GCE 2005
January Series

ASSESSMENT and QUALIFICATIONS ALLIANCE

Mark Scheme

Geography Specification B

(GGB2)

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.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

Set and published by the Assessment and Qualifications Alliance.

The Assessment and Qualifications Alliance (AQA) is a company limited by guarantee registered in England and Wales 3644723 and a registered charity number 1073334. Registered address AQA, Devas Street, Manchester. M15 6EX. *Dr Michael Cresswell Director General*

General Instructions to Examiners on marking.

It is important that every Examiner marks the scripts to the same standard as the rest of the panel. All Examiners must operate the Marking Scheme in a similar and consistent manner, and hence they must all participate in the application of that scheme at the Standardisation Meeting. In particular they should take careful note of all decisions taken or changes made at that meeting. Examiners are allocated to a Team Leader for the period of examining, and any difficulties that arise should be discussed with that person.

The Marking Scheme

The Marking Scheme consists of two sections for each question or sub-question – the Notes for Answers and the Mark Scheme itself.

Notes for Answers (NFA):

These indicate the possible content for the various sections of the question paper. In some cases (for example short answer questions) the NFA might indicate the only response that is acceptable, but in many cases they indicate either a range of suitable responses, or an exemplar of the type of response required. Therefore in most cases, the NFA do **not** provide model answers, and should be regarded as such. More NFA may be added at the standardisation meeting if it is felt by the Principal Examiner that details of appropriate ways of answering the question have been omitted.

The Mark Scheme

This provides the instructions to Examiners as to how they are to assess the work of candidates. The number of marks allocated within the mark scheme to a question should correspond to the number of marks for that question on the question paper.

There are two ways in which the Mark Scheme operates:

(a) It indicates how the marks to short answer questions are to be allocated – usually to a maximum of 4 marks.

(b) It indicates how Examiners should move through the levels in a level response mark scheme - –usually to all questions of 5 marks or more. Each level has a levels descriptor, with clear statements of the "triggers" to move candidates from one level to another. Each Level contains a range of marks as shown on the Mark Scheme.

A number of features have been used to distinguish between levels, for example:

- a number of characteristics, reasons, attitudes etc.
- the degree of specification, for example the use of specification case studies, or accurate detail
- responses to more than one command word, for example, describe and suggest reasons
- the degree of linkage between two aspects of the question
- the depth of understanding of a concept.

The Marking process.

A sample of the Examiner's marked scripts will be marked again by a Senior Examiner according to the procedures set out by the Board. Also the scripts may be re-examined at the Awards Meetings and the subsequent Grade Review. Therefore, it is most important that Examiners mark clearly according to the procedures set out below.

- All marking should be done in red.
- The right-hand margin should be used for marks only.
- The overall mark for a question must be ringed at the end of the answer.
- The total mark for the question must be transferred to the front of the script.
- The left hand margin is where an indication of the level achieved is written. Comments and codes (see below) may also be written on the left.
- Indications of the level achieved may also occur in the body of the answer if this is easier for the Examiner to apply (e.g. in the marking of diagrams).
- Ticks should be used for short answer responses and Level I responses only, with one tick representing one mark (to the maximum allowed in a Levels scheme).
- Levels II, III, and IV should be indicated with a Roman II, III or IV on the script, and this symbol should be used each time this Level is achieved. Examiners may wish to bracket an area of text where this level of response has been achieved.
- Once a candidate has reached Level II, additional Level I credit should be indicated using a + symbol. If these points are of sufficient quality **one additional mark** can be awarded (assuming no further Level II points are made).
- Examiners may indicate strong Level II or III material by writing "Level II (or III) – good" in the left hand margin of the script. The Examiner should ensure that this is reflected in the **awarding of an appropriate number of marks** at the end of the answer.
- Level III is to be used only for questions of 9 marks or more, and Level IV is to be used only for questions of 25 marks in total.

Other Mechanics of marking

- Underline all errors and contradictions.
- Cross out irrelevant sections using a line from top-left to bottom right. (However be careful to check that there is no valid material, however brief, in the mass of irrelevance.)
- Indicate repeated material with "rep".
- Other useful marking codes can be used, for example, "va" for vague, "NQ" or "Not Qu." For failure to answer the question, "Irrel" for irrelevant material, and SIF" for self-penalising material.
- Put a wavy line in the left-hand margin to indicate weak dubious material.
- If the rubric is contravened, mark all answers but count only the best mark towards the candidate's total mark for the script. Put the mark for the question on the front of the script in the usual way, but also write "RAM Rubric" on the front of the script.
- Large areas of text must not be left blank – use the wavy line or write "seen" alongside the text. All pages must have indication that they have been read, especially supplementary sheets.
- Unless indicated otherwise always mark text before marking maps and diagrams – do not give double credit for the same point made in the text and a diagram.

OPTION P GLACIAL ENVIRONMENTS

Question 1

(a) (i) April through to August.
1 mark for incomplete range. 2 marks for complete range. **(0-2 marks)**

(ii) Negative balance is when ablation exceeds accumulation. In the months mentioned the weather is warmer. This tends to mean that there is less accumulation in the form of snow. Also, ablation through melting and evaporation will increase.

Level 1
Simple statements regarding the relationship between accumulation and ablation. **(0-2 marks)**

Level 2
Statements explaining why the accumulation is reduced and/or why ablation is increased. There must be at least one explanation for both ablation and accumulation to gain maximum marks. **(3-5 marks)**

(b) (i) B is the zone of accumulation. Evidence includes: it is in the highest area. The surface area of ice is greater. Will allow reasons why A is not zone of accumulation (Lower, output, river, narrower etc).

Level 1
Correct identification of the Zone of Accumulation. Simple statements with little or no direct reference to the map. **(0-2 marks)**

Level 2
Candidate clearly uses map evidence to justify their reasons for choosing the correct location for Zone of Accumulation. **(3-5 marks)**

(ii) X is the area of extending flow. Extending flow occurs where the gradient of the glacier is steeper than other places. The velocity of the ice increases and the ice thins. It is often characterised by crevasses, especially where the gradient suddenly increases. The map shows that the correct area is one where the slope of the glacier is at its greatest. The width of the glacier is also reduced. Contours at X are straighter indicating less lateral friction.

Level 1
Correct identification of zone of extending flow. Simple description of the nature of extending flow and/or simple evidence for extending flow with little reference to the map at all. **(0-3 marks)**

Level 2
Detailed description of extending/flow which is linked to evidence clearly taken from the map. One level 2 evidence to gain max. **(4-8 marks)**

(c) Frost shattering occurs in areas where the temperatures oscillate around 0°C. When the temperature is above 0°C then water will get into cracks and spaces near the surface of rocks. When temperatures fall below 0°C the water freezes and expands by 9%. This forces the crack wider. When temperature rises, more meltwater gets into the crack and so when that freezes the crack widens further This continues until the fracture is wide enough to break off a piece of the rock. This tends to fall in the daytime when the water melts and there is nothing to support the broken piece of rock.

Level 1
Simple statements regarding the expansion of ice on freezing and the effects that this has on rocks. **(0-3 marks)**

Level 2
Detailed explanation of the process, relating the changing volume of the water on freezing to the changes in the rock. **(4-6 marks)**

(d) Corrie: Armchair shaped hollow with a steep backwall. Hollow is overdeepend and could have a rock lip. Diameter 0.5km – 1km; backwall/depth 100m – 400m. Backwall angle 60°.

Level 1
Simple description of a corrie, using generalisations (e.g. steep, high, deep etc), correct named example. **(0-3 marks)**

Level 2
Detailed description of a corrie. One named example to gain max. Two Level 2 quantification maximum. **(4-6 marks)**

(e) (i) P – Lateral moraine Q – Recessional moraine R – Terminal moraine
One mark for each type of moraine correctly identified. **(0-3 marks)**

(ii) Moraine R is a terminal moraine. Clay produced by abrasion and blocks by plucking. The ice carries material from farther up the valley and brings it down to the snout. The material can be transported on top, within and at the base of the ice. As the glacier begins to slow at the lower margin, thrusting occurs and much of the moraine is pushed through the ice and deposited at the snout. Ridge only formed if 'standstill'. Explanation of this relevant. Bulldozer/push relevant. Sometimes this material overlies a core of ice that makes the ridge stand sharply up from the landscape. Over time this can collapse and form a much less delineated feature. The moraine ridge can be held together by subsequent vegetation growth.

Level 1
Simple ideas relating to the idea that the moraine is brought down by the ice and deposited at the end of the glacier. **(0-3 marks)**

Level 2
Detailed account of the role of the ice in the transport of the moraine to the snout and the process of deposition. Explanation of the composition of moraine. Post glacial processes acting on the ridge to alter its shape are relevant. 4 marks for R incorrectly identified. **(4-7 marks)**

(f) Depends on the example chosen. Simple ideas of the ice acting as a dam, causing there to be a proglacial lake, are the most likely. This overflows through a col, which remains as the river route in post-glacial times. The role of glacial deposition acting as a dam is relevant. A diagram is not necessary.

Level 1
Simple ideas relating the role of ice to the change in a river's direction. Name of an example. **(0-3 marks)**

Level 2
*Detailed description of an example of glacial diversion **or** a detailed generic account of drainage diversion. Do not differentiate between direct and indirect effects.* **(4-8 marks)**

OPTION Q COASTAL ENVIRONMENTS

Question 2

(a) (i) Main features include: long wavelength (10 - 100m) with a low frequency (6 – 10 per minute). They have a low height (less than 1m) and low steepness. They are spilling waves with a swash greater than backwash. Elliptical orbit. Accurately drawn shape.
1 mark for correctly labelled parts of a constructive wave.
2 max for unconnected notes.
(0-6 marks)

(ii) Constructive waves' strong swash takes material up a beach, and the weak backwash cannot take it back down. This results in a steep beach with berms where high tides reach. In destructive beaches, the stronger backwash means that beach material is washed off shore to create an offshore bar. The overall gradient of the beach is reduced. In storms, the strength of the waves can cause material to be thrown above the limit of high tides to create a storm beach. Constructive waves on the other hand have a stronger swash than backwash and with the low frequency, the swash is not interfered with by the backwash. This takes material up the beach. The effect is to cause a build-up of beach material and a steepening of the gradient.

Level 1
Simple link made between the effects of the type of waves on the beach. **(0-3 marks)**

Level 2
Detailed differences between the effects of types of wave on the beach.
Two L2 explicit comparison of effect to gain max. **(4-8 marks)**

(b) Pneumatic action: water forced into crack increases the compression of the air and can exert pressure. As the wave recedes, the pressure is released and the air explodes. Because it is compressed air the effect can reach well beyond the limit of the wave. Sheer weight of the wave (30 tonnes/cm^2) pounds the cliff sending shock waves through the rock. Cavitation. For all of the above there is the importance of repetition.

Level 1
Simple description of the process relating the change in pressure of air to erosion. **(0-3 marks)**

Level 2
Detailed description of the process linking the change in pressure to the wave and then explaining how it can weaken cliffs. **(4-6 marks)**

(c) Wave cut platforms are a relatively flat, gently sloping (½° - 4°) expanse of rock at the foot of a cliff and extending out to sea (up to 700m). The surface of them can reflect the geology so that horizontal bedding leaves horizontal steeped layers, while dipping rocks can leave a corrugated surface. They exist between the high and low tide levels (intertidal), represent the former location of a wave cut notch and are associated with cliff recession. Perched boulders, small beaches at head of wcp relevant.

Level 1
Simple description of wave cut platforms, using generalisations (e.g. steep, high, deep etc.), named example. **(0-3 marks)**

Level 2
Detailed description of a wave cut platform. **(4-6 marks)**
Two Level 2 quantification maximum.

(d) (i) Sand dune: L to R: fore dune; water table; fixed/grey/mature dune; dune slack/water table.
Salt marsh: L to R: micro cliff; creek; salt pan; salting or sward. **(0-4 marks)**
One mark for each correct characteristic labelled.

(ii) Vegetation has helped because: the roots trap sediment and prevent it being blown or washed away. The dead organic material causes the sand dunes to become grey, and enrich the mud of the saltmarsh. The growth of vegetation in the dunes reduces the pH of the sand. The vegetation in the salt marsh dries out the area, allowing other plants to invade.

Level I
Simple statement linking vegetation to one of the qualities of the chosen landform. **(0-3 marks)**

Level 2
Link between a specified feature of the vegetation and a specified quality of the landform. **(4-6 marks)**

(e) (i) 122/3 to 134/5 thousand years before present.
1 mark for incomplete time range. 2 marks for complete range. **(0-2 marks)**

(ii) Eustatic change is worldwide sea level change as a result of an increase or decrease in the amount of water in the oceans. Decrease is because the hydrological cycle is interrupted by falling global temperature and precipitation does not return to the sea instead it stays on the land (base level fall). The converse occurs during global warming. Ice melts, returns to the sea and sea level rises.

Level 1
Simple link between the global change and changes in glacial advance/retreat. **(0-2 marks)**

Level 2
Detailed link between global sea level change and glacial advance/retreat. Must have L2 for both advance and retreat to gain max. **(3-5 marks)**

(iii) Local sea level changes: a barrier reef is separated from land. In the case of the Great Australian Barrier Reef, there is a fault line that lies parallel to the coast so that as the coral grows it sinks relative to the land. This gives the reef material great depth. In other cases, the Darwinian theory states that the islands sink and the coral is able to grow at the same rate as the sinking. The atoll is the last stage in the Darwinian theory, where the island has sunk completely, but the coral has grown in the shallow water.

Global sea level changes: other more recent theories state that the growth of atolls are more to do with a global base level change. As sea levels fell during the last ice age, the islands were planed off by marine erosion. As global sea levels rose again, the coral grew with it. In very recent times, the rising sea levels threaten the existence of low lying coral islands and their economies, e.g. The Maldives.

Level 1
Simple link between the nature of reefs and changes in sea level. **(0-3 marks)**

Level 2
Detailed link between a particular type of base level change and the effect on a reef. Must have both global and local at L2 to gain max. **(4-7 marks)**

OPTION R URBAN PHYSICAL ENVIRONMENT

Question 3

(a) (i) The lowest concentration is at 06.00 with 60 micrograms per metre. This rises to a peak at 08.00 of 190. It falls for an hour down to 110 and then slowly rises to a peak of 225 at 11.30. It then falls slowly and evenly, with one slight drop and rise again around 13.30.
1 mark for each peak, trough, trend or anomaly identified. Simple data repetition will not be accepted.

(0-4 marks)

(ii) Any reasonable argument is to be accepted. The biggest gap is very early in the day when industrial processes may well be at work, but the residential areas are generally quiet. The gap lessens when people go to work and are using cars etc. that are pumping out particulates. The industrial areas do rise but not at the same rate because their processes tend to be fairly even throughout the day. There is a dip in the residential area during the morning after the rush hour, but the industrial areas continue to rise because of the increasing amount of work that is going on. Both increase and then decrease but the overall difference remains similar as both are likely to include their background pollution plus the daytime road traffic.

Level 1
Simple reason for the difference between the nature of the land use and the concentration of pollutants. **(0-3 marks)**

Level 2
Detailed reason for the differences in the concentration of pollutants linked to the land use. **(4-6 marks)**

(iii) Particulate concentration is not the only factor in the pattern of urban precipitation and fog. In both cases, the particulates act as condensation nuclei, but fog is more sensitive to the concentration of particulates and can vary over short distances.
The increase in rainfall is due to the UHI causing uplift of the less dense warm air (causes of the UHI are not relevant here but the expansion of warmed air causing uplift is) + the relief effect of the buildings combined with the increased number of condensation nuclei. The condensation nuclei could be particulate pollution from a variety of human sources. This could be combined with the frictional drag of the urban surface slowing down fronts as they cross over the area leading to longer periods of rain. The greater intensity is caused by the convectional uplift generated by the UHI.
Urban RH is lower than rural RH, mainly caused by the higher urban temperatures and yet urban fogs are common. The absolute humidities may be greater, in certain locations because of the emission of water into the atmosphere by factories, power stations, car exhausts, air conditioners etc. Thus, fog in urban areas occurs when the RH is less than 100% (down to 80%) because of the presence of hygroscopic nuclei in the form of a variety of particulates present in large quantities in urban areas.

Level 1
Simple link between particulate concentration and an increase in precipitation. **(0-3 marks)**

Level 2
Detailed link between particulates and rain and fog production. Realisation that particulates are not the only factor in their production. Must have both precipitation and fog to gain full marks. **(4-8 marks)**

(b) (i) The main characteristics include: cliff between rural and urban; peaks at areas of concentrated human activity (commerce, industry and CBD); troughs in areas of lower human activity (river, park).
1 mark for each identified characteristic linked to the nature of the land use. **(0-4 marks)**

(ii) The causes include: the production of heat by human activity (home heating / air conditioning; factory, car, office heat emissions; human body emissions); lack of surface water producing less heat loss by evapotranspiration; absorption of insolation by multiple urban surfaces which is then re-emitted as long wave radiation that heats the air. The pollution in the urban atmosphere helps to increase cloud amount and also creates a pollution dome that allows in the short wave radiation that absorbs a lot of the outgoing radiation as well as reflecting it back to the surface.

Level 1
Simple definition / description of the UHI effect. Use of unexplained terms for the explanation. **(0-3 marks)**

Level 2
Detailed description of the UHI effect. To gain maximum marks there must be at least a Level 1 example and a Level 2 explanation. Max 6 if no e.g. named. **(4-7 marks)**

(c) (i)

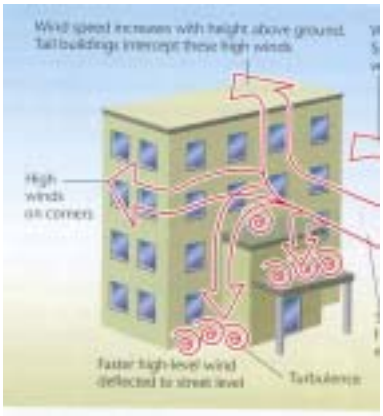

Figure 6.9 Airflow modified by a single building

Level 1
*Simple labels **or** arrows showing the changing direction of air flow. Two L1 max for unconnected notes.* **(0-3 marks)**

Level 2
Arrows showing the change in air flow correctly labelled or annotated.

(4-6 marks)

(ii) Urban areas reduce average wind speed by increasing the friction between the surface and the moving air. NB there may be some confusion between speed and velocity. The velocity is reduced because winds are sent into all directions by reflection and deflection. This does not necessarily reduce their speed. Not only is there increased friction, there are areas completely sheltered from the wind by deflection. This gives zero speed (calm) which can greatly reduce the average speed despite the high speed gusts. There is an increased frequency of gusts usually as the result of either the venturi effect where air is forced through small gaps between buildings or channelled along streets. They are also caused by down-draughts where the upper air speed is transferred to lower levels down the side of buildings. They also occur at the corners of buildings as air rushes from the high pressure upwind side of a building to the low pressure lee.

Level 1
Simple description or explanation involving one action e.g. buildings act as wind-breaks. **(0-3 marks)**

Level 2
Detailed description or explanation of the changes to the speed and frequency of gusts and calms. There must be at least one Level 2 reference to both speed and gusts and calms to gain maximum. **(4-7 marks)**

(d) Routeways are distinctive because they have the possibility of the incursion of **exotic species** of plant and insects, brought in by the traffic, train etc. and represent 20% of the urban city routeways act as **wildlife corridors**, comparable with rural hedgerows. Railway lines enable animals to move around the city with little or **no interference** from traffic. During the days of steam there were frequent **fires** which burnt off tall species of plant and allowed the light in encouraging **light demanding species** e.g. primroses and foxgloves to establish. **Windborne seeds are sucked along** by the trains e.g. Oxford Ragwort. Spiders are moved along the line in the same way. Also, lack of human disturbance created by the fencing enables urban foxes and badgers to exist. On the unburnt, **bramble filled** railway land brambles have established and these provide nesting sites for a wide variety of bird-life. Road traffic acts in the same way with regard to the distribution of animals and insects. They also provide a home for kestrels and **scavenging birds**. The **nitrogen rich fumes boost the growth** of some wildflowers and they in turn increase insects and animals further up the food chain. Increasingly there are embankments and cuttings that are managed much more diligently, and so there has been planned planting of **trees and shrubs to act as noise screens**. Grass is also mown regularly. This can reduce the number of wildflowers and fauna. **Canals act as long ponds.** They often have a variety of waterfowl (moorhens, coots, ducks) and water-loving insects (dragonflies, damselflies) and birds (kingfishers). There are **aquatic plants** (flag iris).

The vast majority of most urban parks is mown grass, a wildlife desert, with low species diversity, one of the few beneficiaries is the Starling. Other areas within parks include flowerbeds, with a variety of bedding plants and annuals and shrubs, many of which are exotic species. The wildlife is reduced because of chemical pesticides etc. There are some parks that have trees, many of which were planted during Victorian times. These provide a habitat for large numbers of insects that in turn provide food for creatures further up the food chain. During Victorian times the parks were planted with laurel bushes and carpet bedding, they could survive the pollution. As the urban air has been cleaned there has been an increase in the variety of plant life. Animal life includes squirrels (though their increase may have been the cause of the decline in songbird numbers) and urban foxes etc. The main reason for the differences between the parks and other urban areas is because they have been designed for mass usage. Thus, the football pitches have to be mown regularly, much more so than e.g. verges. The flower-beds have often had more money spent on them than most gardens, but economies of scale created by extensive planting have meant that there are often many more exotic species than a garden. Also, the nature of the planting has been planned to please the majority of park users rather than individual tastes, etc., etc.

Gardens are so varied that examiners must use their judgement and credit points made that they are generally a reflection of the owner and so can vary from house to house. The important thing is that they are highly planned, even the so-called wild-life garden.

Ecological conservation areas differ because succession has been influenced deliberately by man. The nature of the development will depend on the example chosen. The answer should focus on the managed aspect of the area, thus, one which is simply left alone to go through the succession is not relevant. Management techniques include the reduction in acidity of old industrial and coal spoil sites by addition of lime etc. The deliberate clearing of areas to create a variety of habitats for smaller light demanding species. Some areas have a system whereby mowing is only done once meadow wildflowers have flowered.

Level 1
Simple description of the ecology of chosen land use with no attempt at pointing out the unique qualities. Named example **(0-3 marks)**

Level 2
Detailed description of the unique ecology of chosen area. Two x L2 Sp max.. There must be at least 1 L2 description of unique nature of each area to gain the max mark. **(4-8 marks)**