ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Education

Geography GGA1

Specification A – Post-Standardisation

Mark Scheme

2008 examination - June 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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GGA1

General Guidance for A Level Geography Assistant Examiners

Quality of Written Communication

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 of 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 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 style of writing which matches the requirements of the question and acknowledges the potential complexity of the subject matter;
- demonstrate relevance and coherence with appropriate use of specialist vocabulary;
- demonstrate legibility of text, and qualities of spelling, grammar and punctuation which do not detract from the clarity of meaning.

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 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.

NB 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 '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 Advice

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.

GGA1

Question 1

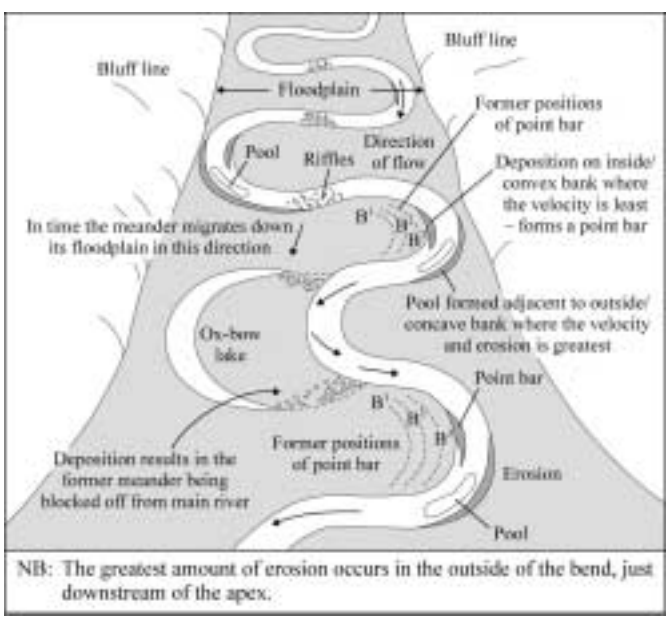
1 (a) Lateral erosion occurs when the river uses its energy to widen the valley as it meanders / where the strongest current in the river flows around the outside of the bend and wears this away (1). Do not allow 'widens the channel'.

Vertical erosion occurs when the river uses its energy to cut down towards its base level/where the riverbed is lowered by erosion (1).

Allow two straightforward statements here. **(2 marks)**

1 (b) (i) A meander (1) which may be incised (1) is sinuous (1) showing deposits / slip-off slope / point bar on the inside of the bend (1) and what looks like a river cliff / steep rocky bank on the outer edge of the bend (1). **(3 marks)**
Evidence of former channel in the bottom right of photograph (1).
Evidence of levees (1).

1 (ii)



NB: The greatest amount of erosion occurs in the outside of the bend, just downstream of the apex.

Level 1 (Basic) **(1-3 marks)**
The answer shows a simple diagram of a meander with deposition on the inside bend and erosion on the outside, so providing a limited explanation of why meanders change position. There may be reference to how meanders change position, e.g. using an arrow.

Level 2 (Clear) **(4-5 marks)**
A clear understanding is shown of how meanders migrate, i.e. downstream and laterally. The why element of the question is also covered, through use of a well-annotated diagram.

(c) **Explain the formation of channel landforms typically found in the upper course of a river.**

This question requires both description and explanation of relevant features. Do not penalise those who include the 'V' shaped valley, but credit in particular **waterfalls, rapids** and **potholes**. Credit diagrams, up to Level 3, if the annotation is detailed.

Waterfalls and rapids occur when there is a sudden change in the gradient of the river as it flows downstream. Waterfalls are more dramatic features than rapids and each may be the result of a resistant band of rock occurring across the course of the river or the rejuvenation of the area, giving the river renewed energy for **vertical erosion** due to a lower sea level.

In the case of the waterfall the river falls over an edge into a deep plunge pool. At the foot of the fall the layers of weak rock are excavated more quickly, by **corrasion** and **hydraulic power,** than the overlaying resistant rock. The force of the water underneath the waterfall swirls around rocks and boulders and enlarges and deepens the plunge pool by the same processes. This undercuts the resistant (cap) rock above. Eventually the overhanging cap rock collapses and the waterfall retreats upstream, leaving a **gorge** ahead of it. This is an example of **headward erosion**.

Potholes are cylindrical holes drilled into the rocky bed of a river by turbulent high velocity water loaded with pebbles. Pebbles can become trapped in slight hollows and vertical eddies in the water will be strong enough to allow the sediment to grind a hole into the rock by **corrasion** / **abrasion**. Potholes can vary in size from a few centimetres to several metres in width. They are generally found in the upper course of the river, where the valley lies well above base level, giving more potential for down cutting, and where the riverbed is more likely to be rocky in nature.

Annotate features=f, explanation=e, Box key words

Level 1 (Basic) **(1-5 marks)**

The answer is predominantly description of a typical upper course river, perhaps with some simple explanation of how waterfalls form. It is likely that non-channel features, such as interlocking spurs, gorges and V shaped valleys will be described.

Level 2 (Clear) **(6-8 marks)**

The answer will concentrate on the channel and there will be a clear explanation of at least one channel feature. Although there will be a sound understanding of the way in which channel features form, the specific terminology, such as vertical and headward erosion, are likely to be absent.

Level 3 (Detailed) **(9-10 marks)**

At this level the response will use more sophisticated geographical terms such as vertical erosion, headward, hydraulic power and corrasion accurately and in context. The formation of at least two channel features must be covered. There may be use of supporting case studies, such as High Force Waterfall on the River Tees.

Question 2

(a) (i) Friction is created by buildings (which act as windbreaks) (1).
Wind speed is generally lower in urban areas (1) by around 20-30% (1). Sometimes the opposite effect is true as air may be funnelled down certain streets creating locally high wind speeds (up to 2). **(2 marks)**

(ii) Building materials such as brick and concrete are non-reflective so store heat during the day (1). Dark coloured roofs, tarmac, brickwalls have a high thermal capacity (1). This stored heat is slowly released during the night (1).
Heat comes from industries, buildings and vehicles, central heating systems which all burn fuel (anthropogenic heat i.e. caused by human activities). Although they regulate the temperature indoors, air conditioning units release hot air into the atmosphere (up to 2 marks).

Air pollution from industries and vehicles increases cloud cover and creates a 'pollution dome', which allows in the short wave radiation as well as reflecting it back to the surface, trapped outgoing radiant energy increases temperatures (up to 2 marks). **(3 marks)**

(b) (i) Most large cities like Beijing are likely to have serious problems with photochemical smog because of the high density of vehicles, dust from building work and factory emissions, which increase the volume of particulates in the air in the confined space of the city. In NICs, such as China there are fewer restrictions on factories/cars to ensure better air quality. Most cities will experience frequent sunshine in the summer. Sunlight reacts with nitrogen oxides (NOx) and hydrocarbons from vehicle exhaust gases, causing a chemical reaction, which results in the production of ozone. Photochemical smog is a particular hazard during anticyclonic conditions, as once the air has descended it is relatively static due to the absence of wind. Additionally, such weather systems tend to be relatively stable, and can persist for weeks at a time during the summer months. Allow reference to any large city or cities in the MEDW or the LEDW.

Level 1 (Basic) **(1-3 marks)**
A simple answer that concentrates on the effects of pollution on general air quality. There may be a token reference to the air being still during the summer so that there are no winds to blow the pollution away.

Level 2 (Clear) **(4-5 marks)**
The answer concentrates on the formation of photochemical smog in relation to human activity. This process is clearly explained in relation to sunlight, high pressure or lack of wind.

(c) **Examine the evidence for and the possible causes of global warming.**

Evidence for: Average world temperatures have risen since records were first kept in 1860. Although the overall rise seems small (1°C), the top ten hottest years have all occurred since 1980, and the 1990s was the hottest decade. The first years of the twenty-first century continued this trend and global warming has probably become the major environmental issue of our time. Although scientists have been slow to commit themselves about the causes and effects, there is no doubt that the planet is heating up. Evidence shows that temperature variations have occurred in the past, but present rises appear too rapid to be the result of natural reasons. Additionally, in recent years both glaciers and ice margins have retreated and sea levels have risen.

Possible causes: Climatic changes have happened in the past, but present evidence seems to suggest that the recent increase in temperature has been brought about by pollution of the atmosphere, in particular the release of huge amounts of carbon dioxide from fires, power stations, motor vehicles and factories. As LEDCs start to develop, (and some countries such as China are well along the road), they too are beginning to generate energy as cheaply as possible. At the present time this means consuming huge quantities of fossil fuels, thereby adding to the problem.
The atmospheric concentration of carbon dioxide has increased by about 15% in the last 100 years and the current rate of increase is estimated to be 0.4% per year. This, together with increases in levels of other greenhouse gases such as methane and nitrous oxides, has upset the natural balance and led to global warming. Additionally large-scale deforestation of areas such as the Amazon Basin have also contributed as trees act as a major carbon sink and store of carbon dioxide. Large-scale pastoral farming and intensive rice cultivation in deforested areas also contribute to an increase in emissions of methane. More sophisticated responses will explain the greenhouse effect, outlining how growing levels of carbon dioxide, chlorofluorocarbons, methane, nitrous oxides and ozone in the atmosphere result in more long-wave radiation being trapped than previously. Credit those who refer to more natural causes, such as sunspot activity.
Annotate answers using **e** for evidence and **c** for causes.

Level 1 (Basic) **(1-5 marks)**
There is likely to be an acknowledgement that global temperatures are increasing, evidence in support of this will be simple and most likely related to melting ice caps. The answer may drift into the predicted consequences of global warming.

Level 2 (Clear) **(6-8 marks)**
One part of the question will be clearly addressed, either the evidence for or the causes of global warming, (substitute breadth for depth).

Level 3 (Detailed) **(9-10 marks)**
Both parts of the question will be fully addressed and there will be

some detail in the response, for example in the explanation of the greenhouse effect.

Question 3

(a) (i) Top level: tertiary consumer/top predator
Third level: secondary consumer/carnivores
Second level: primary consumer/herbivores
Bottom level: producers / plants
All correct = 2 marks, 2 or 3 correct = 1 mark. **(2 marks)**

(ii) Energy initially comes from sunlight, less than 50% of available solar energy is converted for use by plants through the process of photosynthesis (1). Energy is then transferred through each level of the trophic pyramid, although roughly 90% is lost at each level (1) through life processes, e.g. through growth, respiration, excretion, reproduction and movement (up to 2). **(3 marks)**

(iii) The layered structure is a direct result of variations in energy inputs. Varying amounts of sunlight, water and nutrients reach different layers. The shape of the crowns varies with the layers, in order to receive light.

- Emergents have widely spaced, umbrella shaped crowns, straight trunks and high branches.
- The canopy provides almost continuous cover and its mop-shaped and conical-shaped crowns shade the forest floor. About 80% of incident light is absorbed. This layer is species-rich.
- The undergrowth is sparse, although ferns and other herbaceous plants grow quickly in clearing or on riverbanks.

Fewer species are found at this level because less light and nutrients are available.

- Trees grow tall very quickly in gaps in the forest to reach the sunlight.
- The tallest trees are supported by buttress roots, which help to stabilise them.
- The trunks do not have branches at lower levels. This again is due to lack of light on the forest floor.
- Some trees have developed drip tips to their leaves, so the heavy rainfall can drain away.
- Plants such as lianas use the trees as support. Others, such as saprophytes, have a symbiotic relationship.

Level 1 (Basic) **(1-3 marks)**
A simple description of one or two of adaptations, such as buttress roots and drip tip leaves.

Level 2 (Clear) **(4-5 marks)**
A clear description of at least two adaptations with some linkage to the environment.

(b) **With reference to a small-scale ecosystem, explain the interaction between its biotic and abiotic components.**

The question stipulates a small-scale ecosystem so a biome such as the tropical rainforest is inappropriate. Such examples, however, can score marks at Level 1. Relevant examples might be a pond, wood or a hedgerow; be flexible.
Biotic elements include the green plants / producers, the herbivores (plant eaters) and the carnivores. The detritivores / decomposers are also biotic elements. Credit interaction between biotic elements.
Abiotic elements include sunlight energy, precipitation, heat, nutrients, rock and sediments / soil.
Interaction between abiotic and biotic components includes the following – Producers convert sunlight energy into fuel energy by photosynthesis. Plants also use water and carbon dioxide to produce carbohydrates (photosynthesis). Plants also use minerals and nutrients from the soil.
Detritivores break down soil / mineral matter and organic matter. Important for the producers to be able to take such minerals from the soil.
Herbivores, carnivores and omnivores take in water and air. When they die they add matter to the soil.

Level 1 (Basic) **(1-5 marks)**
Provides a basic description of an ecosystem, understands that there are living and non-living components but may not use the terms biotic and abiotic. Allow biome scale answers at this level. Understands and uses terms but does not apply them to an appropriate ecosystem.

Level 2 (Clear) **(6-8 marks)**
Describes an appropriate ecosystem and clearly distinguishes between the abiotic and biotic elements. Mentions, but does not develop, the links between the living and non-living.

Level 3 (Detailed) **(9-10 marks)**
A more detailed appreciation of the **interaction** *between the abiotic and biotic components of the ecosystem e.g. in a British wood e.g. the soil type may be named as brown earth and linked to the climate, which will then be linked to the producers/types of plants growing and animals living there.*