

Mark Scheme (Results) Summer 2007

GCE

GCE Geography (6461) Paper 1

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1.a)

- i. Rift valley (accept faults). Accept East African rift valley. (1)
- ii. Diverging (1)
- iii. Constructive (1)
- iv. Divergence causes tensional faults in the crustal rocks through which rising magma can escape. Magma is likely to be rising due to a hot spot or the upward limb of a convection current. Magma is high temperature and low density. Partial melting of upper mantle and pressure release.

4-3	Developed answer explaining why magma rising and escaping.
2-1	Basic answer relating to magma rising or escaping. Maximum 2 if related to subduction.

- b)i. Linear (1) edge of continental land masses (1) anomaly further inland e.g. Urals (1) on destructive and/or collision plate margins (1), example/location (1). Any 3x1 (3)
 - ii. Compression at continent/continent convergence at collision margins, and/or bucking/uplift, aided by igneous intrusion and/or subduction, at destructive margins.

4-3	Developed explanation with secure understanding of the process mechanism(s).
2-1	Basic awareness of the process(es) or type of plate margin.

c) Batholiths are large features (>100km²) formed by the intrusion of magma that cools and solidifies before reaching the surface. Crystals are large due to slow rates of cooling beneath the surface. Cracks/joints may be the result of contraction during cooling and/or pressure release subsequently.

As they are composed of resistant rocks, the overlying, weaker rocks are often weathered and eroded leaving them exposed as upland areas.

Diagram does not have to be used. Do not double credit diagram and text.

An example is not required, but one may be used to provide evidence/illustration.

6-5	Clear explanation of formation and appropriate comment about landscape impact.
4-3	Basic explanation without full development. Limited reference to the landscape impact. <u>OR</u> detailed comments about landscape impact but limited explanation of formation.
2-1	Description without valid explanation or comment.

(6)

2.a)

- i. Positive relationship i.e. the greater the amount of carbon dioxide, the greater the rate of weathering (1) uneven rate of change/non-linear (1) variations with temperature (1) Use of data (1) Any 3 x 1 (3)
- ii. Calcium carbonate dissolves (1) on reaction with weakly acidic rainwater. (1) (2) If carbonation named only (1) Basic idea of solution only (1)
- iii. Limestone pavement, clint, grike, shake hole, doline etc. Any 2 x 1 (2)

b)i. Mainly linear (1) mid-oceanic e.g. Atlantic (1) anomalies of hot spots (1) example/location (1) Any 3x1 (3)

ii. Basic volcanoes result from the eruption of basic lava directly from the mantle, which is fluid, high temperature, low silica %. This flows freely giving low, gently sloping shield volcanoes. This happens at constructive margins where there are rising limbs of convection currents, or at hot spots where there is a plume of rising magma.

Max 2 if related to volcanoes in general, rather than basic. (4)

4-3	Characteristics of lava and appropriate type of location.
2-1	Characteristics of lava or appropriate type of location.

c) Destructive margin examples likely to include Nazca/S.American Plate, Juan de Fuca/N.American Plate. However, ocean/ocean destructive margins are also acceptable e.g. Pacific/Philippines Plate.

Depending on the type chosen, landforms may include fold mountains, ocean trench, island arc, acid cone or composite volcanoes. Explanations should focus on compressional forces, subduction, rising magma etc.

Diagram does not have to be used. Do not double credit diagram and text. (6)

6-5	A reasonable range of appropriate landforms addressed, with clear links between tectonic processes and their formation. Convincing locational detail.
4-3	More than one appropriate landform addressed. Links to tectonic processes may be implied. Named example stated but not well used.
2-1	Either a description of appropriate landform(s) or a simplistic explanation of one. Example may not be stated.

3.a)

- i. 1. 900million m³ (1 mark)
2. 105 million m³. Accept 95-115 (1 mark)
- ii. 1973 is less variable (1) but higher in some months (1) higher mean discharge in 1960 (1) or other valid descriptions (1) use of evidence (1) (3) Any 3 x 1 but must compare explicitly for max.

- iii. The dam (1) controls and regulates the flow, spreading the discharge much more evenly though the year (1). Discharge is higher in June/July due to the high rainfall at that time (1). Drawdown of reservoir in June/July to allow storage for August high input (1). Lower rainfall input in 1973 (1) Any 3 x 1 = (3) but must have reference to dam for max.

b) i. Percolation is the movement of water from the surface (or the soil) (1) into/through the underlying geology (1) (2) Movement through rock only (Max 1)

ii. 1. Likely to be due to differences in rock type (1) permeable or porous rocks having a relatively rapid percolation rate as water can enter more easily (1) (2).

2. Likely to be due to the state of the ground (1), antecedent conditions. height of the water table, frozen surface etc. not allowing water to enter so rapidly (1) (2). Again, beware answers that refer to how much water is available rather than the rate at which it enters (e.g. more rain in the winter than the summer).

N.B. Answers may refer to how much water is available as a factor influencing rate at which it enters (e.g. relating to interception by vegetation).

Max 1 per part for valid factors but answers relating to infiltration rather than percolation.

c) Description and explanation both required. Appearance = main channel divided into smaller channels, separated by small islands (eyots). Formation = high sediment load and variable discharge are the keys. During times of decreasing discharge, competence and capacity decrease and load is deposited in the channel causing the flow to divide. Often related to glacial meltwater or semi-arid stream environments. Decreasing gradient also a factor. Load often quite large.

Diagram does not have to be used. Do not double credit diagram and text.

An example is not required, but one may be used to provide evidence/illustration. (6)

6-5	Accurate description and clear explanation. Secure understanding of processes involved, variable discharge specified, well-linked to the landform.
4-3	Sound description with valid explanation. Deposition generic. Process linkages may be implied and lacking full depth.
2-1	Basic description without valid explanation.

4.a)

i. Diverted north at confluence with Longford brook (1) diverted south-west below footbridge (1) comment about small scale of changes (1) General reference to straightening(1) Any 2 x 1 (2)

ii. 1. stone groynes = deposition around groyne (1) as velocity is reduced and competence lost (1); erosion increased on the opposite side (1) due to diversion of flow and concentration of energy (1). (4)

2. willow stakes = reduce erosion (1) by protecting bank from flow of water (1) trap sediment (1) stabilise bank (1) Any 2 x 1 (2)

b)i. Discharge = Cross sectional area x Velocity (2)

ii. Discharge increases because:

More water is added to the channel by tributaries, larger basin, groundwater flow and direct precipitation. This greater volume of water increases the channel cross section by erosion. The efficiency of the channel increases and so less energy is lost to friction and the velocity of flow increases. Mark on range and depth, but must have increased volume and increased velocity for max. (4)

c) Description and explanation are both required. Causes are likely to include heavy precipitation, snow melt, steep relief, impermeable rock, deforestation, urbanisation etc etc. Good answers should establish explicit links between causes and the flooding itself. No credit for impacts.

Locational detail may come from rainfall data, names of places, rock types etc

Diagram/map does not have to be used. Do not double credit diagram/map and text.

6-5	Accurate description and clear explanation. Secure understanding of processes involved with explicit links between cause and flood. Convincing locational detail.
4-3	More than one valid cause identified. Cause-effect linkages may be implied and lacking full depth. Example named but not effectively used.
2-1	Basic statement identifying cause(s) but no linkages established. Example may not be named. Generalised answer.

5.a)

- i. SW-NE, South West, SW, North East, NE (1 mark)
- ii. Retreated to the north/west/left (1) extended to the south/east/right (1) variable growth especially adjacent to the runway (1) use of data (1) Any 3 x 1 (3)
- iii. Longshore drift is from the SE which originally distributed beach sediment evenly across the length of the beach. The runway now traps sand on the updrift side, causing accretion of the beach, and a lack of sediment being added to the downdrift side to replace that still being moved by longshore drift.

4-3	Developed answer explaining the impact with reference to longshore drift on both sides of the runway. Supply/ removal relationship needed for max
2-1	Basic answer with general reference to longshore drift being affected by the runway.

b)i. Steep, high frequency, high energy /power, short fetch, short wavelength, plunging, low period, tall, strong backwash, weak swash, backwash>swash etc Any 3 x 1 (3)

ii. Beach material is removed (1) beaches become less steep (1) larger material may be left behind (1) bars may develop just off-shore (1) upper beach lowered, lower beach built up (1). Any 3 x 1 or may develop links between wave characteristics and beach form. Mark on depth of links.

c) Description and explanation are both required. Psammosere or halosere may be used. Description should relate to species diversity, density, height, woodiness etc. Explanation should relate to the amelioration of conditions, mainly by autogenic changes such as stabilization by roots. Species detail can provide locational detail. Diagram does not have to be used. Do not double credit diagram and text (6)

6-5	Accurate description and clear explanation. Secure understanding of processes involved with explicit links between factors and temporal changes. Convincing locational detail.
4-3	Sound description. Factors identified but not explicitly linked to the changes. Example named but not effectively used. Likely to focus on spatial change.
2-1	Basic description of changes. No effective explanation. Example may not be named.

6.a)

- i. Overall rise (1) uneven rate of change (1) use of data as evidence (1) (3)
- ii. Initial rise due to melting of glaciers at the end of the ice age adding to the volume of water in the ocean store. Expansion of water in higher temperatures More recent rises (slower) due to global warming/enhanced greenhouse effect. Tectonic downwarping also possible. Isostatic readjustment of rising Scotland
Mark on depth, but must explain at least two elements for max. (4)
- iii. Northumberland (1)
- iv. Isostatic change (1) due to loss of weight on the land as glaciers melted (1) causing land to slowly rise (1) or tectonic uplift (1) Any 2 x1 (2)

b) Likely to include litter control, fencing, boardwalks, education, legislation, signs, replanting etc etc. However, negative effects of trampling, fire, litter etc are also acceptable. Broader scale view of sea-level change or pollution also possible. In each case, 1 mark for the method and 1 mark for how it modifies the ecosystem. Do not fully credit references to erosion control unless explicitly linked to the ecosystem. 2 x 2 (4)

c) Description and explanation both required. Appearance - a narrow strip of beach extending from the mainland out to an island. Formation - may be extension of a spit by longshore drift, wave refraction around an island or migration of off-shore sediments onto the coast during the post-glacial sea level rise. All are acceptable. Diagram does not have to be used. Do not double credit diagram and text. An example is not required, but one may be used to provide evidence/illustration. (6)

6-5	Accurate description and clear explanation. Detailed understanding of processes involved, e.g. swash/backwash movements, well linked to the landform.
4-3	Sound description with valid explanation e.g. relating to l.s.d. Process linkages may be implied and lacking full depth.
2-1	Basic description without valid explanation.

Maximum 4 for references to on-shore bar rather than tombolo.