



## **General Certificate of Education**

# **Geography 6031**

## *Specification A*

### **GGA4      Challenge and Change in the Natural Environment**

# **Mark Scheme**

*2008 examination - January series*

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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# GGA4

## General Guidance for A Level Geography Assistant Examiners

### Quality of Written Language

As required by QCA, the marking scheme for this unit includes an overall assessment of quality of written communication. There are no discrete marks for the assessment of written communications but where questions are “Levels” marked, written communication will be assessed as one of the criteria within each level.

- Level 1:** Language is basic; descriptions and explanations are over simplified and lack clarity.
- Level 2:** Generally accurate use of language; descriptions and explanations can be easily followed, but are not clearly expressed throughout.
- Level 3:** Accurate and appropriate use of language; descriptions and explanations are expressed with clarity throughout.

### Levels marking – General Criteria

The following general criteria relate to knowledge, understanding and their critical application and the quality of written communication as outlined in the AQA Geography A subject specification. They are designed to assist examiners in determining into which band the quality of response should be placed, and should be used when assessing the level of response an answer has achieved. It is anticipated that candidates’ performances under the various dimensions will be broadly inter-related and the general guidelines for each level are as follows:

**Level 1:** An answer at this level is likely to:

- display a basic understanding of the topic;
- make one or two points without support of appropriate exemplification or application of principle;
- demonstrate a simplistic style of writing perhaps lacking close relation to the term of the question and unlikely to communicate complexity of subject matter;
- lack of organisation, relevance and specialist vocabulary;
- demonstrate deficiencies in legibility, spelling, grammar and punctuation, which detract from the clarity of meaning.

**Level 2:** An answer at this level is likely to:

- display a clear understanding of the topic;
- make one or two points with support of appropriate exemplification and/or application of principle;
- demonstrate a clear style of writing which clearly addresses the terms of the question;
- demonstrate a degree of organisation and use of specialist vocabulary;
- demonstrate sufficient legibility, and quality of spelling, grammar and punctuation to communicate meaning clearly.

**Level 3:** An answer at this level is likely to:

- display a detailed understanding of the topic;
- make several points with support of appropriate exemplification and/or application of principle;
- demonstrate a sophisticated style of writing incorporating measured and qualified explanation and comment as required by the question and reflecting awareness of the complexity of subject matter and/or incompleteness/tentativeness of explanation;
- demonstrate a clear sense of purpose so that the responses are seen to closely relate to the requirements of the question with confident use of specialist vocabulary;
- demonstrate legibility of text, and qualities of spelling, grammar and punctuation, which contribute to complete clarity of meaning.

**N.B.** A perfect answer is not usually required for full marks. Clearly it will be possible for an individual candidate to demonstrate variable performance between the levels. In such cases the principle of best-fit should be applied. Experience suggests that the use of exemplars within this mark scheme and the discussion, which takes place during the Standardisation Meeting normally provides sufficient guidance on the use of levels in marking.

### **Annotation of Scripts**

- Where an answer is marked using a levels of response scheme the examiner should annotate the script with a 'L1', 'L2' or L3 at the point where that level is thought to have been reached. The consequent mark should appear in the right-hand column. Where an answer fails to achieve Level 1, zero marks should be given.
- Where answers do not require levels of response marking, each script should be annotated to show that one tick equals one mark. It is helpful if the tick can be positioned in the part of the answer, which is thought to be credit-worthy.

### **General**

It is important to recognise that many of the answers shown within this marking scheme are only exemplars. Where possible, the range of accepted responses is indicated, but because many questions are open-ended in their nature, alternative answers may be equally credit-worthy. The degree of acceptability is clarified through the Standardisation Meeting and subsequently by telephone with the Team Leader as necessary.

- 1 (a) A raised beach is an emergent coastal landform. Raised beaches are former beaches or wave cut platforms often with relic cliffs behind them – credit some idea of how these are in themselves formed (1-3). They are raised above the shore line by a relative fall in the sea level (eustatic) (1-2). It may also be as a result of the isostatic recovery of the land. Can also be formed when tectonic activity, such as earthquakes, causes the level of the land to rise (1-2). (4 marks)
- (b) Similarities – “drowned” / valleys / caused by post glacial isostatic readjustment (1-3).

Differences (1-3)	Rias	Fjords
Origin	River valley	Glacial valley
Cross-section	V-shape	U-shape
Long profile	Gently sloping (grade)	Over-deepened – “lip”
Plan	Usually dendritic	Usually straightened
Size	Medium scale	Can be huge

Must compare and contrast for full marks.

(4 marks)

- (c) A definition of the two would constitute a good introduction. Also relevant is the rate of change, both of which tend to be gradual. Locational aspects, with isostasy only occurring in (formerly) glaciated areas, are also relevant. Examples of physical impacts of isostasy include raised beaches, rias and fjords from parts (a) and (b) but these in themselves are not creditworthy unless human impacts (farming on raised beaches, sheltered harbours for rias and fjords as well as increasing problems of land communications) are clearly stated. Eustatic changes are likely to concentrate on the issues of sea level rise caused by global warming, especially on low lying areas such as the Netherlands and Bangladesh.

Any view as to extent can be creditworthy, provided it is supported in theory and/or exemplar.

#### Level 1 – Generic Descriptor (1 - 3)

A general statement, possibly defining isostatic and eustatic correctly but with little or no development, theory or exemplars. An answer which only deals with isostatic **or** eustatic changes.

#### Level 2 – Generic Descriptor (4 - 6)

Probably defines isostatic and eustatic correctly with some idea of different impacts, maybe using exemplars and/or showing knowledge, probably not balanced.

#### Level 3 – Generic Descriptor (7)

Clear statement as to **extent** and dealing with human impacts, showing understanding of both isostatic and eustatic changes, with knowledge and/or exemplars.

(7 marks)

**Total for this question: 15 marks**

- 2 (a) Requires a clear statement about forces, thought to be convection currents heated from two main sources: radioactive decay and residual heat (1-3). Some ideas on the nature of different plates and also relative speeds (1-2). The structure of the earth and the slow movement of hot, softened mantle that lies below the rigid lithospheric plates (1-3). Forces associated with subduction are thought to be more important than seafloor spreading (1-3). (4 marks)
- (b) Hot spots are not associated with margins and are thought to be caused by plumes of magma from within the mantle rising through the oceanic crust. The basic magma forms gentle sloping sea mounts reaching from the ocean floor to above the ocean surface (1-3).

These plumes remain relatively stationary within the mantle and the crust moves across them, giving rise to a line of these volcanic mounts increasing in age away from the current hot spot. Only the volcano over the hot spot is active (1-3).

(4 marks)

- (c) This is about impacts on humans but also requires knowledge of processes taking place at the respective margins. Comments regarding different human perspectives are also relevant.

Constructive margins have relatively small land surfaces and so fewer people are directly involved. The processes of sea floor spreading and the development of (largely submarine) volcanic ridges are fairly gentle affairs and, even when hazardous, can be managed (Heimaey, Iceland 1973).

Destructive margins have far more violent processes with explosive, more acidic volcanoes. Since many destructive margins are near coasts there are likely to be more people living there and so are also subjected to earthquakes and tsunamis.

It is unlikely that candidates will attempt to argue against the statement but any attempt to do so should be assessed in the light of the levels criteria.

**Level 1 – Generic Descriptor (1 - 3)**

Basic statements, with general differences or reference to only one type of margin.

**Level 2 – Generic Descriptor (4 - 6)**

More detailed comments about both types of margins and understanding of **either** theory **or** impacts, probably with exemplars.

**Level 3 – Generic Descriptor (7)**

Detailed and knowledgeable comments regarding **both** margins with an explanation showing understanding of both theory **and** impact, with exemplars.

(7 marks)

**Total for this question: 15 marks**

- 3 (a) Distribution is roughly concentric – continuous permafrost closest to the pole and sporadic furthest away (1-2). However, areas of high altitude have fingers stretching further (Rockies, etc) (1-2). The effect of warmer ocean inlets is reflected in the land based permafrost nearby, but the reverse is true for mid continental areas (1-3).

No credit for explanation, which is needed in part (b).

(4 marks)

The use of lines of latitude and/or the Arctic circle to define zones (1-2).

- (b) The main factors are:

- Energy gains and losses from the surface so summer insolation, which decreases the nearer it is to the pole affects the active layer and the depth of permafrost. Net heat loss in the winter is considerable and increases closer to the pole (1-3).
- Thermal characteristics of the subsurface layer; wet ground takes longer to heat up because of the high specific heat capacity of water and dry ground vice versa (1-2).
- Altitude can accentuate the permafrost and rivers reduce it (1-2).
- Continental areas with much lower winter temperatures mean that the permafrost extends further southwards whilst the opposite is true for ocean inlets (e.g. north-western Europe is warmed by the North Atlantic Drift) (1-3).

Alternatively, candidates may offer detail regarding each zone (the actual temperatures are for examiner's guidance only):

- Continuous permafrost exists where winter temperatures are very low (down to  $-50^{\circ}\text{C}$ ) and summers are very short and average temperatures are below  $-5^{\circ}\text{C}$
- Discontinuous permafrost occurs where temperatures average between  $-5^{\circ}\text{C}$  and  $-1.5^{\circ}\text{C}$
- Sporadic occurs when the average is between  $-1.5^{\circ}\text{C}$  and  $0^{\circ}\text{C}$  (1-3).

(4 marks)

- (c) This question asks not only for the strategies themselves but also their effectiveness and broadens out to include other factors than just permafrost. Credit should be given for a range of strategies as well as some idea of their success or failure. The question refers to “cold environments” and examiners are reminded that this is a fairly wide remit according to the specification.

In terms of permafrost regions, there are several strategies and consequences such as:

- pipelines built on stilts which are quite successful, but oil spills compromise not only the permafrost but also the environment;
- roads and airstrips built on gravel pads because drained gravel does not develop ice and frost is not compromised, vehicles, however, still suffer from problems of frost, icing and gales.

In other areas there are different strategies and this may provide a broader canvas; transhumance, avalanche protection, solving problems of communications, etc.

**Level 1 – Generic Descriptor (1 - 3)**

One or two strategies described simply

**Level 2 – Generic Descriptor (4 - 6)**

Two or more strategies described, maybe with some exemplars, in some detail but with limited idea of effectiveness

**Level 3 – Generic Descriptor (7)**

Two or more strategies explained, with either exemplars or theory, with a clear attempt to assess the effectiveness of at least two of them. (7 marks)

**Total for this question: 15 marks**

## Mark Scheme for Synoptic Essays

### Preamble

Examiners should bear in mind that these questions are synoptic in nature and offer candidates the opportunity to demonstrate knowledge and understanding:

1. across a range of geographical subject matter;
2. of connections between the different aspects of geography in the specification;
3. of the importance, where relevant, of human perspectives on themes and issues.

Candidates are advised of this both in the Assessment Unit Rubric and in the Note to Candidate which precedes the essay questions in Section B. Synoptic elements might therefore feature in answers matching all the criteria bands but can be expected to feature more prominently in higher mark bands. It will be seen that explicit synoptic content is a necessary feature of the two band ranges 21-27 and 28-30.

Additionally, essay writing is an important vehicle for the demonstration of communication skills – at level 3 these refer to writing in a manner appropriate to purpose and complex subject matter; organising relevant information clearly and coherently using specialist vocabulary as appropriate and ensuring clarity of meaning through legible text, accurate spelling, punctuation and grammar. (Key Skills – Communication Level 3 C3.3 [QCA]; Para. 13 AS/A Level Geography Specification Outlines [QCA].

Synoptic content and communication aspects should be kept in mind when assessing the unit and are incorporated into the criteria bands set out below which refer to knowledge, understanding and skills. Indicate synoptic content using the letter 's' in the margin as appropriate.

### CRITERIA BANDS

Examiners will use the criteria below to evaluate the work, placing the candidate's performance in the appropriate band and attributing the mark from the left-hand column appropriate to the question concerned. They should seek the best fit from the band descriptor – work adjudged to be in a particular band might not contain all the features attributed to that band.

#### 28 – 30

A very good answer. Consistently relevant to the theme and to the demands of the question. Evaluates explicitly where required. Displays a very confident range of knowledge and understanding by using the appropriate terminology, critically referring to concepts and theory where necessary and establishing relationships between different physical and/or human factors and processes. Synoptic elements are a prominent feature and are fully integrated into the answer and used to purposeful effect in respect of the question's requirements. Demonstrates, where relevant, either implicitly or explicitly awareness of human perspectives upon geographical themes and issues. Argues coherently and in an organised, logical and balanced fashion. Support is consistent, accurate and detailed. A well developed essay style. Detailed and sophisticated communication skills with fluent and cogent writing style.

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**21 – 27**

A good answer which remains relevant to the theme and demands of the question. Evaluation may now only be implicit. Displays a confident range of knowledge and understanding, but with a few omissions at the lower end, e.g. some terminology missing or some pertinent relationships left unexplored. Synoptic elements should be a feature of the answer and seen to be meeting the questions requirements. Some possibly rather uncritical reference to theory; some reference to awareness of human perspectives and decisions taking on geographical issues and problems. Argues well, but organisation may be suspect in places. Support is invariably there, but may not always be detailed. A competent essay style. Effective communication skills with accurate spelling, punctuation and grammar.

**14 – 20**

A satisfactory answer ranging down to the mediocre, which always attempts, but not always succeeds to be relevant. Lacking in evaluation. Displays a reasonable grasp of knowledge, but understanding is suspect in places. Relevant theory and concepts might be mentioned but with basic uncritical application. The interconnections and relationships between different physical and/or human processes are briefly mentioned but understanding of their significance is limited. There is some synoptic content which is relevant to the question. Argument and analysis are partial and become less significant in relation to mere description. Increasingly unbalanced as an answer, and the logic and organisation are clearly deficient. Support is not detailed here, occasionally inaccurate and barely consistent. The bare bones of an essay format. Appropriate communication skills so that meaning is almost invariably clear with adequate language skills. Possibly some spelling/punctuation/grammar errors.

**7 – 13**

A very mediocre answer which is only occasionally relevant to both the theme and the demands of the question. Decidedly deficient in knowledge and understanding with only simplistic notion of relevant theory and concepts. Little if any relevance to inter-relationships between physical and/or human processes and factors or subject matter from other elements in the specification. Increasing irrelevance in a predominantly descriptive context. Clearly lacks an ability to organise material and may drift into another answer. Support is scanty and usually suspect. A weak, barely perceptible, essay format. Basic communication skills – many spelling errors and/or oddities of grammar and punctuation.

**1 – 6**

A very weak answer which shows little attempt to follow the theme and the demands of the question. A very low level of knowledge and understanding, with even the simplest of concepts avoided. Very inaccurate and may completely miss the point. No idea of how to organise material with haphazard format, evidence of guesswork and little or no support. No attempt at an essay format. Little or no language and communication skills. Many errors in spelling, punctuation and grammar.

#### 4 To what extent should coastal management put economic necessity before environmental concerns?

This question covers much of the content and ideas in the “Coastal Management Strategies” section of the specification. It is designed to be synoptic in nature, with opportunities for economic issues such as tourism, transport, regeneration and even power supply being put into context not only with environmental concerns such as wildlife and pollution but also within MEDW/LEDW perspectives.

There may well be other issues driving coastal management that do not fit into this spectrum; where, for instance, do attempts at tsunami prediction and prevention fit? Examiners are reminded that to achieve marks in the Good Band and above, answers must be clearly synoptic.

The three strands to the question are: “Coastal management”, which needs to be defined, be it hard/soft engineering or varying strategies such as managed retreat or landscape protection. “Economic necessity” and “environmental concerns” also need to be addressed in terms of reasons, decision making, cost/benefit analysis etc. Then the underpinning demand to decide on the “extent” to which the statement is correct, examiners should note that this does not necessarily need to come in a conclusion but may appear anywhere in the essay from the introduction to evaluation.

The following is an attempt to consider the debate along with some possible content but should not be considered prescriptive but rather an outline to focus examiners on some valid ways of answering the question.

The statement was probably true for most management strategies in the past for the developed world; the Victorian/Edwardian penchant for hard engineering (sea walls/promenades and groynes) for seaside resorts with little or no awareness of the consequences downdrift, as exemplified by the usual well-rehearsed exemplars from the Dorset, Sussex and Holderness coasts. Subsequent demands for safe harbours using break-waters etc. along with protection of industrial installations such as Bacton Gas Terminal. Flood protection schemes, such as the Thames Barrier and the integrated schemes in the Netherlands are clearly driven by economics, both in their costs and their benefits.

The statement is probably true for much of the LEDW, where management, such as exists, is concerned with saving lives and livelihoods, such as mangroves and earth banks in Bangladesh. Other matters can be even more destructive, including the exploitation of coral reefs, etc.

However, the environmental considerations have become an integral part of recent planning in the MEDW, where wildlife assessments, impacts on local water levels and pollution issues are mandatory parts of large scale planning applications. Cardiff Bay is a possible exemplar where up to 6000 wading birds which fed on the many invertebrates (ironically fed by the sewage outflows from Cardiff) that lived in the mudflats were displaced. So the CBDC has sponsored the creation of a wetlands reserve further up the coast. Other environmental issues included coarse fish migratory routes through the barrage and dealing with algal blooms. Other exemplars could include Netherlands and the creation of the IJsselmeer as a freshwater lake, numerous wildlife reserves and the protection of the outer dunes.

The debate could now be said to be coming full circle. The Blue Flag system of grading British beaches means that, unless the local councils literally “clean up their act” they may well lose revenue from tourism. The development of numerous nature reserves is now bringing a different kind of tourist to some coastal areas. Coral reefs are now being protected as it is becoming clear that they are a valuable resource rather than a source of tourist “tat”.

A descriptive case study or series of examples of coastal management strategies with no explicit relationship to the question but from which an answer may be inferred is unlikely to achieve more than 16 marks. Such a response with concluding comment which refers clearly and explicitly to the terms of the question and which offers some reason(s) as to why coastal management is economic necessity first and environmental consideration last (or not) may achieve up to 20 marks.

Any kind of conclusion as to extent can be valid, providing that it is supported, argued and developed from the essay content.

**Total for this question: 30 marks**

**5 Earthquakes have less impact than mass movement on human activity and physical landscapes. To what extent do you agree with this view?**

This question is designed to link the physical characteristics of earthquakes and mass movement and their impact on the human and physical environments. As such, its content is restricted to those two processes, so the introduction of volcanic eruptions into a response needs to be specifically linked to them (this could include eruptions triggering localised earthquakes and/or mass movement such as mud flows).

Although the question does not refer specifically to hazards, it is to be expected that many responses will focus on the human impacts in these terms.

In terms of synoptic elements of answers, the standard means of accessing synoptic credit may be present (tourism, economics, MEDW/LEDW etc) but may be limited by the terms of the question. So examiners are asked to consider that breadth and depth (including world views and long time scales) in a response can also be considered synoptic. Examiners are reminded that to achieve marks in the good band and above, answers must be clearly synoptic.

Possible content – physical impacts (this is likely to be theoretical rather than exemplar based)

- different mechanisms, earthquakes driven largely by plate movement whereas mass movement is gravity led
- earthquakes tend to be spasmodic and in certain areas whereas mass movement occurs almost everywhere there is a slope
- earthquakes can raise, lower or slip the surface, often to a considerable depth whereas mass movement is about redistributing material from the top to the bottom of a slope and is rarely very deep
- earthquakes can trigger mass movement

Possible content – human impacts (exemplars are likely to be more important here)

- not all earthquakes are hazards and very few mass movements are hazards – yet they can effect the human landscape in a number of ways, including construction of buildings, roads, railways, canals, etc
- there is an implicit impact on agriculture from mass movement where deeper soils are downslope
- however, it is to be expected that hazards will constitute a major part of most responses, with earthquake hazards being shown to have a greater impact (with Kobe, Izmit and all the usual suspects) than mass movement (with Aberfan, etc)
- in this respect prediction and preparation may have some credit, especially with LEDW/MEDW contrasts evident.

On a broader canvas, some responses may point out that the physical impacts of these two processes have been happening on the earth for much longer than humans have been present. This broader view is certainly creditworthy and synoptic.

A descriptive case study or series of examples of earthquakes and mass movement with no explicit relationship to the question but from which an answer may be inferred is unlikely to achieve more than 16 marks. Such a response with concluding comment which refers clearly and explicitly to the terms of the question and which offers some reason(s) as to why earthquakes have more impact than mass movements (or otherwise) may achieve 20 marks. It is difficult to envisage an answer that deals solely with earthquakes **or** mass movement accessing any higher than the lower few marks of the satisfactory band. However, examiners are asked to tolerate an imbalance between human and physical, even at the higher level.

Any reasonable conclusion can be credited providing it is measured, realistic and related to essay content. A balanced and measured answer, with appropriate support, which argues a clear case, is likely to access higher marks.

**Total for this question: 30 marks**

**6 Discuss the view that human activity had more impact on cold environments in the past than it will have in the future.**

This question is synoptic in nature and is designed to engage with the “Present problems and future issues” section of Cold Environments. Synoptic elements may include economics, population pressure, tourism, political and strategic issues. Examiners are reminded that to achieve marks in the good band and above, answers must be clearly synoptic.

The two strands of the question are “human activity” on a variety of scales and activities; and “Cold Environments”, for which a series of definitions would be useful. The whole question is over-arched by “discuss” in terms of past and future. Examiners are reminded that this comment can appear anywhere in the answer, even in the introduction.

The content for human activity is the usual diet of indigenous peoples, sealing/whaling, fur trapping, mineral exploitation followed by more recent HEP, fishing, tourism, political, scientific, etc.

Possible content for the future could include Global Warming, which is clearly the result of human activity:

- reduction in size and depth of permafrost meaning changes in processes, ecology, etc
- warmer climates may make it easier to live in/ extract minerals, etc
- sea level rise will put greater pressure on land areas elsewhere – migration polewards is a real possibility in the northern hemisphere
- impact on the oceans the Southern Ocean currents may be affected by changes in El Niño/La Niña – therefore, fishing may be adversely affected
- Weather events may become more severe, making economic development more difficult
- decrease in size and volume of snow fields, affecting winter sports activities.

Other content for the future could include:

- population pressure, leading to increased demand for land and resources
- increased affluence leading to greater impact of leisure and tourism
- greater environmental awareness leading to greater controls.

Since this is a question which asks in part for a glimpse into the future, the support and exemplars may be rather limited for predictions, but theory should be reasonably sound instead. Examiners are asked to consider this when applying the criteria bands. However, the usual strictures about case studies, with or without a relevant conclusion should apply.

It is hoped that better answers will have some balance within them. Some ways of expressing a more measured approach may be:

- Global Warming is not a new feature (cf June 2006 glacier retreat info.)
- Economic development will continue, especially resource exploitation.

Economic development has clear links to Global Warming (especially in the use of oil).

There are many other factors which may impact on Cold Environments, including tourism, population pressure, and resource pressure.

Any conclusion is appropriate, providing that it has support in theory or fact and reflects the content of the essay. A broad, measured and balanced essay will probably be inherently synoptic and should be rewarded as such.

**Total for this question: 30 marks**