Rewarding Learning

ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2013

Geography

Assessment Unit AS 1

assessing

Physical Geography

[AG111]

FRIDAY 7 JUNE, AFTERNOON

MARK SCHEME

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Foreword

Introduction

Mark Schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of 16 to 18-year-old students in schools and colleges. The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes therefore are regarded as a part of an integral process which begins with the setting of questions and ends with the marking of the examination.

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

The Council hopes that the mark schemes will be viewed and used in a constructive way as a further support to the teaching and learning processes.

Introductory Remarks

The assessment objectives (AOs) for this specification are listed below. Students must:

AO1 demonstrate knowledge and understanding of the content, concepts and processes;

AO2 analyse, interpret and evaluate geographical information, issues and viewpoints and apply understanding in unfamiliar contexts;

AO3 select and use a variety of methods, skills and techniques (including the use of new technologies) to investigate questions and issues, reach conclusions and communicate findings.

General Instructions for Markers

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all markers are following exactly the same instructions and making the same judgements so far as this is possible. Markers must apply the mark scheme in a consistent manner and to the standard agreed at the standardising meeting.

It is important to recognise that in some cases there may be other correct responses that are equally acceptable to those included in this mark scheme. There may be instances where certain judgements have to be left to the experience of the examiner, for example, where there is no absolute, correct answer.

Markers are advised that there is no correlation between length and quality of response. Candidates may provide a very concise answer that fully addresses the requirements of the question and is therefore worthy of full or almost full marks. Alternatively, a candidate may provide a very long answer which also addresses the requirements of the question and is equally worthy of full or almost full marks. It is important, therefore, not to be influenced by the length of the candidate's response but rather by the extent to which the requirements of the mark scheme have been met.

Some candidates may present answers in writing that is difficult to read. Markers should take time to establish what points are being expressed before deciding on a mark allocation. However, candidates should present answers which are legible and markers should not spend a disproportionate amount of time trying to decipher writing that is illegible.

Levels of Response

For questions with an allocation of six or more marks three levels of response will be provided to help guide the marking process. General descriptions of the criteria governing levels of response mark schemes are set out on the next page. When deciding about the level of a response, a "best fit" approach should be taken. It will not be necessary for a response to meet the requirements of all the criteria within any given level for that level to be awarded. For example, a Level 3 response does not require all of the possible knowledge and understanding which might be realistically expected from an AS or AL candidate to be present in the answer.

Having decided what the level is, it is then important that a mark from within the range for that level, which accurately reflects the value of the candidate's answer, is awarded.

General Descriptions for Marking Criteria

Knowledge and Understanding	Skills	Quality of Written Communication	Level
The candidate will show a wide-ranging and accurate knowledge and a clear understanding of the concepts/ideas relevant to the question. All or most of the knowledge and understanding that can be expected is given.	The candidate will display a high level of ability through insightful analysis and interpretation of the resource material with little or no gaps, errors or misapprehensions. All that is significant is extracted from the resource material.	The candidate will express complex subject matter using an appropriate form and style of writing. Material included in the answers will be relevant and clearly organised. It will involve the use of specialist vocabulary and be written legibly and with few, if any, errors in spelling, punctuation and grammar.	3
The candidate will display an accurate to good knowledge and understanding of many of the relevant concepts/ ideas. Much of the body of knowledge that can be expected is given.	The candidate will display evidence of the ability to analyse and interpret the resource material but gaps, errors or misapprehensions may be in evidence.	The candidate will express ideas using an appropriate form and style of writing. Material included will be relevant and organised but arguments may stray from the main point. Some specialist terms will be used and there may be occasional errors in spelling, punctuation and grammar. Legibility is satisfactory.	2
The candidate will display some accurate knowledge and understanding but alongside errors and significant gaps. The relevance of the information to the question may be tenuous.	The candidate will be able to show only limited ability to analyse and interpret the resource material and gaps, errors or misapprehensions may be clearly evidenced.	The candidate will have a form and style of writing which is not fluent. Only relatively simple ideas can be dealt with competently. Material included may have dubious relevance. There will be noticeable errors in spelling, punctuation and grammar. Writing may be illegible in places.	1

Section A

AVAILABLE MARKS

1 **(a)** Tasks

- **Use of GIS** – A Geographic Information System is a computer system which may be used at a variety of stages within the investigation process. It may be used for locational mapwork, to store data, to manipulate, analyse, present or even interpret data.
- **Pilot Testing** – A pilot study involves the completion of a preliminary test to trial data collection equipment or procedures, to identify problems and make corrective adjustments. It is generally conducted in advance of fieldwork on a small percentage of the target population.
- **Sampling** – This process involves the selection of a representative portion of the total population for study. It is completed when the total population is too large for inclusion. When a sufficient sample size is selected and a rigorous method adopted, then valid statistical inferences can be gained and applied to the total population.
- **Risk Assessment** – A risk assessment is the formal procedure adopted to identify potential hazards in fieldwork to ensure that all health and safety issues are fully addressed. Common procedures involve a pre-site visit, class discussion or the completion of a site survey.
- **Personal Research** – This involves the search for relevant knowledge related to the fieldwork. It may be used to ascertain facts or information at any stage within the investigation process. This will involve the study of relevant secondary data sources.

Award [1] for general understanding of the task,
[1] for clear and specific link to fieldwork, and
[1] for explanation of **how** the task was completed.
2 × [3] [6]

(b) **(i)** Award [2] if the distinction between primary and secondary data is clarified. Primary data involves information (qualitative or quantitative) gained from first hand experience, whereas secondary data is extracted from a published source. Award [1] for a single valid definition. [2]

(ii) The method selected must relate to a primary source and must be evidenced on the submitted table. Marks are broken down as follows:

Description of Method [3]
Award [3] for a detailed description of the primary data collection procedure with explicit reference to equipment (if relevant).
Award [2] or [1] if the methodology lacks depth and reference to fieldwork is more general or less explicit.

Evaluation of Method [2]
Award [2] for an answer which includes a critical review of the procedure and displays an awareness of potential or actual strengths and limitations.
Award [1] for a more general awareness. At the lower boundary one component (strengths or weaknesses) may be omitted or points may appear less credible. [5]

AVAILABLE MARKS

(c) (i) The graph presented must be accurately plotted using the tabulated data and adhere to all normal conventions. It must be relevant to the aim of the fieldwork, as presented in the submitted fieldwork report. Mark breakdown as follows:

Title [1] – this must be clearly stated and relate to each of the variables presented

Conventions [2]
– for labelling of axes (variables and units)
– for the inclusion of a key (if appropriate)
– for appropriate scaling

Accuracy [3] – for precision of plotting the values (rigorous cross-referencing is essential)

Method [1] – for the selection of an appropriate graphical representation technique [7]

(ii) A wide variety of answers would be anticipated and answers will depend on the nature of the fieldwork and the data/variables plotted. The factor selected must be **geographical** and may relate to human or physical geography, e.g. climate, soils, geology, ecology, hydrology, human impact, land-use etc.

Award [3]–[4] for thorough geographical reasoning (graphical interpretation) in relation to a clearly stated geographical factor, with specific reference to the graph.

Award [1]–[2] for a less thorough geographical explanation of graphical data in relation to the selected geographical factor. If reasoning is thorough in relation to graph but the factor is implied or less explicitly stated, award max [3]. [4]

(d) Statistical analysis can **reliably** inform the hypothesis testing process and direct the course of the investigation. It can aid data interpretation and the formulation of reliable geographical conclusions. Statistical analysis can allow voluminous raw values to be condensed into a concise and meaningful mathematical form and can provide an **objective** measure of significance. Statistical analysis is necessary to provide **proof** which is essential to accept or reject a hypothesis. The type of statistical method selected for analysis will depend on the aim/hypothesis of the investigation and the nature of the study. There are two key elements in the question.
Mark breakdown as follows;

- Award up to [3] for a theoretical awareness of the purpose of statistical analysis within any fieldwork investigation.
- Award up to [3] for a justification of the chosen method. Candidates need to clearly outline, with reference to their aim or hypothesis, the reasons why their statistical method was selected as suitable. [6]

Section A **30**

Section B

AVAILABLE MARKS

2 **(a)** Afforestation of the Coalburn catchment and forest maturity over a 25 year period have clearly altered the hydrological characteristics of the drainage basin. Trees, compared to grass, store or **intercept** a larger volume of precipitation (an increase from approximately 3% of annual precipitation to approximately 25%). This increased interception storage reduces the speed of transfer of water to the river as surface runoff, a decrease from approximately 65% of annual precipitation to 60%. Consequently the **peak flow** of the river declined. The obvious reduction of infiltration and thus percolation reduced the subsurface **baseflow** component. The reduced surface and subsurface **transfer** of precipitation to the channel produced a decline in both peak and baseflow over time as the forest developed and reached maturity.

Level 3 ([5]–[6])
A detailed and thorough description, and explanation, of the changes over time. The candidate identifies key trends and quotes values from the bar graph. Appropriate key terminology is employed in the explanation of both **stores** and **transfers**.

Level 2 ([3]–[4])
A less detailed answer. Description may be less thorough and specific quotation of values may be omitted. Reasoning may be incomplete or more simplistic and fewer key terms may be evident.

Level 1 ([1]–[2])
A more superficial description or explanation. The answer may lack balance and may fail to address both components of the question. There may be a lack of specialist terms. [6]

(b) Meanders have progressively "migrated" downstream between 1765 and 1930. This is particularly evident around Moss Island where the sinuous meander loop has shifted southwards by approximately 8 km. The formation of meanders is clearly related to erosional and depositional patterns. On the outer meander bank the high velocity, and position of the thalweg, result in the erosion of the concave bend through processes of abrasion, solution and hydraulic action. Low energy conditions on the inside bend and the subsequent deposition, or aggradation of point bar deposits, causes a progressive shift in the meander loop downstream.

Award [2] for accurate description which recognises changing channel positions over time, with spatial/temporal values quoted. Award [1] for more general or simplistic description.

Level 2 ([3]–[4])
Candidates provide an accurate explanation of meander formation in relation to specified fluvial processes. There is confident use of specialist terminology.

Level 1 ([1]–[2])
The explanation may lack depth and fewer specialist terms may be employed. Some inaccuracy may be evident. [2] + [4] = [6] 12

AVAILABLE MARKS

3 (a) (i) Alberta province [1]

(ii) Candidates need to describe, using values from the graphs, the soil conservation methods selected by Canadian farmers in any one selected province. They should recognise the popularity of wind breaks as a soil conservation strategy. Secondly they need to explain why conservation methods are essential. They may acknowledge their importance as a response to soil erosion, monoculture, declining crop yields etc. Methods such as those presented protect the chernozems/ mollisols against wind and water erosion and help retain soil structure, texture, moisture and nutrient status.

Level 3 ([5]–[6])
Candidates provide a detailed answer which includes description of one selected bar chart as well as sound explanation of the need/purpose of soil conservation methods in this mid-latitude environment. There is confident use of specialist terminology. Figures must be quoted for [6] marks.

Level 2 ([3]–[4])
The answer at this level may lack balance and both description and explanation may appear less thorough. At the lower limiting mark one element of the question may be omitted. Fewer specialist terms may be evident.

Level 1 ([1]–[2])
The answer may be more simplistic and lack depth/detail. Candidates may address only one component of the question. Some inaccuracy may be evident and the quality of written communication may be poor.
[6]

(b) There are two key elements in this question.
Mark breakdown as follows:

Description up to [2]
Candidates need to recognise that energy transfer is not 100% efficient and the proportion available declines at the progressive trophic levels along the food chain. Figures should be quoted from the chart.

Explanation up to [3]
Energy can be lost from the producer population as a result of respiration or metabolic cell processes at trophic level 1. In addition, losses from the consumers or heterotrophs include heat, waste, respiration, metabolic cell processes (e.g. movement, digestion, reproduction etc.). Therefore energy availability declines at successive trophic levels within the food chain. [5]

12

AVAILABLE MARKS

4 (a) (i) 48% [1]

(ii) It should become evident from the resource that a variety of factors could influence energy in its passage through the atmosphere or its reflection/ absorption at the ground surface. Such factors may include:

- **Cloud Cover** – a heavy cloud cover in a particular location will absorb or reflect a higher proportion of energy, thus reducing availability at the ground surface.
- **Atmospheric Conditions** – a highly polluted, or dust-laden, atmosphere will increase absorption/reflection and thus reduce energy availability at the ground surface.
- **Ground Surface Characteristics** – the albedo/reflectivity of the ground surface can vary and influence energy loss via reflection. E.g. light coloured surfaces such as snow or ice are more reflective and thus have lower absorption rate.

Candidates may discuss a converse situation and explain why energy input may be increased at particular sites, e.g. in areas of low cloud cover, unpolluted atmospheric conditions, less reflective dark or moist ground surfaces etc. Accept latitude only if it is related to depth of atmosphere. Allow [1] mark for a valid reason with little/no development in relation to the question. [2]

(iii) Award up to [3] for a sound awareness of the distinction between both transfer methods and valid reference to global energy balance, e.g. surplus/deficit zones.
Horizontal Heat Transfers – involve energy exchange across latitudes via ocean currents, global winds and hurricanes.
Vertical Heat Transfers – involve energy transfer from the ground surface into the atmosphere. Such exchanges include conduction, convection, radiation and the transfer of latent heat. [3]
Max [2] marks if examples are not given for both transfers or if no reference to global energy balance.

		AVAILABLE MARKS
(b)	The resource provides evidence of a variety of protection measures – these include satellite monitoring, evacuation planning, the use of sandbags to safeguard against flooding, emergency services, the purchase of survival kits etc. A good answer should include resource reference as well as case study material to discuss how hurricane protection measures can be used to reduce loss of life or damage to property. **Level 3 ([5]–[6])** Candidates discuss a range of hurricane protection measures making good reference to Resource 4B as well as **their** hurricane case study. Discussion should display a purposeful insight into how they aim to achieve a reduced death toll and/or less damage to property. **Level 2 ([3]–[4])** Candidates present a less detailed answer displaying a more limited insight into the purpose of protection measures in reducing the death toll and/or damage to property. Case study material or resource evidence may be omitted at this level. **Level 1 ([1]–[2])** The answer shows a basic, or superficial, insight into the purpose of hurricane protection measures. The answer may lack explicit reference to case study **and/or** resource material [6]	12
	Section B	**36**

Section C

AVAILABLE MARKS

5 Candidates should display a knowledge and understanding of both physical and human factors. Physical factors may relate to climatic, geological, pedological, topographic characteristics of the environment. Human factors may encompass an explanation of river management, deforestation, land-use change, urbanisation etc. Many candidates will exemplify these causes of flooding using their case study material.

Level 3 ([9]–[12])
A well written answer which addresses all aspects of the question in an effective manner. Detail is included and a good range of flooding causes are classified and logically explained.

Level 2 ([5]–[8])
Causes of flooding are outlined but the answer lacks either the breadth or depth of knowledge required. There may be little attempt to classify causes as either human or physical and fewer specialist terms may be included.

Level 1 ([1]–[4])
The candidate provides a more generalised simplistic answer with a distinct lack of explanatory detail. The quality of written communication may be poor. [12] 12

6 Candidates should describe and explain the biotic and abiotic changes which characterise the seral stages of a named vegetation succession case study. There should be reference made to plant species as well as an explanation of the autogenic processes of soil/microclimatic modification.

Level 3 ([9]–[12])
An appropriate vegetation succession case study is outlined and the biotic and abiotic characteristics of the seral stages are described. A sound explanation is provided of the environmental modification processes. The answer is communicated coherently and specialist terms are included.

Level 2 ([5]–[8])
The answer may lack balance and display a less detailed insight into the successional changes and processes. Although succession may not be named, the type of succession should be evident, e.g psammosere, lithosere, hydrosere etc. The level of written communication may be reasonable.

Level 1 ([1]–[4])
A more simplistic answer is presented which may lack depth in both description and/or explanation. There may be inaccuracies evident, fewer specialist terms used and a lack of a spatial context. [12] 12

		AVAILABLE MARKS
7	Candidates must address both aspects of the question. They should display a sound understanding of the cyclogenesis process which occurs along a Polar Front and the air masses involved in the formation of these anticlockwise, spiralling low pressure weather systems. Secondly, candidates should display a knowledge of their effects on people with exemplification and details provided from a selected case study. Human effects may result from heavy rainfall, strong winds, poor visibility, thunderstorms etc. **Level 3 ([9]–[12])** The candidate demonstrates a detailed understanding of the meteorological processes involved in the formation of mid-latitude depressions. Relevant case study material is outlined to exemplify their impact on people. Specialist terminology is evident throughout the answer. **Level 2 ([5]–[8])** There is a general understanding of the formation of these weather systems and the human effects are more generalised with little, or no, case study exemplification. The level of written communication may be reasonable. **Level 1 ([1]–[4])** The candidate may provide a more simplistic or incomplete answer with a distinct lack of specialist terminology. There may be little, or no, case study material and some inaccuracies may be evident. [12]	12
	Section C	**24**
	Total	**90**