

GCE

Edexcel GCE

Geography A (6461)

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Mark Scheme (Results)



## Section A

1. a. Study Figure 1 which shows the global distribution of island arcs.

i. Name the island arc labelled A. 1  
Japan/Japanese islands

ii. Describe the global distribution of island arcs. 3  
Uneven (1), linear/curved lines (1), mainly parallel to coastlines (1), edge of oceans (1), anomaly of those further away from coastlines such as Marianas (1), use of evidence(1). Any 3x1

iii. Explain how island arcs are formed. 4  
At subduction zones, the leading edge of the subducting oceanic plate is melted in the heat and pressure of the asthenosphere. The resultant magma is forced upwards through the overlying crust, erupting as volcanoes and forming a chain of volcanic islands parallel to the edge of the plate. This usually involves one plate of oceanic crust subducting underneath another.  
NB Answers may comment on the distance of the islands away from the continental land mass, due to the low angle of subduction and/or the presence of oceanic crust at the plate margin.

4-3	Developed answer giving process and / or plate details.
2-1	Basic idea that volcanic activity is occurring at plate margins.

b i. Define the term weathering. 2  
The breakdown and / or decay (1) of rock "in situ" (1), usually by the elements of the weather (1), types identified (1). Any 2x1

ii. Briefly explain how rocks are weathered by: 2  
1. pressure release

The weight of overlying rocks or other material, such as ice, causes the rocks beneath to be compressed and compacted. When the pressure is released, as overlying rocks are eroded or when ice melts, the pressure is released and the underlying rock expands causing it to crack and fracture.

2. thermal expansion (insolation). 2  
In areas such as hot deserts, the extremely high daytime temperatures cause minerals within rocks to be heated and to expand. This creates stresses in the rock and so it cracks and fractures. This is compounded by the contraction experienced at night when temperatures are very low. Outside layers expand whilst inner layers do not. Different coloured minerals expand/contract at different rates.

NB Only an outline is required.

C

**Describe and explain the range of impacts that weathering can have on human activity.**

6

Description and explanation are both required. A range of impacts should be identified, and these may be both positive and negative. Negative impacts include building damage and disruption to transport; positive impacts include the formation of landscapes that attract tourists, the creation of valuable products such as kaolin and the formation of soil for agriculture. Explanations should be explicitly linked to the impact on human activity. Examples may be useful but are not a requirement.

6-5	Range of ideas described and explained, possibly supported with examples.
4-3	Range of ideas described, but with little effective explanation. Or one idea described and explained.
2-1	List of impacts stated or one idea simply described.

2. a. Study Figure 2 which contains an extract about the theory of continental drift from a recently published book.
- i. What name is given to the 'single land mass'? 1  
Pangea.
- ii. Describe the evidence used to support the theory of continental drift in terms of:
1. fossils 2  
Fossils of species such as mesosuarus have been found in both Africa and South America. They were small, fresh water creatures that could not have swum the Atlantic, suggesting that the two continents must one have been joined. Other relevant species include the fern, glossopteris, and the Triassic reptiles, cynagnathus and lystrosaurus.
2. geology. 2  
Rocks of similar type, age, formation and structure are found in Brazil and southern Africa. The Appalachians and the Caledonian mountains of Scotland are similar in many ways. This suggests that they were formed together and have subsequently moved apart. Other relevant evidence includes folds and faults, pre-Cambrian shields and tillites.
- NB Description of evidence is all that is required.
- iii. Suggest why the theory was not readily accepted by geologists. 3  
The key reason was that there had been no explanation as to how the continents had changed position, i.e. no acceptable mechanism had been suggested. It was, in fact, suggested that it might have been the centrifugal force of the Earth's rotation or the gravitational pull of the moon. Physicists showed that neither force was strong enough. The lack of knowledge of the intervening sea floor was also a problem. Wegener himself was also not regarded as a subject specialist in any of the areas from which he had drawn his evidence.  
NB Mark on range or depth.
- b. i. What are hot spots? 2  
Hot spots are locations often away from plate margins (1) where magma is rising within the asthenosphere (1) possibly as a mantle plume (1). 2x1
- ii. Describe the characteristics of the lava that usually erupts at hot spots. 4  
Basic (1), low viscosity/ runny (1), high temperature (about 1200 C) (1), low silica content (<50%) (1), able to flow far before solidifying (1), pillow lavas common (1).  
Any 4x1 but extra credit to details such as % silica and approx. temperature.
- c. With reference to a located example, describe and account for the tectonic activity typically associated with a conservative plate margin. 6  
Description and explanation are both required. The emphasis is on the activity, not landforms. An example is required, N.American and Pacific boundary most
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likely. Activities include plate movements, earthquakes and faulting-both horizontal/transform and vertical displacement. May refer to lack of volcanic activity.

Located detail includes names of plates, dates/strengths of earthquakes, names of fault lines.

6-5	Range of process described and explained, supported with convincing located detail.
4-3	Range of processes described, but with little effective explanation or located detail. Or one process described and explained.
2-1	List of process stated or one process simply described

### Section B

3. a. Study Figure 3 which shows the storm hydrograph for an event on a small stream in northern England in May 2004.
- i. Name component B of this stream's discharge. 1  
Groundwater flow or base flow
  - ii. Calculate the lag time of this event. 1

3/3.5 hours

iii. **Describe the shape of the hydrograph.** 3  
Flashy (1), steep rising limb (1), less steep recession limb (1), high peak (1), use of data (1). Any 3x1

iv. **Explain the influence of two physical factors likely to have produced a hydrograph of this shape.** 6  
Factors include: lack of vegetation, thin soils, steep relief, small basin, saturated soil, high drainage density, impermeable rock, intense rainfall, spring snow melt etc  
One mark for the factor and up to two more for the explanation in each case. Must link to shape for max, probably via the production of lots/rapid surface run-off. 2x3

b. **Name and outline three mechanisms by which rivers transport sediment.** 3  
Mechanisms include floatation, suspension, saltation, traction, solution.....3x1 mark, but must have correct name with the outline. One mark for a list of names.

c. **With reference to a located example, describe the appearance, and explain the formation, of a waterfall.** 6  
Description of appearance and an explanation of the formation are both required. The diagram does not have to be used but may aid description. Do not double credit text and diagram. An example should be used.  
Located detail includes rock types, dimensions, name of river/waterfall.

6-5	Detailed description and accurate explanation with convincing locational detail.
4-3	Clear description and some simple explanation with location stated, but not used.
2-1	Basic description without any valid explanation.

4. a. **Study Figure 4 which is a classification of river landforms based on their formation.**

i. **Identify the following landforms in the table from the definitions below:** 3

1. A river channel divided into two or more channels separated by bars and islands.  
Braided channel

2. Small uneven steps on a river bed often created by resistant bands of rock across the channel.  
Rapids

3. A low ridge of alluvium running parallel to a river channel.  
Levéé

- ii. **Describe the position and appearance of a flood plain.** 2  
 Position = lower course or either side of the channel (1) Appearance = flat or low-lying, presence of levees (either for 1)
- iii. **Explain how flood plains are formed.** 4  
 Erosion on the outside bend of a meandering river widens the valley floor by causing the retreat/removal of bluffs. Deposition by the river during times of flood causes the flood plain to build up with a layered structure. Mark on depth but must include erosion and deposition for max.
- b. i. **Define the term precipitation.** 2  
 Any deposit of moisture (1) from the atmosphere to the ground (1) whether solid or liquid (1), including rain, snow, sleet, hail... (1) Any 2x1
- ii. **Explain how orographic (relief) processes cause rainfall.** 3  
 Air carrying water vapour moves towards a relief barrier. The air is forced to rise over the barrier. As it does so it cools and, if dew point temperature is reached, it becomes saturated. Further cooling means that the air can not hold all of the water vapour it contains and so some is condensed into water droplets forming clouds. If the water droplets become large enough they fall as rain.

3	Reference to condensation process or raindrop formation process.
2-1	Basic idea of air rising and cooling over a relief barrier.

- c. **With reference to a named example, describe and explain the downstream changes in river velocity.** 6  
 Description and explanation are both required. Explanation could be related to gradient, channel shape, human activity, rock type etc but must be explicitly linked to velocity. A graph or diagram may be used but is not required. Located detail includes names of places, velocity data, rock types etc. Do not double credit text and diagram. Beware for answers referring to discharge rather than velocity; there may still be credit via factors or partial explanation.

6-5	Accurate description and sound explanation. Convincing locational detail used.
4-3	Accurate description but little effective explanation and use of located detail
2-1	Vague, inaccurate description of downstream change.

### Section C

5. a. Study Figure 5 which is a photograph of coastal landforms on the south coast of Malta, an area that has experienced long-term sea-level change.
- i. Identify the landform formed as a result of sea level change. 2
- C. abandoned (relict) cliff
- D. raised beach or platform.
- ii. Describe the sea level change responsible for these landforms. 1  
Fall/drop/decrease
- iii. Suggest reasons for this type of sea level change. 4  
Eustatic = decreasing global temperature meaning more water stored on the land as snow and ice, less returned to the ocean store hence sea level falls.  
Isostatic = rising land levels following the melting of ice cover and loss of weight at the end of a glacial period  
Tectonic uplift = due to convergence of plates.  
Mark on depth but must have more than one for max.
- b. With reference to a located stretch of coastline, suggest how rising sea levels may influence different types of human activity. 6  
May refer to settlement, agriculture, transport, industry, tourism etc.  
Influences may be positive (eg increased tourism inland) as well as the more obviously negative (eg the loss of farmland). Location detail includes names of places, tourist attractions, farms, road numbers etc.
- |     |  |
|-----|--|
| 6-5 | A wide range of activities identified with links between cause-effect explicitly made. Convincing locational detail. |
| 4-3 | A narrow range of human activities referred to but clear cause-effect links are made. Location stated but not used.  |
| 2-1 | Possibly a list or a few simple statements of human activities that could be affected. Location un-named.            |
- c. i. Name and outline three processes by which waves erode coastlines. 3

Processes include hydraulic action, pounding, corrosion (solution) and abrasion (corrasion). 3x1 mark, but must have correct name with the outline. One mark for a list of names.

- ii. **Explain how rates of marine erosion may be influenced by geological factors.** 4  
 Factors include presence of cracks/joints/faults/bedding planes, chemical composition, strength of bonds etc. Named examples can provide evidence.

4-3	Developed answer with specific geological characteristics, and possibly examples.
2-1	Basic ideas of weak/resistant, with examples

6. a. **Study Figure 6 which is a model of the influence of wave energy on coastlines.**

- i. **Suggest entries for boxes E and F.** 2  
 E = wave energy less than coastline resistance (1)  
 F = deposition (1)

- ii. **Describe how waves change when entering shallow water.** 2  
 slow down (1), steepen (1), reduce in wavelength (1), break (1). Any 2x1

- iii. **Explain the influence of two factors that can affect coastline resistance.** 4  
 Factors include geology, human activity, vegetation, beach material, beach angle/width..... Mark on depth of explanation. (2 x 2)

- b. **Describe the typical characteristics of constructive waves.** 4  
 Low height (1), low energy (1), low frequency (1), low angle (1), swash>backwash (1), depositional (1).... Any 4x1

- c. i. **Define the term ecosystem.** 2  
 The interaction of living organisms (1) with their surrounding environment (1).....or similar.

- ii. **With reference to a located example, describe how and explain why coastal ecosystems are modified by different types of human activity.** 6  
 Both how (method/impact) and why (reason/strategy) need to be addressed. The focus must be on the ecosystem (plants, animals, soil) not erosion defences. Examples might include Studland or other sand dune ecosystems.  
 Activities include negative ones such as trampling, littering, lighting fires etc and positive management approaches such as fencing off, replanting, litter bins/patrols, designated barbeque areas. Located detail includes species names, landowner, number of visitors etc

6-5	Both how and why are addressed. Clear focus on the elements of the ecosystem. Range of different human activities used. Convincing located data/detail.
4-3	Clear focus on how with methods and/or impacts

	effectively described. Explanation may be very limited or lacking. Direct references to ecosystem. Location named but not used.
2-1	Vague generalised and unsupported statements about coastal management. No focus on ecosystem. Location not named.