

GCE

Edexcel GCE

Geography A (8214 / 9214)

6461

Summer 2005

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Mark Scheme (Results)



**1 Study Figure 1 which shows the relationship between climate and the type and rate of weathering**

- a** **With Reference to Figure 1:**
- i** **Define the term weathering:**  
Breakdown and decay of rock (1) in situ (or equivalent) (1)  
by the elements of the weather (1) biological / physical / chemical (1)  
Any 2 x 1 **2**
  - ii** **State the maximum mean annual temperature at which strong mechanical weathering occurs;**  
Accept  $-5^{\circ}\text{C}$  to  $-7^{\circ}\text{C}$  (1) **1**
  - iii** **State the minimum mean annual rainfall required for moderate chemical weathering;**  
Accept 500 mm to 600mm (1) **1**
  - iv** **Explain why strong chemical weathering only occurs in warm wet conditions.** **4**  
Water is the medium for chemical reactions such as solution (2), reactions occur faster at higher temperature in processes such as hydrolysis and oxidation (Vant Hoff's Law: 250% increase in rate for each  $10^{\circ}\text{C}$  rise in temp). Also references to ideal growing conditions for dense vegetation leading to high rates of biochemical weathering. (2)

4-3	Clear links established with specific processes or detail of the relationship/Law.
2-1	Basic statements

- b** **i** **Name two physical factors, other than climate, that also influence the type and rate of weathering.** **2**  
rock type, rock structure, vegetation, relief, soil, aspect (Any 2x1) (2)
- ii** **Explain how rates of weathering may be increased by human activity.** **4**  
increasing acidity of rainfall by pollution eg burning fossil fuels releasing  $\text{CO}_2$ , deforestation exposing rock to temperature extremes, afforestation increasing biological action of plant roots, quarrying/road cutting exposing rocks and releasing pressure, etc.

4-3	Cause-effect links clear, perhaps via process detail
2-1	Basic ideas relating to relevant activities

- c** **With reference to a located example, describe and explain the impact of weathering on a limestone landscape.** **6**  
Likely to concentrate on limestone pavement. May also refer to shake holes/dolines. Physical weathering producing scree also relevant. Beware of cave- based answers that relate more to erosion by running water than weathering. (6)

Diagram does not have to be used; do not double credit.

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6-5	Direct reference to named and convincingly located features. Clearly explained link between process and landform. May make generalised comment about the role of weathering. Accurate use of terminology.
4-3	May be descriptive of landscape with valid features identified but few if any direct refs or clear links to weathering processes. Unconvincing locational detail.
2-1	Low level description of the landscape or a single feature. No convincing explanation or locational detail.

Total 20 Marks

**2 Study figure 2 which shows the global pattern of tectonic plates, earthquake zones and volcanoes.**

- a**
- i** **Name tectonic Plate A;** **1**  
Pacific Plate (1)
  - ii** **Draw a bold arrow on Figure 2 to indicate the direction of movement of the Nazca plate;** **1**  
On diagram-broadly Eastwards (1)
  - iii** **Describe the global pattern of volcanoes;** **3**  
Liner belts/bands (1), Edge of continents (1), at plate margins (1), especially subduction zones (1), Pacific Ring of Fire (1), anomalies mid-ocean (1) Any 3x1 (3)  
Max 1 for list of locations or statement of unevenness.
  - iv** **Explain why volcanoes occur in the Hawaiian Islands.** **3**  
Hot spot (1) plume of rising magma (1) rising as less dense (1) under pressure (1) due to thin, weak crust (1). Any 3 x 1
- b**
- i** **What is meant by the term extrusive igneous landforms.** **2**  
Landforms formed as magma cools and solidifies (1) on the surface (1) (2)
  - ii** **Explain how such landforms can provide economic benefits.** **4**  
Volcanoes attract tourists who spend money in the local economy and create a demand for tertiary employment; lava can weather to produce fertile soils for agriculture, geothermally heated water, etc.

4-3	Cause-effect links clear with focus on economy
2-1	Basic ideas relating to relevant benefits

- c** **Describe and explain the formation of dykes and sills and their impact on the landscape.** **6**

Both formed by magma rising towards the surface but cooling and solidifying beneath i.e. intrusive. Sills form as magma spreads along bedding planes, dykes cut across bedding planes. Impact on landscape generally comes with weathering and erosion of overlying, weaker rocks exposing the resistant dykes/sills. (6)

NB Diagram does not have to be used; do not double credit.

6-5	Clear description and sound explanation of both landforms with reference to landscape impact.
4-3	Sound description of both landforms with some valid explanation.
2-1	Low level description of one or both of the landforms

Total 20 Marks

3 Study Figure 3 which shows the discharge of the River Thames at Eynsham during the water year 2001-2002.

- a
- i **With reference to Figure 3:**  
**Define the term discharge;** **2**  
The rate (1) at which water flows through a channel (1) or CSA x Velocity  
(2) (2)
  - ii **State the maximum discharge in March** **1**  
34-36 cumecs (1)
  - iii **Name the month which had the greatest variation in discharge;** **1**  
Accept January or February (1)
  - iv **Suggest reasons why the discharge is highest in February.** **4**  
Factors could include: heavy rainfall, saturated ground, possible snow melt addition, lack of vegetation cover, low levels of human extraction, limited evaporation loss. (4)

4-3	Cause-effect links clear for at least two factors
2-1	Basic ideas relating to relevant factors

- b
- i **Name and outline three processes by which rivers transport their load.** **3**  
Solution=soluble minerals dissolved  
Suspension=particles held in the body of the flow  
Saltation=particles moved downstream in a series of leap-frogging or hopping motions  
Traction=particles rolled along the river bed  
Floatation=material floating on the surface Any 3x1 (3)
  - ii **Explain how rivers use their load in processes of erosion.** **3**  
Particles of load collide with each other and wear each other away i.e. attrition. Particles of load rub against bed/banks wearing them away. Both processes needed for max (3)
- c **Describe the appearance and explain the formation of a delta.** **6**  
May focus on a particular type (arcuate, bird's foot, estuarine) or deal with more generally, deposition is the basic process, but better answers are likely to refer to braiding and even flocculation. May also refer to the balance between river inputs and marine losses.  
(6)

NB Diagram does not have to be used; do not double credit

6-5	Clear description and sound explanation with some specific process detail
4-3	Sound description with basic references to deposition, perhaps due to energy loss at the mouth
2-1	Low level description of the appearance of a delta

Total 20 Marks

4 Study Figure 4 which shows the annual sediment yield of major drainage basins.

- a **With reference to Figure 4:**
- i **Define the term drainage basin;** **2**  
The area of land drained by a river (and its tributaries) (2)
  - ii **State the annual sediment yield of the Mississippi drainage basin;** **1**  
50 - 99 (1)
  - iii **Describe the global pattern of annual sediment yield;** **3**  
Highest in tropical/low latitudes (1), anomalies within the general pattern eg Alaska or New Zealand (1), use of data (1)  
List of locations (1) statement of unevenness or lack of pattern (1)  
Any 3 x 1 (3)
  - iv **Suggest one way in which climate may have influenced this pattern.** **2**  
Higher rainfall = greater discharge and transport, warmer temps = more weathering and more debris etc. Credit logical answers. Identification of climatic feature (1), link to sediment yield (1) (2)
- b
- i **State how the efficiency (hydraulic radius) of a river channel is calculated.** **2**  
Cross Sectional Area/Wetted Perimeter (2)
  - ii **Describe and explain the relationship between channel efficiency and river velocity.** **4**  
The higher the efficiency, the higher the velocity (1)  
Proportionally (1) less water in contact with bed and banks (1) so less friction to slow speed (1) (4)
- c **With reference to a named river, describe and explain downstream changes in its discharge.** **6**
- Description and explanation both required. Expect an overall increase, perhaps with anomalies. Reasons likely to relate to greater channel volume, increased velocity, human activity eg dams, artificial channels etc (6)

NB Diagram does not have to be used; do not double credit.

6-5	Clear description and sound explanation changes with convincing locational detail
4-3	Sound description of changes, little if any explanation or locational detail
2-1	Low level, generalised description of downstream change

Total 20 Marks

- 5 Study Figure 5 which shows the number of tidal submergences experienced per year along a transect across a salt marsh at Milford Haven (SW Wales).
- a With reference to Figure 5:
- i Describe the relationship between the number of submergences and distance inland from the mean low water mark; 3  
Decreasing number of submergences with increasing distance from MLWM (negative relationship) (1), anomaly at 44m or sudden decrease at 40m (1) Use of data (1)
  - ii Name the type of plant succession found in a salt marsh environment; 1  
Halosere (1)
  - iii Name two plant species commonly found below the mean high water mark in a salt marsh; 2  
Algae, eel grass (zostera), salicornia (glasswort marsh samphire), spartina (rice or cord grass) sea purslane, sea lavender, sea aster or other valid species Any 2x1 (2)
  - iv Explain one way in which plants in a salt marsh adapt to environmental conditions. 2  
Halophytic-can tolerate saline conditions due to salt secreting glands, deep roots-for stability in mud, woody stems-to maintain rigidity, extract nitrogen directly from the air etc.  
(1) for an appropriate "way", (1) for valid explanation. (2)
- b
- i Define the terms swash and backwash 2  
Swash = the movement of water up a beach after a wave has broken (1)  
Backwash = the movement of water down the beach from the top of the swash (1) (2)
  - ii How do swash and backwash strength differ in a constructive wave? 1  
Swash stronger than backwash (1)
  - iii What effect do constructive waves have on beaches? 3  
Deposit beach material (1), increase average gradient (1), move larger particles further up beach (1), produce berms (1) Any 3x1 (3)  
No double penalty if (ii) is reversed.
- c With reference to a named example, describe and explain the formation and development of a spit. 6

Description and explanation both required. Expect references to longshore drift for formation, with development of marsh behind and curving of end in better answers for development. Growth across an inlet to form a bar also possible.

NB Diagram does not have to be used; do not double credit

6-5	Clear description and sound explanation with some idea of development. Convincing locational detail.
4-3	Sound description of shape with basic explanation
2-1	Low level, generalised description of spit

Total 20 Marks

6 Study Figure 6 which is a photograph of Milford Sound, a fjord in New Zealand.

- a
- i **Describe the shape of the fjord;** 2  
Any relevant descriptive comments (2 x 1) (2)
  - ii **Suggest how fjords are formed;** 4  
Drowned lower reaches of glacial troughs formed as relative sea level rises. This could be caused by isostatic or eustatic change.

4-3	Development of either glacial processes and / or sea level changes.
2-1	Basic ideas of rising sea level and glacial troughs

- iii **Identify two ways in which rias differ from fjords.** 2  
Rias were river valleys whilst fjords were glacial valleys  
Rias are more winding whilst fjords are relatively straight  
Rias have V-shape cross-section whilst fjords are U-shaped  
Rias gradually deepen towards sea whilst fjords may have a shallow threshold  
Rias have less steep sides  
  
Any 2 x 1 (2)

- b i **Outline how human activity might contribute to long - term rising sea level.** 2  
Burning fossil fuels which increase the concentration of greenhouse gases in the atmosphere and contributes to global warming. This causes glaciers and ice sheets to melt, adding more water to the ocean store. Outline only required. (2)
- ii **Describe two effects of long - term rising sea level on human use of the coastline.** 4  
May cause increased rates of erosion and coastal retreat; may lead to increased frequency and level of coastal flooding etc. Increases the need for coastal defences such as sea walls. Effects on settlement, agriculture, transport and industry are possible. For example, increased salinity of groundwater reducing agricultural productivity. Description only required. (4)

- c **With reference to a named example, describe the appearance and explain the formation and development of a stack.** 6  
Description and explanation both required. Expect references to erosion and arch collapse for formation, with subsequent undercutting and collapse to form stump as development.

NB Diagram does not have to be used; do not double credit

6-5	Clear description and sound explanation with some idea of development. Convincing locational detail.
4-3	Sound description of appearance with basic explanation of formation
2-1	Low level, generalised description of stack

Total 20 Marks

