Mark Scheme (Results)
January 2008

GCE Geography A (6464/01)

6464 Physical Systems

Question Number		Question
1.		**(a)** Distinguish between **conventional** and **frontal** mechanisms of uplift.
		Indicative content
		Convectional = air heated by solar radiation/terrestrial re-radiation, expands, become less dense than surrounding air and so rises. Frontal = less dense warm air meets more dense cold air. Warm air rises over cold air and/or cold air cuts underneath warm air forcing it to rise. (5)
Level	Mark	Descriptor
2	5-4	Secure understanding of both trigger mechanisms with density of air explicit.
1	3-1	One mechanism secure or basic awareness of both.

Question Number		Question
1.		**(b)** Account for the spatial and temporal variations in Britain's rainfall.
		Indicative content
		• "Account for" requires explanation. • Reasons likely to be based on pressure systems, air masses, orographic effect, wind direction, proximity to sea, etc. • "spatial" – from place to place, likely to include north/south, east/west, upland/lowland differences. • "temporal" – over time, both seasonal and longer term. (20)
Level	Mark	Descriptor
5	20-16	Thorough explanation with reference to a good range of factors. Shows clear understanding of processes involved. Addresses both spatial and temporal variations in a fairly balanced way. Uses a range of data as evidence.
4	15-12	Sound explanation with reference to a reasonable range of factors. Shows understanding of processes involved. Addresses spatial and temporal variations, but not necessarily in a balanced way. Provides some data as evidence.
3	11-8	Some accurate explanation with reference to valid factors, but limited in range and depth. Has knowledge of processes involved. Likely to focus on spatial or temporal variations. Names locations/times but lacks specific data.
Level 2	7-4	Mainly descriptive but with some simplistic cause-effect statements. Shows knowledge of factors but little effective understanding. Broad references to place and time, but not just lifted from the resource.
Level 1	3-1	Very little accurate description or factual content. Likely to lack relevance, perhaps focussing on a single extreme event or impact on human activity.

(Total 25 marks)

Question Number	Question	
2	**(a)** Define the term adiabatic lapse rate and briefly explain why the rates for dry and saturated air differ.	
	Answer	Mark
	Adiabatic lapse rate is the rate of temperature change in air parcels as they change in height. They change temperature due to their expansion/contraction and the resultant pressure alteration Difference is due to release of (latent) heat during condensation in saturated air. 3 marks for definition; 1 for temp change, 1 for height change; 1 for pressure/expansion and/or contraction 2 marks for explaining difference; 1 for release of heat energy, 1 for ref. to condensation.	(5)

Question Number		Question	
2		**(b)** Examine the weather characteristics associated with different states of atmospheric stability.	
		Indicative content	
		"Examine" requires description, explanation and comment. - Weather characteristics include precipitation, temperature, cloud cover, humidity, wind etc. - States of stability include stable, unstable, neutral and conditional. - Key is that stable conditions lead to calm, clear, dry weather…. - unstable conditions lead to wet, windy, cloudy weather. - However, spatial and temporal variations occur e.g. anticyclonic gloom in stable conditions. (20)	
Level	Mark	Descriptor	
5	20-16	Accurate description and thorough explanation with reference to a range of states. Shows clear understanding of processes involved. Appreciates variations, either temporal or spatial. Uses a range of data as evidence.	
4	15-12	Accurate description and sound explanation with reference to a reasonable range of states. Shows understanding of processes involved. Deals with a variety of weather characteristics. Provides some data as evidence.	
3	11-8	Effective description and some accurate explanation with reference to stability and instability, but limited in range and depth. Has knowledge of processes involved. Likely to focus on cloud/precipitation. Lacks specific data.	
2	7-4	Mainly descriptive but with some simplistic explanation. Shows knowledge of either stability or instability. Probably refers only to cloud/precipitation. No evidence provided.	
1	3-1	Very little accurate description or factual content. Likely to lack relevance, perhaps focussing on causes of uplift or extreme weather events.	

(Total 25 marks)

Question Number	Question	
3	**(a)** Define the term **glacier system** and suggest why glaciers are regarded as **open** systems.	
	Answer	Mark
	Glacier system = the relationship between inputs (precipitation, avalanches etc), throughputs (stores and movement of ice) and outputs (melting, evaporation etc). It is an open system because the inputs and outputs are external OR the amount of ice in the glacier can change over time. N.B. May offer a view of a landscape-shaping system instead. POINT MARK. 2 marks for inputs, throughputs and outputs. 1 mark for ref to ice. 2 marks for explanation of "open".	(5)

Question Number	Question	
3	**(b)** Examine the factors influencing the short and long-term variations in the position of glacier snouts.	
	Indicative content	
	• "Examine" requires description, explanation and comment • "factors" – should be based on the glacier budget, but also refer to gradient, basal temperature, nature of the valley shape/geology etc. • "short-term" likely to be seasonal, surges. • "long-term" likely to relate to global climate change. (20)	
Level	Mark	Descriptor
5	20-16	Accurate description and thorough explanation with reference to a good range of factors. Shows clear understanding of processes involved. Addresses both short and long-term variations in a fairly balanced way. Uses a range of data as evidence.
4	15-12	Accurate description and sound explanation with reference to a reasonable range of factors. Shows understanding of processes involved. Address both short and long-term variations, but not necessarily in a balanced way. Provides some data as evidence.
3	11-8	Effective description with some accurate explanation with reference to valid factors, but limited in range and depth. Has knowledge of processes involved. Likely to focus on short or long-term variations. Names locations/times but lacks specific data.
2	7-4	Mainly descriptive but with some simplistic explanation. Shows knowledge of factors but little effective understanding. Broad references to place and time.
1	3-1	Very little accurate description or factual content. Likely to lack relevance, perhaps focussing on mechanisms of movement or landscape impact.

<div align="right">(Total 25 marks)</div>

Question Number	Question	
4	(a) Distinguish between the processes of **erosion** and **weathering** as experienced in glacial environments.	
	Answer	Mark
	Erosion = wearing away of the landscape by the moving ice in a glacier e.g. plucking, abrasion etc. Weathering = breakdown of rocks by the elements of the weather e.g. freeze-thaw, frost shattering etc. The difference is that erosion involves movement whereas weathering occurs "in situ". POINT MARK. 2 marks for each definition. 1 mark for the difference being explicit.	(5)

Question Number		Question	
4		(b) Explain how erosion and weathering processes influence the characteristics and location of glacial landforms.	
		Indicative content	
		"Explain" requires reasons to be offered. - Both weathering and erosion should be addressed. - Landforms include trough, corrie, arête, pyramidal peak, roche moutonnée etc. "characteristics" – appearance, size. "location" – within the glacial landscape, in relation to the glacier, named/located examples. "influence" – may be formation or modification. (20)	
Level	Mark	Descriptor	
5	20-16	Thorough explanation with reference to a good range of landforms. Shows clear understanding of both sets of processes involved. Addresses both characteristics and location in a fairly balanced way. Uses a range of located examples as evidence.	
4	15-12	Sound explanation with reference to a reasonable range of landforms. Shows understanding of both sets of processes involved. Addresses characteristics and location, but not necessarily in a balanced way nor very explicitly. Provides some located examples as evidence.	
3	11-8	Some accurate explanation with reference to valid landforms, but limited in range and depth. Has knowledge of at least one set of processes involved. May lack explicit references to characteristics and location. Some examples, but not located.	
2	7-4	Mainly descriptive but with some simplistic explanation. Shows knowledge of a limited range of landforms but little effective understanding.	
1	3-1	Very little accurate description or factual content. Likely to lack relevance, perhaps focussing on non-glacial erosion/weathering.	

(Total 25 marks)

Question Number	Question	
5	**(a)** Distinguish between the terms **litter** and **humification**.	
	Answer	Mark
	Litter = dead organic matter, including leaves, twigs, dead animals, excreta etc Humification = breakdown and decay of dead organic matter by micro-organisms such as bacteria, and its incorporation into the soil. The difference is that litter is matter, humification is a process. POINT MARK. 2 marks for each definition. 1 mark for explicit distinction.	(5)

Question Number	Question	
5	**(b)** Examine the influence of organisms (plants, animals, man) on soil profile characteristics.	
	Indicative content	
	• "Examine" requires description, explanation and comment • Comments could relate to relative importance of this factor to others • "Organisms" include plants, animals and man. Good answers should deal with all three. • Soil profile characteristics include depth, colour, pH, minerals, texture, structure, horizons etc etc	(20)

Level	Mark	Descriptor
5	20-16	Accurate description and thorough explanation with reference to a good range of characteristics. Shows clear understanding of processes involved and relates to all three elements in a fairly balanced way. Evidence provided with relevant detail from named and located examples. May comment on variations in influence or relative importance.
4	15-12	Accurate description and sound explanation of a reasonable range of characteristics. However, there may be some limitations in depth and may not cover all three elements in a balanced way. Some evidence provided from specific soil examples. May comment in the conclusion.
3	11-8	Effective description and some accurate explanation. Linkages may often be stated rather than explained. Characteristic may be limited in range and fairly generalised. Examples may be named, but not well used. Unlikely to comment
2	7-4	Mainly descriptive but with some simplistic explanation. Shows knowledge of a limited range of characteristics but little effective understanding. No examples provided. No comment made.
1	3-1	Very little accurate description or factual content. Likely to lack relevance, perhaps focusing on other factors.

(Total 25 marks)

Question Number	Question
6	**(a)** Distinguish between the terms **primary succession** and **secondary succession**, giving an appropriate example of each.

	Answer	Mark
	Primary succession = long-term development of a plant community, starting from a bare inorganic surface e.g. lithosere, hydrosere etc. and leading towards a climax community (equilibrium). Secondary succession = long-term development of a plant community, starting from pre-existing vegetation e.g. abandoned farmland etc. and leading towards a climax community (equilibrium). The difference is the state of the environment at the start. POINT MARK. 1 mark for each definition. 1 mark for each example. 1 mark for explicit distinction.	(5)

Question Number	Question
6	**(b)** Examine the factors that have influenced either a named **lithosere** OR a named **hydrosere**.

	Indicative content	
	• "Examine" requires the seral stages to be identified, and these changes explained with reference to influencing factors. • Factors are both autogenic and allogenic…. • …and may include competition, climate change, human activity, bioconstruction etc etc. • Focus should be on either lithosere (succession on bare rock) or hydrosere (succession in fresh water).	(20)

Level	Mark	Descriptor
5	20-16	Accurate description and thorough explanation with reference to a good range of factors. Shows clear understanding of processes involved. Shows conceptual awareness. Uses a range of data/species as evidence.
4	15-12	Accurate description and sound explanation with reference to a reasonable range of factors. Shows knowledge of concepts. Shows understanding of processes involved. Provides some data/species as evidence.
3	11-8	Effective description with some accurate explanation with reference to valid factors, but limited in range and depth. Has knowledge of processes involved. Names places but lacks specific data.
2	7-4	Mainly descriptive but with some simplistic explanation. Shows knowledge of factors but little effective understanding. May take a spatial transect view without awareness of temporal change.
1	3-1	Very little accurate description or factual content. Likely to lack relevance, perhaps focussing on characteristics of one plant community.

Max Level 3 for psammosere or halosere.

(Total 25 marks)