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ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Education

Geography 5036 Full Course

Specification B

Unit 2 GGB2

Mark Scheme

2007 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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GGB2

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 felt by the Principal Examiner that details of appropriate ways of answering the question have been omitted.

The Mark Scheme

This is provided in italics and provides the instructions to Examiners as to how they are to assess the work of the 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 question 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 "trigger" 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 a 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 it 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 had 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 used only for questions of 9 marks or more, and Level IV is to be used only for questions over 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.
- 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 the text must be 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.

Triggers and some level descriptors

Named feature, named example, named location = level 1
Described feature = level 2
Accurate quantitative description, correct location of plant species = 2 times level 2 max
Named process = level 1
Process + effect = level 2
Process explained = level 2
Explained process + effect = good level 2
Explained process + effect described = very good level 2

Question 1
Option P Glacial Environments

(a) (i)

Landform	Identifying Letter
Arête	**D**
Terminal Moraine	
Glacial Trough	**B**
Pyramidal Peak	**E**
Hanging Valley	**C**
Corrie	**A**

1 mark for each landform correctly identified. **0 – 5 marks**

(ii) Depends on the landform chosen. Essentially they are all formed by glacial erosion processes and some nivation/weathering. The nature of the question means that nivation processes are relevant, especially in D, B and A.
Most likely choice will be the corrie. Nivation processes create a hollow which then is occupied by ice. Ice builds up and begins to flow out of the hollow. Plucking occurs on the backwall and abrasion on the floor of the hollow. Freeze/thaw can steepen the backwall. Terminal moraine acceptable.

Level 1 **0 – 3 marks**
Simple explanation of a relevant process, or the naming of such a process.

4 – 7 marks

Level 2
Detailed explanation of processes leading to the formation of the chosen landform.

(b) (i) The vector diagram shows that the dominant orientation is NE to SW. e.g. 12/60 or 20% of the sample found at 45 to 225 degrees. Just over half of the sample lies between +/- 15 degrees of NE/SW. There is a sub-dominant direction of NW/SE with a peak of 5 stones at 135 degrees. NB will allow e.g. 24/120.

Level 1 **0 – 3 marks**
Simple description of the graph with direct lifts from figure 2.

Level 2 **4 – 6 marks**
More detailed description with some elements of analysis or summary.

(ii) Evidence could include: striations, orientation of crag and tail, roche moutonnée drumlins, valley trend linked to gradient.
Field relationships of till/outwash etc. Movement of erratics.

Level 1 **0 – 2 marks**
Simple statements linking at least one piece of evidence to the direction of ice movement.

Level 2 **3 – 5 marks**
More detailed statements linking evidence to the movement. Must have 2 at L2 to gain max.

(c) Outwash plain deposits are those brought out of the glacier by meltwater streams. The streams are highly energetic and so are able to carry a large amount of material in them. Their competence is high and so there is a range of sizes. As the streams emerge from or off the ice they encounter increased friction and so slow down. Their competence is reduced and the largest material is deposited first, the finer being taken a long way down the stream. This produces well sorted deposits. The stream usually becomes braided. The discharge of water is seasonal and so there are also graded deposits. Length 5km – 80km; depth 1m – 75m; gradient 0.5^{o} – 4^{o}.

Level 1 **0 – 3 marks**
Simple description of an outwash plain with detail of the morphology, scale, field relationships or deposits. (i.e. simple = 1 adjective). Simple explanation. Named example.

Level 2 **4 – 8 marks**
Description of an outwash plain. Simple explanation for the shape, size or location of the landform. Max 2 Quantitative points. There must be at least one L2 explanation to get to the top of this level. (Annotate E)

(d) (i) Permafrost is perennially frozen ground. It can be continuous, discontinuous and sporadic. Continuous PF occurs where the temperature of the ground is below 0°C all year round. Discontinuous permafrost is usually only shallow and occurs in patches, often where it is warmer. It was probably formed in the pleistocene often under ice (although the thickest area was not).

Level 1 **0 - 3 marks**
Simple definition of permafrost glaciated.

Level 2 **4 - 6 marks**
Detailed description with information on locality, temperatures or types of PF.

(ii) Frost Heave: Occurs in the active layer above permafrost. Stones in the ground have a higher thermal conductivity/lower specific heat capacity than soil around. This means that ground under stones is colder than the surrounding sediments and ice lenses develop. They increase in size by migration of water to the lens. As the lens grows, it forces the stone above to move upwards. When the lens melts, the void is filled with sediment and stops the stone from falling back. Repetition of processes. Surface mounding and sediment sorting.

Level 1 **0 – 3 marks**
Simple description of the process using unexplained terms or one-word descriptions.

Level 2 **4 – 7 marks**
Detailed explanation of the process with specialist terms explained.

(iii) Stone polygon: 0.5 – 10 m diameter; dome height 0.1 – 1 m. Elongated polygons 2 – 6 degrees, stripes 6 – 35 degrees. Fine clay in dome centre-angular stones around. Name of landform.

Level 1 **0 – 3 marks**
Simple description of chosen landform with little detail of shape, scale etc.

Level 2 **4 – 6 marks**
Detailed description of the chosen landform with 2XL2 Q max.

Question 2
OPTION Q COASTAL ENVIRONMENTS

(a) (i)

Landform	Identifying Letter
Stack	**B**
Wave cut platform	**D**
Stump	**A**
Bar	
Arch	**E**
Wave cut notch	**C**

0 – 5 marks

One mark for each correctly identified landform

(ii) Depends on the landform chosen. Likelihood that the candidate will choose stack or stump. Relevant processes include hydraulic action and abrasion leading to exploitation of weaknesses. Undercutting, cave and arch formation plus subaerial processes will lead to collapse of cliff. Could lead to stack/stump or wcp.

Level 1 **0 –3 marks**
Simple explanation of processes using unexplained terminology, weak links between process and product.

Level 2 **4 – 7 marks**
Detailed explanation of processes. Links between process and the change wrought. Sequence of three events in correct order. Must have clear link between process and effect on chosen landform to gain max.

(b) Wave height and wind speed: Negligible height until wind reaches 2 m/s. Height begins to rise, and as wind increases the rate of rise increases, so that at 10m/s it is 2.2m whereas at 20m/s it is 9.0m. Wave period and wind speed: This is a positive linear relationship. Period changes as soon as there is any wind. As the wind speed increases so does the wave period. E.g. at 10m/s the period is 7.5 seconds whereas at 20m/s it is almost 15 seconds.

Level 1 **0 – 3 marks**
Simple lifts from the graph with no attempt at analysis. Simple statements regarding the relationships.

Level 2 **4 – 6 marks**
Analysis of the graphs using examples taken from the graphs. Detailed statement regarding their relationship. Candidate must have at least one L2 for each relationship to reach max.

(c) (i) Relevant description can be either of a named example or a generic feature though there must be at least one level 2 descriptor of a named example to gain max. Descriptions of scale, field relationships, deposits and appearance are all relevant. Spits occur at river mouths and where the coastline changes direction.

Level 1 **0 – 3 marks**
Simple description of a spit using very general terms.

Level 2 **4 – 6 marks**
Detailed description of a spit. There must be at least one L2 descriptor of a named example to gain max.

(ii) LSD is the movement of sediment along a coast by wave action. Waves approaching the beach at an angle (under the influence of the wind), the swash pushes the beach material up the beach at the same angle. When the wave recedes, it does so at right angles to the beach and the backwash removes beach material seawards. Thus the sediment moves in a zig-zag fashion.

If the LSD brings material along the coast, as soon as the water deepens and the waves no longer break (resulting in inability to move material), then deposition occurs. There is a shallowing of the water and so waves can break and so LSD can occur.
Other relevant processes include marine transgression bringing sediment to the spit from places that are now offshore.

Level 1 **0 – 3 marks**
Simple explanation of the process of longshore drift with no link between the process and spit formation.

Level 2 **4 – 7 marks**
Detailed explanation of the process(es) with links between the process(es) and the formation of a spit. Generic explanation of LSD on its own 1x L2.

(d) Depends on the example chosen. Relevant reasons could include the rapid retreat of the coastline (Holderness), the saving of infrastructure (Mappleton), the conservation of amenity (Barton on Sea, Brighton etc). Reasons include also the physical processes operating on the chosen coastline (LSD, slumping etc) that have caused the problem in the first place.
Sea defences can include:
Gabions – wire filled baskets placed at the base of a cliff. They present a large surface area and allow the water to infiltrate so as to reduce backwash effects.
Sea wall – designed to take the force of the waves, set deep in the bedrock for strength, often curved to dissipate the wave's energy upwards. They are expensive and can cause problems with scouring at their base or further along the coast.
Revetments – designed to allow the sea to break on them and expend energy by allowing some of the water to infiltrate. Once again the backwash is reduced.
Groynes – stop longshore drift by preventing waves travelling up a beach at an angle. They can however cause depletion of sediment to areas further down drift.
Reefs – waves break offshore. Energy is expended there.
Drains on cliffs allow rainwater to soak in the rocks and be discharged reducing the chances of slumping.

Managed retreat as in East Anglia. Recognise that the cost of defence is greater than the value of the land.
Beach nourishment. Other types of coastal management schemes are relevant including the management of different user groups e.g. Porlock Bay.

Level 1
Naming of the management scheme with vague information on the aims of the scheme and/or how it attempts to achieve that aim. **0 – 3 marks**

Level 2 **4 – 8 marks**
Details of the scheme and how it works to overcome the stated aims. 2 X L2 Q max. At least 1 x L2 for both to gain max.

(e) (i) 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 atoll 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 **0 – 3 marks**
Simple description of reefs or simple link between the nature of reefs and changes in sea level.

Level 2 **4 – 6 marks**
Detailed link between base level change and the effect on a reef.

(ii) Humans affect coral reefs in a variety of ways. Directly, they over fish them using explosives or cyanide poison. Living coral is removed for the tourist trade. They quarry them to help build an infrastructure for growing populations. Tourists also remove souvenirs etc. In some places pollution from effluent laden rivers can kill the coral. Indirectly, e.g. in Australia, the removal of mangroves has increased the silt content of the water etc. Global warming has caused the seas to warm up and this has bleached large areas of coral. Also, it may have contributed to more extreme storms that seriously damage large areas of coral. Rising sea levels caused by human activity are NOT rapid enough to kill coral.

Level 1 **0 - 2 marks**

Simple statements about how coral is being damaged with no link to the relevant human activity.

Level 2 **3 – 5 marks**

Detailed link between a human activity and a particular danger or change to the coral.

Question 3
Option R: Urban Physical Environments (Temperate Urban Areas)

(a) (i)

Heat Island Features or Land Use	Identifying Letter
Heat Island 'Plateau'	C
Rural Area	D
Suburban Commercial Area	B
Railway Station	
River	E
Heat Island 'Cliff'	A

One mark for each correct answer. **0 - 5 marks**

(ii) CBD peak caused by the UHI effect. Here there are more heat sources etc as well as more retentive surfaces. Multiple reflections and absorptions mean that buildings absorb the heat and then give it out at night. Higher pollution levels mean that there are more clouds and the pollution dome to act as a blanket. The lack of moisture/veg means that heat is not lost through evapotranspiration.
The sink is caused by the river. The air above the river is cooled by evaporation processes and by conduction. Also cold air may move in along the valley.
The plateau is caused by all the same processes as the CBD but not to the same extent. The final cliff is the boundary between the urban area and its UHIE and the rural area.

Level 1 **0 – 3 marks**
Simple statement (i.e. one adjective) explaining the UHI or an anomaly. (e.g. river cools the air above).

Level 2 **4 – 7 marks**
Link between a change in the temperature and a valid reason OR an explanation of an anomaly.

(iii) The answer the candidate give will very much depend on the example they use. Most will use UK cities. This is about the changes in the UHIE, not seasonal changes in the climate itself. Thus in the UK the UHIE is greatest at night during a winter anticyclone. During periods of low pressure, winter and summer, the UHIE is negligible. Increasingly the summer anticyclones can cause a 'heat wave' in a city where the UHIE is very great because of various human activities.
Candidates must not be credited for seasonal changes in weather / climate only in the UHIE.

Level 1 **0 – 3 marks**
Simple description of any change in the UHIE seasonally with weak or no link to named example.

Level 2 **4 – 6 marks**
Detailed description of a seasonal effect on the UHIE linked to the location of example chosen.

(b) (i) In simple terms, as wealth increases, the urban concentrations of particular matter fall. However: From a pci $100 to $3-400 the concentration rises to a peak of 1800μgm^{-3}. It then falls rapidly and with an increasing rate of change, to a minimum of 50 μgm^{-3} at a wealth of $11000. It begins to rise again.

Level 1 **0 – 3 marks**
Simple description of the graph ignoring any anomalies and not using the log scale accurately.

Level 2 **4 – 6 marks**
Detailed description of the graph, pointing out the anomalies and using the scale accurately.

(ii) Particulate concentration is not the only factor in the pattern of urban fog. The particulates act as condensation nuclei, fog is sensitive to the concentration of particulates and can vary over short distances.
The condensation nuclei could be particulate pollution from a variety of human sources.
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% (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 **0 – 3 marks**
Simple link between particulate concentration and an increase in fog.

4 – 7 marks

Level 2
Detailed link between particulates and fog production. There must be at least one clear statement that this is in an urban area to gain the max marks.

(c) Beware of reasons for reasons. Thunderstorms are more common in urban areas for 2 main reasons. The main one is that the UHI creates a localised area of low pressure which draws in air from the surrounding area. As the air approaches the urban area it warms up. This warm air is then subject to convectional uplift. This uplift accelerates as the rate of cooling of the rising air is less than that of the surrounding air, making the temperature difference even greater. Large cumulonimbus clouds develop and storms occur. The whole thing is aided also by the presence of a greater number of hygroscopic nuclei in the form of particulate pollution.

Level 1 **0 – 3 marks**
Simple statement regarding the fact that urban areas are warmer than surrounding or the presence of particulates.

Level 2 **4 – 6 marks**
Links between the warmth and / or presence of particulates of the urban area and the uplift of air resulting in convectional rain. Generic convectional rain 1x L2

(d) (i) Introduction could have been from escapes from gardens, from plants brought in by collectors or amateur gardeners. Escapes could occur from wind blown seed, animal or plant vectors etc.

Level 1 **0 – 2 marks**
Simple statements naming deliberately introduced species but not linking them to reasons for their introduction or method of introduction.

Level 2 **3 – 5 marks**
Detailed statements linking named species to reasons for introduction or method of introduction.

(ii) 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.

Level 1 **0 – 3 marks**
Simple description of the ecology of parks or gardens with no attempt at pointing out the unique qualities or explaining why there is such an ecology.

Level 2 **4 – 8 marks**
Detailed description of the ecology of parks and gardens 2 X L2 Sp max; reasons for the unique nature of ecology. There must be at least 1 L2 explanation of difference to gain the max mark.