Paper 1 Mark scheme

Question number	Answer	Mark
1(a)(i)	D	(1)

Question number	Answer	Mark
1(a)(ii)	Award 1 mark for one of the following, maximum 1 mark: Rocks formed in layers (1) Idea of compaction/cementation (1) Oldest rocks are at the bottom/youngest at the top (1) May contain fossils of plants and/or animals (1) **Accept any other appropriate response**	(1)

Question number	Answer	Mark
1(b)	B	(1)

Question number	Answer	Mark
1(c)(i)	Award 1 mark for one of the following, maximum 1 mark: Forestry (1) Urbanisation/settlement (1) Deforestation (1) Building of roads/rail (1) Reject farming/agriculture **Accept any other appropriate response**	(1)

Question number	Answer	Mark
1(c)(ii)	Award 1 mark for farming activity and a further one mark for effect on the landscape, up to a maximum of 2 marks: Farming clears the natural surface vegetation/trees (1), which can result in a mono-culture and/or artificial landscape (1) Farming can plant the same crop over and over (1) which can give landscapes the same appearance (1) In some parts of the UK, farming has led to a loss of hedgerows (1) as farmers removed them to improve efficiency of farming (1) Farming has led to sheep in upland landscapes (1) which has created a deforested and grazed/grassy landscape (1) **Accept any other appropriate response**	**(2)**

Question number	Answer	Mark
2(a)(i)	Award 1 mark for one of the following, maximum 1 mark: Stack (1) Cliff (1) Wave cut platform (1) Bay (1) Arch (1) Headland (1) Reject depositional features **Accept any other appropriate response**	**(1)**

Question number	Answer	Mark
2(a)(ii)	Award 1 mark for one of the following, maximum 1 mark: Root action is where roots grow into the ground (1) Chelation/influence of soil acid (1) Action of animals such rabbit burrowing (1) Reject erosional processes **Accept any other appropriate response**	**(1)**

Question number	Answer	Mark
2(a)(iii)	Award 1 mark for point about rip rap and a further one mark for how this protects coastal landscapes, up to a maximum of 2 marks: Large (manmade) boulders are placed along the cliff line (1) which protect the coast by acting as a sea wall (1) The gaps between the rocks allow water through (1), therefore slowly dissipating energy (1) **Accept any other appropriate response**	**(2)**

Question number	Indicative content
2(a)(iv)	**AO3 (4 marks)/AO4 (4 marks)** **A03** • Wave direction is determined by the prevailing wind resulting in the wash proceeds up the beach at an angle to the coast. • Sediment is moved along the coast. The swash pushes sediment up the beach, its direction determined by the prevailing wind. The back wash causes material to move back down the beach at right angles to the coast. • The swash/back wash process produces a zig zag movement of sediment along the coast. Over time, large amounts of material can be transported along the beach. • Where the coast changes direction, material is deposited offshore. Over time, there is a buildup of material off the coast – this forms a spit. Long-shore drift is a dominant process in maintenance of the spit. • Once material moves to the east of the headland, there is a lower energy environment, allowing deposition to occur, which encourages the deposition of fine materials resulting in the creation of mudflats/a salt marsh area. • Over time, the spit can develop a hook/become recurved and its shape is influenced by both river currents/tidal movement and localised wind in the estuary mouth. • The estuary is important in the diagram as it limits the growth of the spit due to the deep water and the currents. • Transportation occurs until a change in direction of the coastline. **A04** • The prevailing wind is south-westerly. • The long shore drift is moving west to east. • There is evidence of a narrow strip of beach/sand in front of the mainland (before the headland). • There is fast water flowing out of the river mouth in a north south direction. • The landform is a recurved spit, which curves towards the north/mouth of river estuary. • Behind the spit there is a build-up of sediment forming a salt marsh area.

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1–3	• Attempts to apply understanding to deconstruct information but understanding and connections are flawed. An unbalanced or incomplete argument that provides limited synthesis of understanding. Judgements that are supported by limited evidence. (AO3) • Uses some geographical skills to obtain information with limited relevance and accuracy, which supports few aspects of the argument. (AO4)
Level 2	4–6	• Applies understanding to deconstruct information and provide some logical connections between concepts. An imbalanced argument that synthesises mostly relevant understanding, but not entirely coherently, leading to judgements that are supported by evidence occasionally. (AO3) • Uses geographical skills to obtain accurate information that supports some aspects of the argument. (AO4)
Level 3	7–8	• Applies understanding to deconstruct information and provide logical connections between concepts throughout. A balanced, well-developed argument that synthesises relevant understanding coherently leading to judgements that are supported by evidence throughout. (AO3) • Uses geographical skills to obtain accurate information that supports all aspects of the argument. (AO4)

Question number	Answer	Mark
3(a)(i)	Award 1 mark for one of the following, maximum 1 mark: River cliff (1) Slip off slope/point bar (1) Meander (1) Flood plain (1) **Accept any other appropriate response.**	**(1)**

Question number	Answer	Mark
3(a)(ii)	Award 1 mark for one of the following, maximum 1 mark: Carbonation/acid rain (1) Dissolution/solution weathering (1) **Accept any other appropriate response**	**(1)**

Question number	Answer	Mark
3(a)(iii)	Award 1 mark for point about channelisation and a further one mark for how this protects river landscapes, up to a maximum of 2 marks: Making the channel wider or deeper (1) increasing the capacity of the river to hold water (1) Where a channel is straightened/meanders are removed (1) so water can pass through the area more quickly (1) Concreting of beds and banks (1) reducing friction/increasing velocity/reducing flood risk to that area (1) **Accept any other appropriate response**	**(2)**

Question number	Indicative content
3(a)(iv)	**AO3 (4 marks)/AO4 (4 marks)** **AO3** • Illustrates the dynamic process of erosion, transport, and deposition occurring over the length of a river – though in the formation of an oxbow lake, erosion might be seen as the dominant factor. • Material is eroded from the outside of the meander creating a river cliff – the water travels at greater speed on the outside bend and has more energy for erosion. This process also leads to the provision of sediment in the river. • In the lower-energy environments on the diagram, deposition will take place, e.g. on the inside of meanders where the water level is shallow, friction is high and deposition occurs forming point bars. • The high-energy areas of the meander (erosional areas) were extended with the result of a narrowing of the neck of the meander. Subsequently, high flow/flood broke through the neck of the meander leaving a body of water cut off, forming an oxbow lake. **AO4** • The river flows from north to south. • There are alternate areas of erosion (river cliffs) and deposition (point bars). • The river meanders across the flood plain. • The flood plain is approximately 100 m wide. • The diagram indicates differential rates of erosion and deposition, with the greatest amount of erosion taking place on the outside of meanders, • There is a wide valley floor with hills/cliffs/steep valley sides on either side, • There is a body of water separate from the main channel, an oxbow lake.

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Level 2	4–6	• Applies understanding to deconstruct information and provide some logical connections between concepts. An imbalanced argument that synthesises mostly relevant understanding, but not entirely coherently, leading to judgements that are supported by evidence occasionally. (AO3) • Uses geographical skills to obtain accurate information that supports some aspects of the argument. (AO4)
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Question number	Answer	Mark
4(a)(i)	Award 1 mark for one of the following, maximum 1 mark: Corrie/cirque/cwm (1) Glacial trough (u-shaped valley) (1) Arête (1) Tarn/glacial lake (1) Reject Truncated spurs, Roche Moutonnée **Accept any other appropriate response**	**(1)**

Question number	Answer	Mark
4(a)(ii)	Award 1 mark for one of the following, maximum 1 mark: Freeze thaw weathering (1) Exfoliation – extreme changes in temperature (1) Reject answers that describe chemical or biological weathering. **Accept any other appropriate response**	**(1)**

Question number	Answer	Mark
4(a)(iii)	Award 1 mark for point about nature/type of tourism and a further one mark for effect on glaciated landscape, up to a maximum of 2 marks: Climbers (1) can cause rock to become loose as they put supports on the cliffs (1) Walkers (1) can lead to soil erosion along upland footpaths with high footfall (1) Walkers leave waste in upland areas (1), which does not decompose in cold conditions (1) Reject answers that are about how the upland landscape affects human activity **Accept any other appropriate response**	**(2)**

Question number	Indicative content
4(a)(iv)	**AO3 (4 marks)/AO4 (4 marks)** **AO3** • An important process from the diagram is ice stagnating and melting. • This is due to a change in the glacial mass balance, ie differences inputs and outputs to the system. • The drumlin is made up of rock eroded by the glacier further upstream. • Ancient glaciers would have carried debris, which would have accumulated at the base. • Melting ice at the base of the glacier causes material to deposited, as there is too much to be carried. • Drumlins are formed underneath the glacier so are formed behind the terminal moraine. • Drumlins build up over time, layers of glacial till and rock. • Terminal moraines mark the maximum extent of the glacier at a given time. • The long axis of drumlins aligns with the flow of glacial ice. • As the glacial continues to flow, it reshapes the drumlin with a steep 'stoss end' and gradually-falling 'lee slope' in front. **AO4** • Ice moved from north to south. • At the end of the valley glacier is a terminal moraine. • At the base of the valley glacier is an area of rich debris rock. • The drumlin is located further north of the terminal moraine.

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Level 2	4–6	• Applies understanding to deconstruct information and provide some logical connections between concepts. An imbalanced argument that synthesises mostly relevant understanding but not entirely coherently, leading to judgements that are supported by evidence occasionally. (AO3) • Uses geographical skills to obtain accurate information that supports some aspects of the argument. (AO4)
Level 3	7–8	• Applies understanding to deconstruct information and provide logical connections between concepts throughout. A balanced, well-developed argument that synthesises relevant understanding coherently leading to judgements that are supported by evidence throughout. (AO3) • Uses geographical skills to obtain accurate information that supports all aspects of the argument. (AO4)

Question number	Answer	Mark
5(a)(i)	Award 1 mark for one of the following, maximum 1 mark: Orbital changes/Milankovitch cycles (1) Solar variation/sunspot activity or cycles (1) Volcanic eruption (1) Reject human causes such as the EGE/global warming. **Accept any other appropriate response.**	**(1)**

Question number	Answer	Mark
5(a)(ii)	Award 1 mark for each correctly identified source of evidence, up to 2 marks: Ice cores (1) Pollen records (1) Tree rings (1) An example of a historical sources (e.g. painting) (1) **Accept any other appropriate response**	**(2)**

Question number	Answer	Mark
5(a)(iii)	Award 1 mark for the calculation of the correct answer = 13.5°	**(1)**

Question number	Answer	Mark
5(a)(iv)	Award 1 mark for point about prevailing wind and a further one mark for each effect on the climate of the UK, up to a maximum of 3 marks. Map shows larger amounts of precipitation in the west (1) because the prevailing wind brings moist air from the south west (1), which rises over land and condenses (1). Map shows locations in the east have higher temperatures (1), which could be because they are not facing the prevailing wind (1) and therefore are sheltered by the higher altitudes in the west (1. **Accept any other appropriate response**	**(3)**

Question number	Answer	Mark
6(a)(i)	D	**(1)**

Question number	Answer	Mark
6(a)(ii)	B	**(1)**

Question number	Answer	Mark
6(a)(iii)	Award 1 mark for point about atmospheric circulation and a further one mark for its contribution to climatic conditions, up to a maximum of 2 marks. The air mass originates from an area of high pressure (around sub equatorial South America) (1) which brings dry/hot weather (1) so there is a lack of rainfall (1). The high pressure conditions (1) lead to cloudless skies/warm temperatures (over 20°) (1) because of the lack of condensation (1). **Accept any other appropriate response**	**(3)**

Question number	Answer	Mark
6(b)(i)	Award 1 mark for point about human cause of drought and a further one mark for explanation of this, up to a maximum of 2 marks. De-forestation leads to a reduced tree cover (1) which means that there is less interception (1). Intensification of farming (1) may involve unsustainable use of irrigated water in crop production (1). Construction of large reservoirs (1) may cause drought downstream by reducing the flow of water (1). Reject natural causes of drought. **Accept any other appropriate response**	**(2)**

Question number	Answer	Mark
6(b)(ii)	Award 1 mark for a basic impact, and a further one mark expansion up to a maximum three marks. Domestic water supply shortages (1), leading to hosepipe bans/lack of water for swimming pools (1) as the need for water conservation increases (1). Water supply for recreational purposes is restricted (1), e.g. there is not enough water to irrigate golf courses (1) which could result is a loss of business (1). Water supply for farming is reduced (1), making it harder to irrigate the land and grow crops (1), which might push up food prices for consumers (1). **Accept any other appropriate response.**	**(3)**

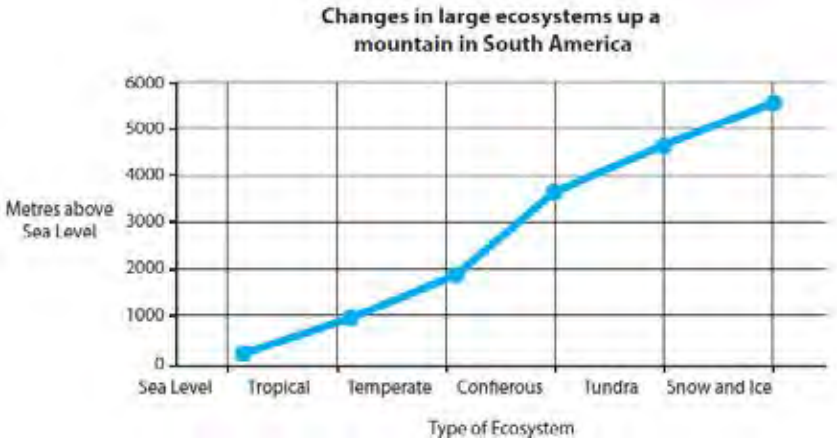
Question number	Answer	Mark
6(c)(i)	Eye/eye wall Reject centre, middle, hole.	**(1)**

Question number	Answer	Mark
6(c)(ii)	Award 1 mark for point about sea surface temperature and a further one mark for how this links to cyclone distribution, up to a maximum of 4 marks. Figure 9c shows warm sea surface temperatures are near the equator (1) which corresponds with the pattern of hurricanes forming around the equator in Figure 9b (1). Figure 9c shows warm sea surface temperatures of over 25 °C to the east of South America (1), which would create the pattern of cyclones shown to the east of Central and North America (1). Figure 9b shows cyclones only form just north or south of the equator only, but not on the equator (1) where there is rotation of air because of the Coriolis effect (1). Pattern of cyclones on Figure 9b shows they do not normally form over land/in colder seas with surface temperatures much less than 25 °C (1), which is because they need the warm water as a source of latent heat of energy (1). **Accept any other appropriate response**	**(4)**

Question number	Indicative content
6(d)	**4 Marks for AO2 / 4 marks for AO3** **AO2** • Potential environmental impacts include flooding, damage to environment from industrial damage, contaminated ground water/water supplies, soil erosion leading to crop damage/failure. • Different groups of people respond to the environmental impacts, including individuals, organisations and local governments/the national government. • Individuals can construct makeshift flood defenses to prevent their land from being flooded (e.g. sandbags). • Local governments ensure that education is provided and messages are given to locals to warn residents about potential hazards such as flooding and contaminated drinking water supplies. • Organisations identify hazard-prone areas at risk of flooding/environmental damage. • The national government ensures that relevant monitoring bodies produce the necessary information in prediction/forecasting the weather. • The national government may mobilise military/emergency aid resources to prepare flood defenses/respond to contamination/protect crops and wildlife. **AO3** Evaluation will depend on specific case study but may include: • Because the country is developed, the economic development/wealth and technology provide access to more accurate information about potential cyclone events and more advanced ways to deal with the environmental impacts. • Individual responses have a relatively small impact on reducing environmental damage. They can protect their own land/environment but not much beyond that. • The relative value of an organisation's response to environmental impacts will depend on the organisation's priorities. Some environmental groups may focus on environmental impacts (e.g. wildlife protection) but other aid organisations may focus on social impacts (safety, food, shelter). • National governments can have the biggest impact because they have the resources, capacity and authority to respond to environmental effects on a large scale. • National governments can collaborate with other national governments in providing aid, which enables them to respond to environmental impacts that cross national borders.

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1–3	• Demonstrates isolated elements of understanding of concepts and the interrelationship between places, environments and processes. (AO2) • Attempts to apply understanding to deconstruct information but understanding and connections are flawed. An unbalanced or incomplete argument that provides limited synthesis of understanding. Judgements are supported by limited evidence. (AO3)
Level 2	4–6	• Demonstrates elements of understanding of concepts and the interrelationship between places, environments and processes. (AO2) • Applies understanding to deconstruct information and provide some logical connections between concepts. An imbalanced argument that synthesises mostly relevant understanding, but not entirely coherently, leading to judgements are supported by evidence occasionally. (AO3)
Level 3	7–8	• Demonstrates accurate understanding of concepts and the interrelationship between places, environments and processes. (AO2) • Applies understanding to deconstruct information and provide logical connections between concepts throughout. A balanced, well-developed argument that synthesises relevant understanding coherently, leading to judgements that are supported by evidence throughout. (AO3)

Question number	Answer	Mark
7(a)	Abiotic refers to the non-living component of an ecosystem Reject living components. **Accept any other appropriate response**	**(1)**

Question number	Answer	Mark
7(b)(i)	Award 1 mark for each correct plot (2 x 1) Award 1 mark for joining dots together (1)  	**(3)**

Question number	Answer	Mark
7(b)(ii)	Award 1 mark for interpretation of the line graph and a further mark for a link to the distribution of ecosystems, up to a maximum of 2 marks each. Tundra can exist only above 4000 m (1) because other trees cannot grow in the thin soil at the top of a mountain (1). The line graph shows the steepest increase is between 1900 and 3800 m (1), which means that coniferous forests can exist in a greater range of altitude/temperature than the other ecosystems shown on Figure A (1). Tropical can exist only under 900 m above sea level (1) because it cannot survive in the colder temperatures associated with higher altitude (1). **Accept any other appropriate response**	**(4)**

Question number	Answer	Mark
7(c)(i)	Award 1 mark for the following, up to a maximum of 2 marks: Heathlands (1) Woodland (1) Wetlands (1)	**(2)**

Question number	Answer	Mark
7(c)(ii)	Mermaid's Pool/lake/tarn	**(1)**

Question number	Answer	Mark
7(c)(iii)	South west/SW	**(1)**

Question number	Answer	Mark
7(d)(i)	Award 1 mark for the following, up to a maximum of 2 marks: Foodstuffs or specific examples (1) Medicines or chemical/genetic material for medicines (1) Timber/wood (1) Recreation or other cultural value (1) **Accept any other appropriate response.**	**(2)**

Question number	Answer	Mark
7(d)(ii)	Award 1 mark for identification of the adaptation and a further one mark for an explanation of the adaptation, up to a maximum of 4 marks. Drip tips (1) to remove excess water in conditions of over 2000mm of precipitation (1). Buttress roots (1) to stabilise the trees as they increase in height (1). Waxy leaves (1) to stop water infiltrating into leaf and rotting it (1). Tall straight tree trunks (1) to grow straight up towards the light to out compete other species (1). Epiphytes sink roots into a host plant (1) so they do not need to sink roots to the ground (1). **Accept any other appropriate response**	**(4)**

Question number	Answer	Mark
7(d)(iii)	Award 1 mark for identification of the difference and a further one mark for an explanation of this point, up to a maximum of 4 marks. **Biomass store –** bigger in TRF (1) as more nutrients are held in the vegetation because of the high biodiversity in the system (1) so there are more available nutrients (1), as there is more photosynthesis, meaning a greater amount of productivity (1). **Soil store –** smaller in TRF (1) **–** as the nutrient uptake is higher in TRF and there is greater amount of leaching due to more rainfall in TRF (1). **Litter store –** smaller in the TRF (1) as the rate of decomposition is much greater because of the high humidity (1). Arrows are generally larger in TRF as the rate of nutrient recycling is much faster between stores (1) due to climatic and biodiversity, meaning that transfer is more preferable in TRF (1). Accept comments based on different-sized stores/arrows in the temperate deciduous forest.	**(4)**

Question number	Indicative content
7(d)(iv)	**AO2 (4 marks)/AO3 (4 marks)** **AO2** • Climate change will have an impact on soil, temperature, rainfall, and weather events, which could threaten tropical rainforests' and deciduous woodlands' structure, function and biodiversity. • Tropical rainforest structure will be threatened by rising sea levels caused by climate change. • Tropical rainforest biodiversity could be threatened by animals migrating because they cannot adapt to the changing climate of their current habitat. • Deciduous woodland structure could be threatened by nutrient and moisture depletion in soils, leading to reduced tree growth. • Deciduous woodland biodiversity could be threatened, as increased numbers of pests are introduced into ecosystems through migration. **AO3** • Threats to tropical rainforests and deciduous woodlands are naturally similar, since climate change may bring an increase in temperature and a decrease in moisture, which will have common effects on vastly different ecosystems. • Attempts to mitigate against climate change threats, for example through sustainable management, can vary significantly for tropical rainforests and deciduous woodlands (judgements will depend on case studies). • A specific ecosystem's natural ability to adapt to climate change can vary, which means impacts of climate change will be 'threats' only to ecosystems that cannot adapt. • Climate change will not have the same impact everywhere (e.g. some areas may get colder/wetter rather than hotter), so the degree of threat is dependent on the impacts in the given area.

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Level 2	4–6	• Demonstrates elements of understanding of concepts and the interrelationship of places, environments and processes. (AO2) • Applies understanding to deconstruct information and provide some logical connections between concepts. An imbalanced argument that synthesises mostly relevant understanding, but not entirely coherently, leading to judgements that are supported by evidence occasionally. (AO3)
Level 3	7–8	• Demonstrates accurate understanding of concepts and the interrelationship of places, environments and processes. (AO2) • Applies understanding to deconstruct information and provide logical connections between concepts throughout. A balanced, well-developed argument that synthesises relevant understanding coherently leading to judgements that are supported by evidence throughout. (AO3)

Marks for SPGST		
Performance	**Marks**	**Descriptor**
SPaG 0	0	*No marks awarded* • Learners write nothing. • Learner's response does not relate to the question. • Learner's achievement in SPaG does not reach the threshold performance level, for example errors in spelling, punctuation and grammar severely hinder meaning.
SPaG 1	1	*Threshold performance* • Learners spell and punctuate with reasonable accuracy. • Learners use rules of grammar with some control of meaning and any errors do not significantly hinder meaning overall. • Learners use a limited range of specialist terms as appropriate.

SPaG 2	2–3	*Intermediate performance* • Learners spell and punctuate with considerable accuracy. • Learners use rules of grammar with general control of meaning overall. • Learners use a good range of specialist terms as appropriate.
SPaG 3	4	*High performance* • Learners spell and punctuate with consistent accuracy. • Learners use rules of grammar with effective control of meaning overall. • Learners use a wide range of specialist terms as appropriate.