over. However, a variety of plants including some of those form the earlier phases may be found due to the varying conditions on any one site. In some places Japanese Knotweed has become dominant (particularly along water courses). This plant reaches 3 m and casts a dense shadow under its canopy. In such sites only bindweed can survive alongside this plant.

Scrub Woodland phases (over 10 years)

- Birch, Broom, Hawthorn and Sycamore may establish on longer established derelict sites. The increasing humus content resulting from a number of years of plant colonisation allows these larger species to survive. These species arrive both through wind-dispersed seed (sycamore) and bird dispersed seed (Hawthorn).

Candidates could achieve maximum marks without reference to the unlikely circumstances surrounding the establishment of climax vegetation in a derelict urban site. However:

Climax Woodland

- In the middle of cities the absence of seed parents limits development towards woodland…in the 'leafy' suburbs, however, the opportunity for trees to become established is much greater. If they arrive early, trees with small lightweight windborne seeds may become established and become dominant eg birch, willow. Larger seed trees may enter closed vegetation eg sycamore, rowan, ash.

Assess out of 6 allowing max of 4 x ½ for correctly located plant species at 4 different locations.
Max 1 for any one explanatory factor eg salinity, humus, pH (6)
Max 2 for adaptations of any plant

Question 5 – Population Geography

Answers will, of course be dependent on country chosen.
For a **Developed** country such as the U.K. factors influencing the changes in the **Birth Rate** might include:

- Marked decline in early 1900's as people begin to want smaller families – helped by improved education/family planning/more effective methods of contraception

- Improved ante and post natal care led to increased survival rates

- The 'bulge' in the late '40's – early '50's can be attributed to the post WW2 "baby boom"

- Continuing steady decline since can be explained by costs associated with child rearing, greater career opportunities (aspirations?) for women, invention of the contraceptive pill, greater prosperity providing a wider range of alternatives for a couple's disposable income…..

The gradual decline in the **Death Rate** (interrupted by WW1 and WW2) could be attributed to such points as better geriatric care, improvements in nutrition, housing, sanitation and hygiene which have led to vastly better living conditions and, of course, to advances in medicine such as heart transplants, open heart surgery, use of antibiotics and widespread immunisation against previously common health problems like measles or polio.

Candidates who choose a **Developing** country could offer the following reasons for the continuing high **Birth Rates** until well into the 20th century:

- Lack of birth control/family planning

- Parents wanting many children as an 'insurance policy' because of high infant mortality rates

- Children, being seen as an 'economic asset' (as opposed to an 'economic liability?') to the family

- Religious beliefs/attitudes encouraging large families

The obvious decline in recent decades could be attributed to family planning initiatives and government incentives and controls to limit births such as China's one-child-family policy. [China, in fact, would be a good example to take, since the 'bump' in the birth rate shown on the diagram could be explained by Mao Zedong's earlier pro-natalist policies of the 1950's!].

Reasons for the sudden and rapid decline in **Death Rates** for a Developing country could include:

- Improvements in medical care including health education programmes/P.H.C.
- Immunisation/disease eradication campaigns (eg smallpox wiped out) encouraged and funded by the likes of the W.H.O. which have better controlled infectious diseases
- Improvements in diet and nutrition arising from education and from agricultural advances such as the "Green Revolution"
- Better sanitation, improved housing and cleaner public water supplies which have lowered the incidence of water and food-borne diseases such as typhoid, dysentery and cholera
- Noticeable decrease in infant mortality rates
- Increased life expectancies

Assess out of 6 allowing up to 4 marks for either Birth Rates or Death Rates. Overgeneralised responses which fail to make any appropriate references to a named country should score a maximum of 5.
Max 1 for description of graph. **(6)**

Question 6 – Rural Geography

Candidates' answers will depend to a large extent upon the areas of study but are likely to include some of the points noted below:

Extensive commercial agriculture

- Large open fields suitable for a high degree of mechanisation are still typical of this landscape, however in many locations strip cultivation is growing in significance. Strip cultivation has been introduced alongside contour ploughing and shelter belt planting to tackle soil erosion. The broad, high row of sunflowers, aligned north-south in parts of the Great Plains, shelter spring wheat and reduce the removal of top-soil by wind erosion

- Farming landscape may become more diversified. Further improvements in soil quality are also likely through the reduction in the monoculture of wheat

- Introduction, in some areas, of organic farming. This has altered the farming landscape by the introduction of a range of crops in contrast to the monoculture of wheat

- Diversification of farm output may provide greater long-term security for the farming population though current data (from North America/prairie states) illustrates that the total farming population continues to decline

- The introduction of new crops and consequent increase in expenditure is likely to see a greater dependence on agricultural contractors (as illustrated in the photograph) to harvest newly introduced crops into the farming landscape of extensive commercial agriculture

Intensive peasant farming

- More intensive production has led to greater use of irrigation with a consequent impact upon the farming landscape eg the construction of reservoirs, more intensive network of irrigation channels

- The use of mechanised farm equipment to replace labour intensive implements has further supported more intensive production in much of South East Asia

- The development of a 'monoculture' of rice as an additional crop grown through the dry season supported by intensive irrigation. The reduction in cattle, which were formerly grazed on the paddies in the dry season, has significantly changed the farming landscape in Western Malaysia

- The reduction in the use of draught animals plus the reduction in cattle for meat production has significantly reduced the organic manure returned to the intensively used fields. Chemical fertilisers are now used much more intensively. There is some evidence of pollution of fields and water courses resulting from over fertilisation

- In favoured areas the shift from subsistence peasant agriculture to commercial peasant agriculture in now well underway. Farmers have a surplus for sale and are benefiting from improved living standards

Assess out of 6, allowing up to 4 marks for people or landscape.
Award up to 1 mark for description of changes
Award ½ mark for specific named location within a country. **(6)**

Question 7 – Industrial Geography

Answers should be able to identify a number of common factors in the location of industry in this area.

For example:

- Access to dual-carriageway (A494/548) or Motorway (M53/56) for transport of raw materials/products (Areas A, B, D, E, F)
- Motorway network leads to many nearby large cities eg Liverpool and Manchester – markets/sources of components
- Access to rail network (Areas A – F) for transport
- Canal/tidal river for import of heavy raw materials (Areas D and E)
- Flat land – ease of building (Areas A – G)
- Plenty room for expansion (Areas E and F)
- Nearby power stations (2971, 4576)
- Nearby settlements for workforce eg Chester for Area G
- Airport

  Or any other correct, relevant point

Assess out of 6.
For full credit answers must clearly explain the importance of the location factors and specifically refer to (or contain map information from) at least two areas. If only one area referred to then a maximum of 4 should be awarded.
Appropriate grid references could be rewarded up to a maximum of 2 marks. **(6)**

Question 8 – Urban Geography

Answers will depend on the candidate's chosen city and will be improved by authentic references.
Candidates could approach the answer in two different ways. They could either track particular land uses eg residential, from the centre to the edge of the city or they could examine each area in turn. Both approaches are acceptable.

For example a candidate could select Edinburgh and examine 4 areas:

- Princes Street/CBD
- Haymarket and Dalry Road/Inner City
- Corstorphine/Outer Zone
- The Gyle and City Bypass/Edge of the City

However answers must describe and explain the differences in land use.

Assess out of 7 awarding a maximum of 4 marks for either description or explanation of the differences in land use. Maximum 5 if no reference to the city studied, but be charitable
Award up to 2 marks for references to places appropriate to the city. **(7)**

[END OF MARKING INSTRUCTIONS]