



Rewarding Learning

**ADVANCED SUBSIDIARY (AS)
General Certificate of Education
January 2011**

Geography

Assessment Unit AS 1

assessing

Physical Geography

[AG111]

FRIDAY 14 JANUARY, MORNING

MARK SCHEME

General Descriptions for Marking Criteria

Knowledge and Understanding	Skills	Quality of Written Communication	
<p>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.</p>	<p>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.</p>	<p>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.</p>	3
<p>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.</p>	<p>The candidate will display evidence of the ability to analyse and interpret the resource material but gaps, errors or misapprehensions may be in evidence.</p>	<p>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.</p>	2
<p>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.</p>	<p>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.</p>	<p>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.</p>	1

Section A

- 1 (a) The answer must clearly match the needs of the question. Candidates need to display an awareness of Health and Safety when planning fieldwork. Potential hazards/risks specific to the fieldwork require consideration, perhaps determined through the completion of a risk assessment or a pre-site visit and precise minimisation strategies need to be proposed.

Level 3 ([5]–[6]) The breadth of the question is recognised and the answer displays a balance. Relevant hazards/risks are identified and precise minimisation strategies are outlined. The answer displays coherent thought and is expressed effectively.

Level 2 ([3]–[4]) The answer may lack balance as it may focus on hazards/risks with limited consideration of strategies (or vice versa). Alternatively, the strategies may be general in nature and not closely linked to the hazards/risks identified or the actual fieldwork undertaken. The quality of written communication may be reasonable.

Level 1 ([1]–[2]) Candidates may only address one aspect of the question (either hazards or contingencies). The hazards/strategies proposed may appear less plausible or may only have tenuous links with the fieldwork. The answer will lack depth and may be poorly organised and poorly expressed. [6]

- (b) (i) The statistical analysis performed will depend on the chosen technique, but it must be relevant to the aim/hypothesis of the investigation. Therefore cross-referencing is essential with the report submitted.

Measures of Central Tendency/Range

- Calculation of mean [2]
- Calculation of median [2]
- Identification of mode [1]
- Calculation of range [2]

Spearman's Rank Correlation or Nearest Neighbour Analysis

- Accuracy of calculation [5]
(Maximum of [3] if error in ranks results in incorrect rs)
(Maximum [3] if Spearman's Rank is performed with less than 7 ranked pairs)
- Statistical interpretation [2]

N.B. Maximum 4 marks if selected statistical technique is inappropriate to the aim/hypotheses stated in the report. [7]

(ii) The answer requires thorough geographical reasoning in relation to the statistical outcome obtained. Relevant theoretical factors or concepts should be proposed and explanation developed. The answer will depend on the nature of the fieldwork and the statistical result (which may support or contradict the proposed aim or hypothesis). No credit for statistical interpretation. Maximum Level 2 for an answer that does not link to their statistic.

Level 3 ([5]–[6]) An organised, well written, accurate answer is produced which outlines and fully explains relevant factors which relate to the statistical outcome. Key terminology is employed and the geographical factors/theories display sound understanding of the theoretical context of the fieldwork.

Level 2 ([3]–[4]) Explanation of factors are generally accurate but the breadth or depth of the interpretation may be restricted. The answer may lack the integration of key terminology but reasonable understanding should be evident.

Level 1 ([1]–[2]) Explanation is more limited, simplistic and at the lower mark boundary may lack clarity. Although some valid factors may be outlined, the reasoning will lack depth. Language employed may be basic. [6]

(c) Answers will obviously vary depending on the fieldwork undertaken and the evaluation factors selected. Candidates need to display an ability to critically review their fieldwork in relation to their chosen factor and consider its influence (whether positive or negative) on the geographical conclusion produced.

For each factor:

Level 2 ([3]–[4]) A well expressed answer which displays a sound understanding of how the chosen factor influences both the nature and reliability of the geographical conclusion. Convincing linkage to their fieldwork is evident and the answer displays geographical insight.

Level 1 ([1]–[2]) Answers at this level, although evaluative, may lack depth and linkage to their fieldwork is less convincing. At the lowest mark the answer may be fairly simplistic and reflect very limited geographical insight. $[4] \times 2$ [8]

(d) The candidate is required to reflect on their selected geographical location (outlined in the fieldwork report for verification) and justify its suitability, or conversely its unsuitability, for the investigation of the proposed geographical aim. The answer should display a knowledge of the physical/human environment of the selected site.

Award [3] for a valid, well expressed answer, which displays a knowledge of the chosen fieldwork site and focuses fully on the demands of the question.

Award [1] or [2] for a more limited answer, or the justification displays only a general knowledge of the fieldwork location. The answer at the lowest level may lack focus and fail to reflect on their location in the context of the geographical aim of the study. [3]

30

Section A

30

Section B

- 2 (a) Pools and riffles can occur on both straight and meandering channels often with regular spacing. There are many contrasting characteristics worthy of credit. In meandering channels pools generally occur on the outside of bends with riffles located mid channel between meanders. **Pools** are typically areas of scour, fine sediment, deeper depressions or hollows in the bed of the channel which are not exposed at low flow. By contrast **riffles** are lobes of deposited gravel, coarser sediment with a steeper gradient and can be exposed at low flow. Their **formation** is related to stream energy. Surplus energy, particularly at high flow, is expended on eroding pools and riffles are areas where deposition occurs as energy is lost.

Award up to [2] for characteristics of pools.

Award up to [2] for characteristics of riffles.

Award up to [2] for explanation of formation. [6]

- (b) The answer must focus on **stores** and **transfers** within the drainage basin.

Geology: Permeable bedrock will facilitate percolation and baseflow which reduces the volume of water stored in the soil and transferred via surface runoff. Impermeable rocks impede percolation and consequently increase the soil store. This encourages surface runoff to the channel as infiltration is reduced with more saturated soils.

Soil Type: The texture of the soil determines its ability to store and transfer water. Permeable soils, with a high sand content, encourage infiltration and throughflow. This decreases the volume of surface runoff to the river. Impermeable soils, such as clay rich soils, impede infiltration making surface runoff the dominant hydrological transfer method of water back to the main channel.

Relief: The topography of the drainage basin alters its ability to store and transfer water. Steep basins have a reduced capacity for infiltration and surface runoff becomes the principal transfer method. In more lowland sections of the catchment area, where gradients are lower, infiltration is facilitated and water moves more gradually to the channel by the subsurface hydrological transfer methods and surface flow is less voluminous.

Award ([3] or [4]) for a detailed answer which displays a full understanding of both stores and transfers in relation to the selected factor. The answer is well communicated with a good use of geographical terminology.

Award [2] or [1] for an answer which lacks detail or may fail to focus on both stores and transfers. There may be a more limited use of key terms. [4]

(c) There are a number of factors which encourage delta formation and increase the rate of development. Conversely, the opposing situation could act to reduce the rate of delta growth.

- The **load** of a river is crucial. Rivers which transport a large volume of sediment downstream for subsequent deposition will encourage formation. Conversely in situations where rivers transport a lower volume of alluvial material this will reduce the rate of sediment accumulation on the sea bed.
- The **marine environment** may be considered. The material must be deposited faster than it can be removed by waves, tides and currents. A low tidal range and destructive high energy waves which scour the coastline will reduce the rate of formation whereas a large tidal range with low energy constructive waves produce a more favourable coastal environment.
- The **gradient of the sea bed** is a worthy consideration as it provides a platform for the aggradation of alluvium. A steep submarine gradient will reduce the rate of delta growth whereas a low gradient platform will encourage delta growth.
- The presence of **salt water** in the sea will encourage the fine clay particles to “flocculate” as it generates an electrical charge which will encourage a more rapid settling rate, compared to fresh water conditions.

Award [2] for a valid factor fully described.

Award [1] for the identification of a plausible factor or one which lacks development.

[2]

12

3 (a) (i) The selected characteristic must be observable on Resource 3 and must relate to the vegetation. No credit can be given for soil characteristics. Candidates may recognise the biodiversity or stratification of the grasses. They may recognise that some species have long roots which extend deep into the topsoil. Other plants have a dense underground web of root fibres close to the surface. [1]

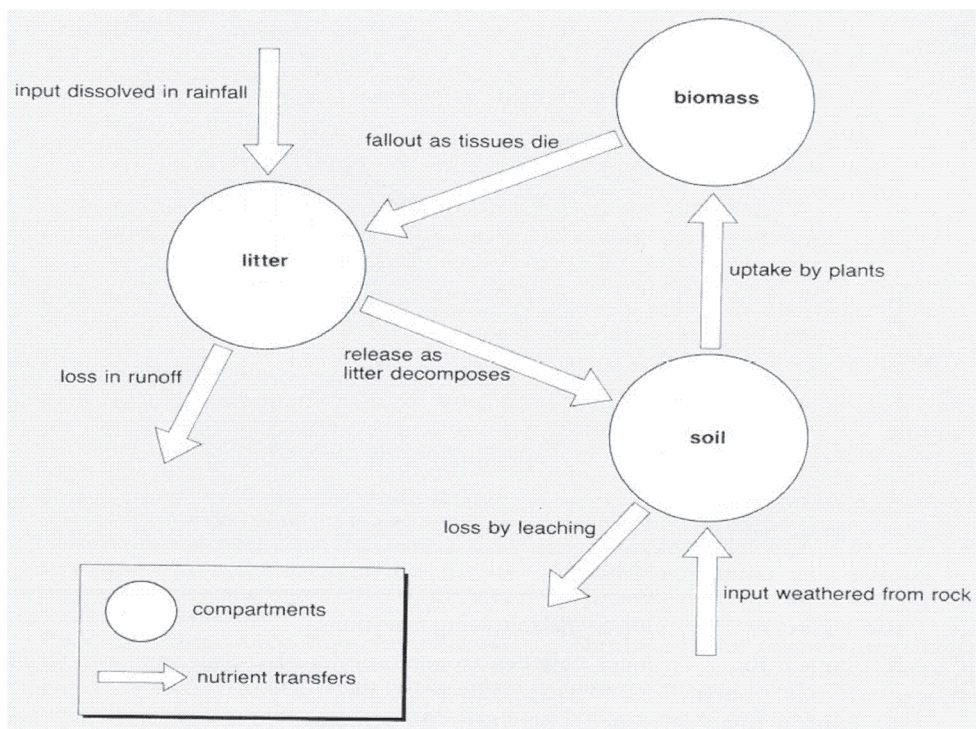
- (ii) Monoculture is the specialism of farming activities involving the repetitive growth of a single crop. This process greatly alters many of the natural vegetation, and soil, characteristics evident on Resource 3. Explanation may include some of the following:
- The replacement of natural vegetation with a single crop reduces floral diversity, biomass and stratification.
 - Ploughing breaks up the dense root mat which leaves the soil vulnerable to wind erosion.
 - The repetitive uptake of nutrients causes a drain from the system and the loss of leaf litter breaks down the nutrient cycle.
 - The loss of mull humus reduces the soil's moisture retention capacity.
 - The use of machinery and chemical fertilisers causes a further deterioration of the soil structure and nutrient status.

Level 3 ([5]–[6]) A well communicated, detailed answer which displays a sound understanding of how monoculture alters the characteristics of **both** vegetation and soil as displayed in Resource 3. The answer should include key geographical terminology.

Level 2 ([3]–[4]) Valid effects are explained but with insufficient depth or clarity. The answer may fail to address both soil and vegetation characteristics illustrated in Resource 3.

Level 1 ([1]–[2]) The answer is very generalised with a more limited understanding evident and key terminology may be omitted. At the lowest level there may be some misunderstanding or inaccuracy evident. [6]

(b) The nutrients or chemical elements of an ecosystem are circulated between a number of stores and transfer pathways as shown below.



Stores

- The biomass (living plants and animals)
- The soil
- The litter

Transfers

- The uptake or growth pathway (between the soil and biomass stores)
- The fallout pathway (the death of animals and plants and its addition to the litter store)
- The decay pathway (decomposition of litter to humus which adds to the soil store)
- Additional input and output pathways may be included.

Level 3 ([5]) The candidate logically describes the process of nutrient cycling between essential store and transfer pathways using their named small scale ecosystem.

Level 2 ([3]–[4]) The candidate provides a more general, but reasonably full description of nutrient cycling. Fewer key terms may be evident and a named ecosystem may be omitted or simply named as a label.

Level 1 ([1]–[2]) The candidate provides a limited response which fails to describe the process clearly or logically.

- If no ecosystem is named or it is an inappropriate scale, max Level 2.
- Accept an accurate, fully annotated diagram if used to describe nutrient cycling.

[5]

12

4 (a) The cyclonic weather conditions experienced at 3 pm (when the warm front passes) are related to the climatic processes operating when the warm Tm airmass and the cold Pm airmass converge in this spiralling weather system. At the warm front of the depression, the warm less dense air rises over the colder air ahead. This uplift of warm air initiates a fall in pressure to 1000mb. As the warm tropical maritime air rises over the cold airmass, it cools, expands and becomes unstable, producing clouds (nimbostratus clouds with 6 oktas coverage) and heavy frontal rainfall (which peaks at 5mm at 3 pm). The associated high humidity of 95% reflects the high water vapour content of the air. The temperature reaches a peak of 17°C as warm Tropical maritime air is experienced. The uplift of air molecules produces wind speeds of approximately 20 knots. As air is uplifted in an anticlockwise spiral, the wind direction veers to the South West to reflect the motion of the Tm air around the low pressure centre.

Level 3 ([7]–[8]) The candidate produces a well written answer which demonstrates a sound understanding of the four selected weather elements associated with the passage of the warm front. The answer is well supported with accurate and appropriate graph references.

Level 2 ([4]–[6]) The candidate produces an adequate, but less detailed, answer. There may be a lack of balance evident between description and explanation of the selected weather elements. Alternatively the candidate may include only two or three elements.

Level 1 ([1]–[3]) The candidate produces a more limited, or incomplete, answer. Some variables/elements may be described with little/no progress into explanation. Alternatively, some basic explanation may be attempted with minimal/no graph description. [8]

(b) An energy surplus is experienced between 40°N and 40°S of the equator where incoming solar energy is greater than outgoing energy. An energy deficit is experienced between 40° and 90° both North and South of the equator as incoming energy is less than outgoing energy resulting in an energy deficit.

Therefore heat transfer and distribution is essential to address this imbalance. Ocean currents transfer about 20% of this heat. Warm ocean currents, e.g. North Atlantic Drift which moves north from the tropical zone helping to raise temperature in the N. Atlantic, transfer heat. The Labrador Current, which is a cold ocean current, decreases temperatures on the Eastern side of the USA.

Level 2 ([3]–[4]) A detailed answer which displays a sound understanding of the global energy balance and the importance of ocean currents in the process of heat transfer.

Level 1 ([1]–[2]) A more generalised, simplistic answer which may not address fully all aspects of the question. At the lowest mark the answer may lack organisation, clarity, detail or specialist terminology. [4]

12

Section B

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Section C

- 5 Candidates need to reflect on the statement and consider its validity within their selected case study location (a large scale drainage basin or its delta). The primary causes of floods are mainly the result of external climatic factors whereas secondary causes tend to be drainage basin specific. Candidates need to recognise that many interconnected factors conspire to produce large scale flood events and the precise causes provided will depend on the spatial context selected. Causes may relate to climatic, topographical, geological, pedological, human factors etc.

Level 3 ([9]–[12]) A well written answer which covers all aspects of the question in an effective manner. Case study detail is evident and a good range of flooding causes are outlined. There is an attempt made to assess the validity of the statement for the chosen flooding study.

Level 2 ([5]–[8]) Causes of flooding are outlined, but the answer lacks either the breadth or depth of knowledge expected. Causes may be theoretical with little reference to case study material. There may be no attempt to consider the validity of the proposed statement and few specialist terms may be evident.

Level 1 ([1]–[4]) The candidate provides a more generalised simplistic answer which lacks depth. There may be no spatial context or evaluative insight evident. The quality of written communication may be poor. [12]

12

- 6 The statement provides a stimulus as well as a theoretical context for the question. The details required on succession and seral communities depends on the small/regional scale case study selected. The question demands a knowledge of seral stages as well as an explanation of the progressive environmental changes which have allowed the succession to proceed. Answers must display an understanding of autogenic **processes** which may be related to the soil, microclimate or both. There should be reference made to vegetation species for the selected succession case study.

Level 3 ([9]–[12]) An appropriate vegetation succession case study is selected and seral communities are clearly, and logically, outlined. A detailed explanation of environmental modification processes is presented and communicated coherently using specialist geographical terminology.

Level 2 ([5]–[8]) A succession is identified with some valid recognition of seral stages but the processes of its formation may lack explanatory depth or clarity. The level of written communication may be reasonable.

Level 1 ([1]–[4]) The candidate provides an answer which is more simplistic and is more limited in terms of its accurate content. The description and explanation of processes lacks depth and the spatial context may be missing or inappropriate. The quality of written communication may be poor.

[12]

12

7 The question requires candidates to name a specific hurricane/cyclone event and evaluate the protective measures employed to minimise devastation in relation to this extreme weather event. The types of protective measures outlined will depend on the selected case study. They are likely to include prediction, monitoring, forecasting, education, building code requirements, engineering solutions, evacuation etc. The command word “evaluate” requires more than simply discussion. Good answers should include strengths and weaknesses of measures with some element of critical reflection.

Level 3 ([9]–[12]) An appropriate hurricane/cyclone event is selected and a range of protective measures are outlined and evaluated. The answer is well structured with good case study depth and detail.

Level 2 ([5]–[8]) A less detailed answer where reference to case study material is effective, but depth of knowledge is limited. There may be some attempt made to evaluate protective strategies. The level of written communication may be reasonable.

Level 1 ([1]–[4]) The candidate presents an answer which is more general or simplistic with little/no case study material. There may also be little/no attempt made to evaluate protective measures and some inaccuracy may be evident. The level of written communication may be poor.

[12]	12
Section C	24
Total	90