



Rewarding Learning

**ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2012**

Geography

Assessment Unit AS 1

assessing

Physical Geography

[AG111]

WEDNESDAY 13 JUNE, AFTERNOON

**MARK
SCHEME**

MARK SCHEMES

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- and 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) (i) Candidates need to display an awareness of the fieldwork investigation process. Three intervening stages between primary data collection and the final geographical conclusion require identification. Marks cannot be provided for any of the stages already labelled on Resource A. Appropriate stages may include:
- Data Tabulation
 - Data Processing
 - Lab analysis
 - Statistical Analysis
 - Statistical Interpretation
 - Data Presentation/Graphical Representation
 - Data Analysis/Description
 - Interpretation/explanation
 - Evaluation
 - Secondary Data Collection/Research
- (3 × [1]) [3]

- (ii) Candidates need to display an understanding of three of the specified methods of sampling available to the researcher as well as an insight into their potential strengths/weaknesses in relation to their individual fieldwork. Obviously their discussion should be evaluative and provide an awareness of the need to ensure that their chosen “subset” is objective, unbiased and representative of the “total population”. Discussions should include reference to any three of the sampling methods (random, systematic, stratified or pragmatic).

Award [4] for **methodology** – one for each selected sampling method (3 × [1]) for the inclusion of depth, terminology and appropriate details for all three methods.

Award [4] for **appropriateness** – one for reflection on each selected sampling method (3 × [1]) plus [1] for any one explicit reference to actual field study.

[4] + [4] [8]

- (b) (i) The mark breakdown is as follows:-

Title [1] – must be specific and accurate

Conventions [2] – for labelled axes
– for provision of a key (if necessary)
– for appropriate scaling of the graph

Accuracy [3] – for the accurate and precise plotting of values from the table

Method [1] – for the selection of an appropriate graphical technique (in relation to the aim and data tabulated)

N.B. Line graphs require continuous data on the x-axis

T – 1
C – 2
A – 3
M – 1

[7]

- (ii) Although some analysis may be included as context, the focus of the question concerns **explanation** of the graph in relation to geographical theory.

Level 3 ([5]–[6])

The answer displays a sound geographical reasoning of the graphical trend with relevant and effective integration of geographical theory.

Level 2 ([3]–[4])

The answer provides less detailed explanation with limited inclusion of geographical concepts or theories.

Level 1 ([1]–[2])

The answer presents simplistic explanation with very limited geographical understanding evident. Discussion may be purely descriptive for [1] mark.

[6]

- (c) (i) Primary data is obviously “current” which is beneficial in all studies. The investigator is in control of the data collection process, which can ensure accuracy, if a rigorous approach is adopted. Similarly the researchers can ensure that the sampling method and sampling size are appropriate for reliable and representative data collection. The data collection can be specifically tailored to meet the requirements of the aim/hypotheses which is advantageous.
(2 × [1])

[2]

- (ii) Award [3]–[4] for a detailed description of the methodology employed and the efforts made to ensure accuracy. There should be explicit and convincing linkage with fieldwork.

Award [1]–[2] for a methodology which lacks depth with little, or no, recognition of how accuracy was ensured. Reference to actual fieldwork may be more general or less explicit.

[4]

AVAILABLE
MARKS

30

Section A

30

Section B

AVAILABLE
MARKS

- 2 (a) (i)** Resource 2A illustrates how land-use change can influence the hydrological characteristics and processes operating within the drainage basin. As the percentage of impervious surfaces increases from 0% to 75%–100%, the volume of surface runoff increases by 45%. There is a corresponding decline in deep infiltration from 25% to 5% and a subsequent decline in shallow infiltration from 25% to 10%. The removal of vegetation cover reduces interception, storage and evapotranspiration losses by up to 10%.
- Award ([3]–[4]) for a thorough description of both hydrological stores and transfers. Accurate values must be quoted from the resource.
- Award ([1]–[2]) for less detailed description with few values quoted, if any. Alternatively the answer may be incomplete and may fail to distinguish between stores and transfers. [4]
- Maximum [3] if no attempt to distinguish accurately between stores and transfers.
- (ii)** As surface runoff provides a rapid and more voluminous hydrological transfer of water to the drainage basin, discharge in the river is likely to increase. Storm hydrographs are likely to display a reduced delay time (or lag), a higher peak discharge and steep rising and recession limbs.
- Award [1] for a recognition that discharge increases.
Award up to [2] for the description of other storm hydrograph characteristics
[1] + [2] [3]
- (b) (i)** 100 mm s^{-1} Accept $90\text{--}100 \text{ mm s}^{-1}$ [1]
- (ii)** A velocity in excess of 1000 mm s^{-1} is required to erode clay particles of 0.001 mm in diameter. This value gradually falls to 100 mm s^{-1} for sand grains of 0.1 mm . As particle size increases beyond 0.5 mm , flow velocity values increase in a positive relationship, e.g. values of 100 mm s^{-1} require flow velocities of approximately 1400 mm s^{-1} for erosion. As sediment size increases (beyond 0.5 mm) higher velocities indicate that higher levels of river energy are required to move/erode particles. However smaller particles (clay and silt) require higher velocities to lift them due to their “cohesive” or bonding properties. No credit for discussion of transport, settling or deposition.
- Award up to [2] for a description of the relationship. For [2] accurate values or sediment categories must be quoted. Award [1] if only one limb described.
- Award up to [2] for an accurate explanation of the relationship in relation to river energy and particle size, [1] mark for the accurate explanation of each limb. [4]

12

- 3 (a) (i) Grasses form the climatic climax vegetation as they are adapted to the climate in the mid-latitude areas. As Resource 3A illustrates, tall grass Prairie dominates in areas which receive annual average precipitation values in the region of 600 mm, with short grass Prairie characteristic of drier zones. The low annual rainfall is insufficient to support trees. Grasses have a short rapid life cycle which allows them to adapt to the short growing season of approximately 5 months and the extreme winter temperatures, which can drop as low as -10°C . They can also tolerate the high temperature range of approximately 35°C , as well as the wind chill factor from strong winds.

Award up to [3] for an answer which describes the adaptation of mid-latitude grassland vegetation to the climatic characteristics of the biome. For [3] there must be reference to precipitation values presented in Resource 3A. Maximum [2] for an answer based on the resource only. Maximum [2] for no resource use. [3]

- (ii) Monoculture involves the repetitive agricultural production of a single crop.

This intensive method of agricultural production results in a negative impact on chernozem soils. The use of machinery and chemical fertilisers causes a deterioration in the soil structure, texture and nutrient status. Ploughing breaks up the dense root mat of the grasses which leaves the top soil vulnerable to wind erosion. The repetitive uptake of nutrients and the harvesting of biomass results in a drain of nutrients from the topsoil. Removal of biomass reduces natural nutrient cycling and leaves the soil more susceptible to nutrient loss through leaching.

Level 3 ([5]–[6])

The candidate presents a well developed answer which addresses both aspects of the question and makes several salient points. There is an accurate definition of monoculture presented and a sound understanding of the associated impact on chernozem soils.

Level 2 ([3]–[4])

A less detailed answer is presented with some relevant discussion. A less precise definition may be presented and there may be a less thorough understanding of the impact of monoculture on the chernozem.

Level 1 ([1]–[2])

The candidate provides a more simplistic answer which may fail to address aspects of the question. There may be generalisation or inaccuracies included. [6]

AVAILABLE
MARKS

- (b) A plagioclimax is the name given to the stable vegetation community which results when natural succession which has been altered or stopped, and subsequently the ecosystem has not been allowed to reach its natural equilibrium.

A plagioclimax can be produced as a result of physical factors, e.g. volcanic eruptions or temporary climatic changes. It may be caused by human activities such as:

- Deforestation
- Grazing
- Burning of moorlands, heaths etc.
- Draining of wetlands
- etc.

Mark breakdown

Award [1] for an accurate and coherent definition of plagioclimax.

Award up to [2] for an accurate description of one causal factor. [3]

AVAILABLE
MARKS

12

- 4 (a) (i) Pressure – 1010 mb [1]
Cloud Cover – 2 oktas [1] [2]

- (ii) The air mass type would be classified as Tropical Maritime (Tm) which is warm and moist.
Identification of Tropical Maritime [1]
Characteristics relating to temperature **and** humidity [1] [2]

- (iii) Good candidates should make explicit resource reference and quote values from Resource 4A to support the predicted change in weather. As the depression moves eastwards, the cold front approaches and temperatures drop significantly as the warmer Tm air of the warm sector is replaced by the cold Pc air mass. As the cold Polar air mass invades, pressure rises sharply as it undercuts the warmer Tm air, forcing it to rise. The cyclonic nature of the system results in strong winds which approach from the west/north-west. As the warm unstable air rises, cools and condenses, thick towering cumulus cloud will eventually give way to heavy rainfall (occasionally accompanied by thunderstorms).

Level 3 ([5])

The candidate provides a detailed description and explanation of the projected changes in weather associated with the passage of the cold front. Explicit reference is made to the resource.

Level 2 ([3]–[4])

The candidate provides a valid but less detailed description and explanation of the weather changes. The range of weather elements described may be more limited and there may be some imbalance between description and explanation.

Level 1 ([1]–[2])

The candidate provides a limited, or less accurate, description and explanation. Explanation may be neglected and knowledge and understanding may be lacking. [5]

- (b) Candidates need to use Resource 4C to identify and describe wind speed patterns as Hurricane Ike progressively moves across the NW Gulf of Mexico. Strongest winds are associated with the anticlockwise rotational air uplift, which reaches a maximum in the eye wall. The lowest wind speeds are associated with the calm central eye of the storm.

Award [3] for an answer which accurately describes wind patterns and provides a valid explanation in relation to the structure of the hurricane.

Award [1]–[2] if the description or explanation is more superficial. At this level the answer may be imbalanced with only one element of the question addressed. Maximum [1] if description only is provided. [3]

Section B

**AVAILABLE
MARKS**

12

36

Section C

AVAILABLE
MARKS

- 5 The candidate must provide a locational context for their chosen drainage basin/delta and examine both the beneficial and detrimental effects of flooding. The beneficial effects may include ground water recharge, silt deposition and improved soil fertility, increased harvest yields, expansion of aquatic ecosystems, aquaculture etc. Detrimental effects could include damage to property, infrastructure, agriculture loss, disease, deaths etc. Candidates are provided with the opportunity to demonstrate their case study knowledge.

Level 3 ([9]–[12])

The candidate provides a balanced answer which displays a detailed and accurate knowledge of both the beneficial and detrimental effects of flooding on people and property. The answer is well structured, coherently communicated and includes case study detail.

Level 2 ([5]–[8])

The candidate provides an answer which may be imbalanced or lacking in either the breadth or depth of knowledge required. The answer may be more theoretical with less case study detail included.

Level 1 ([1]–[4])

At this level the answer may be more generalised or simplistic, possibly lacking case study detail. There may be a limited number of effects outlined and only one aspect of the question may be addressed. The quality of communication may also be poor. [12]

12

- 6 The details of the answer will depend on the local scale case study selected, which may be a sand dune, a lake, a woodland, a peatland etc. The locational context of the ecosystem should be outlined in the answer. Candidates need to explain how energy enters the ecosystem through solar radiation and moves through named autotrophs and heterotrophs at successive trophic levels. Energy losses should also be considered from the open system. Candidates also need to demonstrate a knowledge of nutrient cycling between the biomass, litter and soil stores. There should be good reference to case study specifics throughout. Maximum **Level 1** if an inappropriate case study is used.

Level 3 ([9]–[12])

The candidate provides a balanced and well written answer which addresses both aspects of the question in an effective manner. Detailed case study and accurate theoretical knowledge are demonstrated.

Level 2 ([5]–[8])

The answer may lack balance or provide a more simplistic, or generalised discussion of both aspects of the question.

Level 1 ([1]–[4])

The candidate displays very limited understanding of energy flow and nutrient cycling. The answer may address only one aspect of the question and inaccuracies may be evident. [12]

12

- 7** Anticyclones in summer, which result from a large mass of subsiding air (spiralling in a clockwise motion from the upper atmosphere) produce characteristic weather. As the air descends towards the ground surface, molecules are compressed and the air warms adiabatically. Thus condensation, cloud formation and rainfall do not occur. They may result in heat wave conditions during the day. At night however the lack of cloud will result in the loss of heat energy. The cold ground surface may be sufficient to cause condensation of water vapour resulting in the formation of early morning dew or mist. This will disperse throughout the day as sunshine builds up. In winter longer nights combined with clear skies result in a more intense cooling of the land. There is an increased risk of dew, frost and thicker, more extensive fog which can produce hazardous conditions. Candidates need to use their case study knowledge to exemplify the human effects of such weather conditions.

Level 3 ([9]–[12])

The candidate addresses all aspects of the question – providing a sound description and explanation of the summer and winter weather and the human effects of both types of anticyclones. Detailed, accurate knowledge is demonstrated and case study details are included.

Level 2 ([5]–[8])

The candidate provides a less detailed or more imbalanced answer which may not address fully all elements of the question. There may be a limited attempt made to explain the weather characteristics experienced in summer and winter. There may be a lack of case study detail included to exemplify the human effects.

Level 1 ([1]–[4])

The candidate provides a more simplistic answer which may lack balance and the inclusion of case study detail. At this level limited/no explanation of weather may be included and some inaccuracies may be evident. [12]

Section C

Total

**AVAILABLE
MARKS**

12

24

90