Mark Scheme (Results)

Summer 2024

Pearson Edexcel GCE
In Geography (9GE0)
Paper 1

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Summer 2024

Question Paper Log Number P74464A

Publications Code 9GE0_01_2406_MS

General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Question number	Indicative content	Mark
1 (a)	**AO3 (4 marks)**	
(i)	Method (1) Sum the 11 death totals 21,942 +689 + etc = 44327 then divide by 11 = 4029.727 Answer = 4029.7 (to 1 decimal place) (1)	**(2)**
(ii)	Method (1) List the 11 death totals in ascending order: 180 244 689 756 1012 1297 1572 2476 4,535 9,624 21,942 and identify the middle (6^{th}) number Answer = 1297 (1)	**(2)**

Question number	Indicative content Assess the importance of levels of development in understanding the impacts of tectonic hazards.
1(b)	**AO1 (3 marks)/AO2 (9 marks)** **Marking instructions** Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below. Responses that demonstrate **only** AO1 without any AO2 should be awarded marks as follows: • Level 1 AO1 performance: 1 mark • Level 2 AO1 performance: 2 marks • Level 3 AO1 performance: 3 marks. **Indicative content guidance** The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include: **AO1** • The social and economic impacts of tectonic hazards (volcanic eruptions, earthquakes and tsunamis) on the people, economy and environment of contrasting locations in the developed, emerging and developing world. • Inequality of access to education, housing, healthcare and income opportunities can influence vulnerability and resilience. • Governance and geographical factors (population density, isolation/accessibility, degree of urbanisation) influence vulnerability and a community's resilience. • Contrasting hazard events in developed, emerging and developing countries to show the interaction of physical factors and the significance of context in influencing the scale of disaster. **AO2** • The level of development is a key factor as it influences the community's vulnerability and resilience to tectonic hazards and so influences the impacts of the tectonic hazards. • Communities with a higher level of development will have better access to education, housing, healthcare and income opportunities and so reduce the community's vulnerability and increase the community's resilience reducing the impacts of the tectonic hazard. • The level of development also influences all stages of the stages in the hazard management cycle (response, recovery, mitigation, preparedness) all of which may reduce the impacts of the tectonic event. • For instance, the level of development influences the affordability of strategies such as land-use zoning, hazard – resistant design and engineering defences. Countries such as the USA can therefore afford to have a range of management strategies to

Question number	Indicative content **Assess the importance of levels of development in understanding the impacts of tectonic hazards.**
	reduce the impact of earthquake events as evidenced by the relatively low death toll from the 1989 Loma Prieto earthquake of 63 compared to a similar sized earthquake in Haiti in 2010 which killed between 100,000 and 160,000 people. • Yet another key reason in determining the impacts of tectonic events is the tectonic setting of the community as this determines the nature of the tectonic hazard. 90% of all tsunamis are recorded in the Pacific Ocean making communities in this region more vulnerable than communities situated on other seaboards. • The frequency of tectonic events, however, are also important as the more frequent the event the higher the vulnerability. Mount Merapi in Indonesia is a Decade Volcano and has frequent pyroclastic flows affecting the vulnerability of the communities living on the flanks of the volcano and so increasing the impacts of the event. • The impact of the event is also affected by human geographical factors such as communities which are isolated such as those in Afghanistan or Nepal having a greater vulnerability to the earthquake hazard than those in California. • A key factor in determining the impacts of tectonic hazards is the magnitude of the event. 1 in 1,000-year events are hard to manage given their scale. The Tohoku 2011 earthquake and subsequent tsunami had a very high magnitude leading to the loss of over 20,000 lives. • The frequency of the events is also a key factor as the high frequency of tsunami events in the Pacific Ocean led to effective prediction using the PTWC based in Hawaii thus reducing the impacts of the event. • Weak governance and levels of corruption are also key factors in influencing the impacts as good governance can ensure effective management as building codes must be inspected and checked regularly for such a strategy to work. Yet governance can be weak in both developed and developing countries. • The level of development is therefore likely to reduce the impacts of tectonic events as VHHD countries are likely to have better management than LHD countries. • Some may use models such as the PAR/Degg/Park model to structure their answer. **Reward those candidates who examine the differences in the level of development within a country such as rural and urban impacts.** **Reward those candidates who examine the differences in the type of impact such as economic and social.** **Accept other assessments of the importance of levels of development in understanding the impacts of tectonic hazards.**

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	**1–4**	• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1) • Applies knowledge and understanding of geographical information/ideas, making limited logical connections/relationships. (AO2) • Applies knowledge and understanding of geographical information/ideas to produce an interpretation with limited relevance and/or support. (AO2) • Applies knowledge and understanding of geographical information/ideas to make unsupported or generic judgements about the significance of few factors, leading to an argument is unbalanced or lacks coherence. (AO2)
Level 2	**5-8**	• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1) • Applies knowledge and understanding of geographical information/ideas logically, making some relevant connections/relationships. (AO2) • Applies knowledge and understanding of geographical information/ideas to produce a partial but coherent interpretation that is mostly relevant and supported by evidence. (AO2) • Applies knowledge and understanding of geographical information/ideas to make judgements about the significance of some factors, to produce an argument that may be unbalanced or partially coherent. (AO2)
Level 3	**9-12**	• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1) • Applies knowledge and understanding of geographical information/ideas logically, making relevant connections/relationships. (AO2) • Applies knowledge and understanding of geographical information/ideas to produce a full and coherent interpretation that is relevant and supported by evidence. (AO2) • Applies knowledge and understanding of geographical information/ideas to make supported judgements about the significance of factors throughout the response, leading to a balanced and coherent argument. (AO2)

Question number	Indicative content Explain how processes of lodgement and ablation have created this relict till plain.
2(a)	**AO1 – (3 marks)/AO2 – (3 marks)** **Marking instructions** Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below. **Indicative content guidance** The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include: **AO1** • Glaciers (ice sheets) alter landscapes by a number of processes • Glacial deposition creates distinctive landforms and contributes to glaciated landscapes • The formation of lowland depositional features • Till plains, lodgement and ablation till • These processes create a number of distinctive landscapes • There have been multiple glacial and interglacial periods **AO2** • Lodgement till derives from subglacial sediment which is material that has been eroded and then transported by the ice. This material is 'plastered' or 'lodged' on to the surface of the ground on which the glacier rests. It has a wide range of grain sizes, with usually a high proportion of silt and clay. Larger sediments can exhibit the impacts of abrasion and become more rounded. When a glacier eventually melts, the lodgement till is exposed as a sheet of well-compacted sediment ranging from several centimetres to many metres in thickness. Lodgement till is normally unstratified and poorly sorted. • Ablation till in contrast is usually associated with supraglacial sediments which are derived from freeze-thaw eroded material that has fallen onto the ice from rocky slopes above and then carried by the ice sheet. When the ice melts due to ablation a mixture of fine and coarse angular rock fragments, with much less sand, silt, and clay than lodgement till termed ablation till is deposited. • Both lodgement and ablation till can then create large flat till plains such as those found in East Anglia and in Minnesota. These have subsequently been modified by human use, particularly in the creation of agricultural plains. • Relict till-plains often have complex histories of multiple glacial advances and retreats with outwash from previous interstadial/interglacial periods being overlain with till from more recent glacial advances. • Accept that some of the features may be sub glacial melt-out or deformation till.

	Accept other explanations of how lodgement and ablation have contributed to this relict till plain.

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	**1–2**	• Demonstrates isolated or generic elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1) • Applies knowledge and understanding to geographical information inconsistently. Connections/relationships between stimulus material and the question may be irrelevant. (AO2)
Level 2	**3–4**	• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1) • Applies knowledge and understanding to geographical information to find some relevant connections/relationships between stimulus material and the question. (AO2)
Level 3	**5–6**	• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1) • Applies knowledge and understanding to geographical information logically to find fully relevant connections/relationships between stimulus material and the question. (AO2)

Question number	Indicative content Suggest how glacial erosion has contributed to the formation of this landscape.
2(b)	**AO1 (3 marks)/AO2 (3 marks)** **Marking instructions** Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below. **Indicative content guidance** The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include: **AO1** • Glacial erosion creates distinctive landforms and contributes to glaciated landscapes • Glacial erosional processes such as abrasion, quarrying, plucking, crushing and basal melting • These are combined with weathering (especially freeze-thaw) and mass movement to create distinctive assemblages of landforms and landscapes • The processes leading to the formation of landforms associated with cirque and valley glaciers such as cirques/corries, arêtes, pyramidal peaks glacial troughs, truncated spurs • Deglaciation creates a relict (paraglacial) landscape that has been modified in the past 10,000 years **AO2** • There is clear evidence of a corrie labelled Angle Tarn and a well-defined arete between Rossett Pike and Rossett Crag. • Cirques/corries are created by glacial erosional process such as plucking at the steep back wall (Hanging Knotts) and nivation and subsequent quarrying of the rock with abrasion on the lip of the corrie. • At the back wall there is plucking and quarrying which is the removal of well jointed or loosened blocks of bedrock by the movement of ice in the corrie. Blocks freeze onto the glacier sole and are then pulled clear of the backwall as the ice moves. • Plucking is particularly effective where a glacier flows over rock that has are ready been weakened by frost weathering. • Abrasion involves the wearing down of rock surfaces by the grinding effect of rock fragments frozen into the base of glaciers. through its action it produces smoothed bedrock surfaces that often exhibit parallel sets of scratches (1- 10mm diameter), called striations which are found on the lip of the corrie. • Frost shattering is also important as the corrie, is partly shaped by the process as this occurs on the back wall, giving a steep and characteristic jagged, broken appearance. The weathered material falls onto the corrie glacier, and via crevasses works its way to the base of the glacier. Here, the material is used as the tools in the abrasion process, deepening the base of the corrie. Freeze-thaw

	weathering and mass movement continue to modify the landscape during the current inter-stadial period. • Aretes and pyramidal peaks are characteristic results of corrie/valley glaciation as are steep and inherently unstable valley sides with scree and cliffs – a U-shaped valley may be seen in 2408. • The landscape of this relict (paraglacial) glaciated upland area is a result of multiple glacial advances and interstadial retreats. • It will have been much modified in the past 10,000 years, not least by human activity. • Some candidates may view the word 'crag' as an indication that there are crag and tail feature in this glacial landscape. Whilst there are no crag and tail landforms shown in the resource, allow limited credit for candidates who are led by the numerous references to the label crag on the map but must discuss the contribution of glacial erosion. **Accept other explanations of how glacial erosion has contributed to the formation of this landscape.**

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	**1–2**	• Demonstrates isolated or generic elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1) • Applies knowledge and understanding to geographical information inconsistently. Connections/relationships between stimulus material and the question may be irrelevant. (AO2)
Level 2	**3–4**	• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1) • Applies knowledge and understanding to geographical information to find some relevant connections/relationships between stimulus material and the question. (AO2)
Level 3	**5–6**	• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1) • Applies knowledge and understanding to geographical information logically to find fully relevant connections/relationships between stimulus material and the question. (AO2)

Question number	Indicative content Explain why some glacial landscapes have greater economic value than others.
2 (c)	**AO1 – (8 marks)** **Marking instructions** Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below. **Indicative content guidance** The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include: **AO1** • Glacial landscapes can be a consideration of active and relict landscapes or glacial and periglacial landscapes. • Expect some explanation on how the landscape gives rise to the differing economic opportunities. • Glaciated landscapes can be important for primary, secondary and tertiary industries economically in all parts of the economy (primary, secondary and tertiary). • In active glaciated landscapes those which offer economic activities such as skiing on the glaciers in upland glaciated landscapes such as the French Alps will have a higher economic value than those unsuitable for skiing. • Yet those active glaciated landscapes can also offer the opportunity to develop hydro-electric power such as the reservoir at Saas Mattmark which has an earth filled dam made out of morainic material fed by glacier and snow melt. • Relict glaciated landscapes allow the development of quarries providing building stone such as the green slate from Honiston. • In relict glaciated landscapes the glacial deposits found in the valley floors can be used for building materials and combined with quarrying cement works have been built in glaciated upland areas utilizing the electric power from nearby HEP dams such as the Exshaw cement works in Canada. • The ribbon lakes in the glacial troughs of relict glaciated landscapes have proved to be a tourist attraction such as in the Lake District. • The steeper slopes unsuitable for agriculture can be used to develop forestry such as in the relict glaciated landscape of north Wales. • Periglacial landscapes which contain rock glaciers which can be used for road construction. • Mining is also a key economic opportunity in periglacial areas such as the Red Dog Mine, located in the DeLong Mountains, Alasaka which is the largest source for zinc and a significant source of lead in the world. • Reward those candidates who focus on the reasons why some have a higher value than others such as accessibility, the level of economic development and the value of the resource being exploited. **Accept that some glacial landscapes have low economic value.** **Accept other explanations of why some glacial landscapes have a higher economic value than others.**

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	**1–2**	• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1) • Understanding addresses a narrow range of geographical ideas, which lack detail. (AO1)
Level 2	**3–5**	• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1) • Understanding addresses a range of geographical ideas, which are not fully detailed and/or developed. (AO1)
Level 3	**6–8**	• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1) • Understanding addresses a broad range of geographical ideas, which are detailed and fully developed. (AO1)

Question number	Indicative content Evaluate the view that active glacial landscapes are always more fragile than relict landscapes.
2(d)	**AO1 (5 marks)/AO2 (15 marks)** **Marking instructions** Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below. Responses that demonstrate **only** AO1 without any AO2 should be awarded marks as follows: • Level 1 AO1 performance: 1 mark • Level 2 AO1 performance: 2 marks • Level 3 AO1 performance: 3 marks. • Level 4 AO1 performance: 4–5 marks. **Indicative content guidance** The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include: **AO1** • Glaciated landscapes face varying degrees of threat from natural hazards (avalanches and glacial outburst floods). • Human activities (leisure and tourism, reservoir construction, urbanisation) are threats to glaciated landscapes. • Human activity can also degrade the landscape and fragile ecology of glaciated landscapes (soil erosion, trampling, landslides, deforestation). • Global warming is having a major impact on glacial mass balances, which in turn risks disruption of the hydrological cycle (meltwater, river discharge, sediment yield, water quality). **AO2** • A key way in which active glaciated landscapes are thought to be more fragile than relict landscape is due to the threats posed by global warming. Recent studies show that most glaciers are currently retreating with only maritime glaciers in Scandinavia showing glacial advances. This has led to a cumulative mass balance loss of glaciers from 1980 to 2018 of −21.7m. • Furthermore, the pace of glacier loss has accelerated from -228 millimetres per year in the 1980s to -921 millimetres per year for 2010-2018. At this rate some glaciers are set to disappear by 2100. This therefore highlights the fragility of active glaciated landscapes. • Furthermore, the fragility of these landscapes is highlighted by the fact that increased temperatures will result in greater amounts of meltwater at the base leading to increased rates of glacier movement and the likelihood of glacier surges leading to large blocks of ice surging to lower and so warmer altitudes further accelerating the loss of the glacier. • This retreat will also threaten landscapes due to the changes in the hydrological cycle that this will bring as well as the increased chance of glacial outburst floods. • The fragility of active glaciated landscapes is also highlighted by the impact on melt water. Industrial pollutants such as black carbon as well as mercury, pesticides, and other persistent organic pollutants

Question number	Indicative content **Evaluate the view that active glacial landscapes are always more fragile than relict landscapes.**
	could have significant impacts on water quality and impact upon freshwater and marine ecosystems highlighting their fragility. • Although relict glaciated landscapes are often thought as being less fragile, anthropogenic processes nevertheless such as deforestation on exposed slopes have been found to cause increased damage to the landscapes such as in the Canadian Rockies whilst over cultivation and overgrazing is also thought to cause damage to the relict glaciated landscapes in Andean areas highlighting that relict landscapes too are fragile. • Furthermore urbanization, mineral exploitation and reservoir construction also highlight the fragility of relict glaciated landscapes with pollution and toxic waste being threats from hastily built urban areas. It is thought that relict glaciated landscapes often take decades to recover further highlighting their fragility. • Tourism through footpath erosion and trampling also highlights the fragility of these landscapes such as in the Lake District. • Relict glaciated landscapes may also be affected by global warming as much as active glaciated landscapes. Studies have shown that the rising temperature will affect the tree lines and the development of grasses and shrubs at increased altitudes. Furthermore, it is likely that global warming will increase the risk of forest fires in relict areas as well as changing the often unique biodiversity in lakes in upland areas. • Overall whilst many relict glaciated landscapes are undoubtedly fragile and suffer from human activity, active glaciated landscapes face threats to their very existence and so it can be argued that active glacial landscapes are more fragile than relict landscapes. **Accept other evaluations of the view that active glacial landscapes are always more fragile than relict landscapes.**

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	**1–5**	• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1) • Applies knowledge and understanding of geographical ideas, making limited and rarely logical connections/relationships. (AO2) • Applies knowledge and understanding of geographical information/ideas to produce an interpretation with limited coherence and support from evidence. (AO2) • Applies knowledge and understanding of geographical information/ideas to produce an unsupported or generic conclusion, drawn from an argument that is unbalanced or lacks coherence. (AO2)
Level 2	**6–10**	• Demonstrates geographical knowledge and understanding, which is occasionally relevant and may include some inaccuracies. (AO1)

Level	Mark	Descriptor
		• Applies knowledge and understanding of geographical information/ideas with limited but logical connections/relationships. (AO2) • Applies knowledge and understanding of geographical ideas in order to produce a partial interpretation that is supported by some evidence but has limited coherence. (AO2) • Applies knowledge and understanding of geographical information/ideas to come to a conclusion, partially supported by an unbalanced argument with limited coherence. (AO2)
Level 3	**11–15**	• Demonstrates geographical knowledge and understanding, which is mostly relevant and accurate. (AO1) • Applies knowledge and understanding of geographical information/ideas to find some logical and relevant connections/relationships. (AO2) • Applies knowledge and understanding of geographical ideas in order to produce a partial but coherent interpretation that is supported by some evidence. (AO2) • Applies knowledge and understanding of geographical information/ideas to come to a conclusion, largely supported by an argument that may be unbalanced or partially coherent. (AO2)
Level 4	**16–20**	• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1) • Applies knowledge and understanding of geographical information/ideas to find fully logical and relevant connections/relationships. (AO2) • Applies knowledge and understanding of geographical information/ideas to produce a full and coherent interpretation that is supported by evidence. (AO2) • Applies knowledge and understanding of geographical information/ideas to come to a rational, substantiated conclusion, fully supported by a balanced argument that is drawn together coherently. (AO2)

Question number	Indicative Content Explain how sea level change contributes to the formation of emergent coastlines.
3(a)	**AO1 (3 marks/AO2 (3 marks)** **Marking instructions** Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below. **Indicative content guidance** The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include: **AO1** • Sea level change influences coasts on different timescales • Longer-term sea level changes result from a complex interplay of factors both eustatic (ice formation/melting, thermal changes) and isostatic (post glacial adjustment, subsidence, accretion, and tectonics). • Sea level change has produced emergent coastlines (raised beaches with fossil cliffs) and submergent coastlines (rias, fjords, and Dalmatian). **AO2** • The diagram shows an emergent coastline which has a raised beach backed what may be fossil cliffs, wave cut notches and caves. There is also a low contemporary cliff with what appears to be talus and a contemporary beach. • Expect candidates to explain this by either reference to sea level fall which would expose these landforms by the uplift of the land through dramatic tectonic events or through those who explain isostatic readjustment in the UK. It is permissible as there is no date to discuss eustatic sea level fall during glacial periods. • Candidates may well then explain how the features are therefore historic. • Reward those candidates who develop the idea that both historic and contemporary marine and subaerial processes are at work in the diagram. **Accept other explanations how sea level change contributes to the formation of emergent coastlines.**

Level	Mark	Descriptor
	0	No rewardable material.

Level	Mark	Descriptor
Level 1	**1–2**	• Demonstrates isolated or generic elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1) • Applies knowledge and understanding to geographical information inconsistently. Connections/relationships between stimulus material and the question may be irrelevant. (AO2)
Level 2	**3–4**	• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1) • Applies knowledge and understanding to geographical information to find some relevant connections/relationships between stimulus material and the question. (AO2)
Level 3	**5–6**	• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1) • Applies knowledge and understanding to geographical information logically to find fully relevant connections/relationships between stimulus material and the question. (AO2)

Question number	Indicative content Explain how sediment transport and deposition contribute to the formation of this landscape.
3(b)	**AO1 (3 marks)/AO2 (3 marks)** **Marking instructions** Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below. **Indicative content guidance** The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include: **AO1** • Transportation and deposition processes produce distinctive coastal landforms (beaches, recurved and double spits, offshore bars, barrier beaches and bars, tombolos and cuspate forelands), which can be stabilised by plant succession. • Sediment transportation is influenced by the angle of wave attack, tides and currents and the process of longshore drift. • Vegetation is important in stabilising sandy coastlines through dune successional development on sandy coastlines and salt marsh successional development in estuarine areas. **AO2** • The map shows a recurved spit with a salt marsh behind. • The spit has been created through sediment from sediment sources within the sediment cell transported by the process of longshore drift. • Expect details of marine processes of transportation such as traction, saltation and suspension. • Spits form due to the presence of a surplus of sediment combined with the process of longshore drift, the dominance of constructive waves and an appropriate coastal configuration – presence of an estuary or a change in direction of the coast. • Recurved spits can form when there are two dominant directions of wind – one from the SW and one from the SE. This means that the sediment that forms the end of the spit is then moved in a different direction due to longshore drift creating a recurved end to the spit. • In addition, wave refraction 'bends' waves around the tip of the spit and so aids the formation of these recurved hooks to the spit. • There are other processes at work particularly the role of vegetation in stabilizing the spit. • As well as sediment transport by the sea there is also sediment transport by a river bringing sediment down which is deposited in the low energy environment formed behind the spit. • There would also be the process of flocculation causing the sediment to settle in this area. Vegetation succession in the form of halosere succession is also important in contributing to the development of the landscape shown. • Accept that this is a low-lying coastline with plentiful sediment supplies. **Accept other explanations of how sediment transport and deposition contribute to the formation of this landscape.**

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	**1–2**	• Demonstrates isolated or generic elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1) • Applies knowledge and understanding to geographical information inconsistently. Connections/relationships between stimulus material and the question may be irrelevant. (AO2)
Level 2	**3–4**	• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1) • Applies knowledge and understanding to geographical information to find some relevant connections/relationships between stimulus material and the question. (AO2)
Level 3	**5–6**	• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1) • Applies knowledge and understanding to geographical information logically to find fully relevant connections/relationships between stimulus material and the question. (AO2)

Question number	Indicative content Explain the role of mass movement in creating distinctive coastal landforms.
3(c)	**AO1 (8 marks)** **Marking instructions** Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below. **Indicative content guidance** The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include: **AO1** • Mass movement is the movement of material downslope. It is caused by weakening strength causes such as heavy rain leading to the saturation of the cliff and by trigger causes such as the undercutting of the cliff by wave action. • Blockfall is when large blocks of material are weakened through weathering and then fall to the bottom of the slope (i.e. cliff). This then creates a talus scree slope. These are particularly evident at the foot of cliffs composed of well jointed geologies such as sandstone and chalk cliffs found in Sandown Bay on the Isle of Wight. • Rotational slumping is when rock becomes saturated and an increase in the pore water pressure inside the rock causes the rock to shear. This is often aided by lubrication at the base of the rock. This leads to an arc of failure as the material rotated around a pivot and so slips down the slope. This leads rotational scars and terraces being formed. This is found in cliffs composed of clays or unconsolidated materials such as boulder clay found on the Holderness coast. • Landslides is the name given to any other way in which material moves down slope such as mudflows or translational slides. These form short lived mud lobes or alluvial fans on the beach. • Reward those candidates who discuss the influence of geology and geological structure on the type of mass movement and the subsequent landforms that may result from this mass movement. • Allow the formation of stacks if mass movement is linked to the collapse of the arch. **Accept other explanations of the role of mass movement in creating distinctive coastal landforms.**

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	**1–2**	• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1) • Understanding addresses a narrow range of geographical ideas, which lack detail. (AO1)
Level 2	**3–5**	• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1) • Understanding addresses a range of geographical ideas, which are not fully detailed and/or developed. (AO1)
Level 3	**6–8**	• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1) • Understanding addresses a broad range of geographical ideas, which are detailed and fully developed. (AO1)

Question number	Indicative content **Evaluate the view that the higher the level of economic development the greater the consequences of coastal flooding.**
3(d)	**AO1 (5 marks)/AO2 (15 marks)** **Marking instructions** Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below. Responses that demonstrate **only** AO1 without any AO2 should be awarded marks as follows: • Level 1 AO1 performance: 1 mark • Level 2 AO1 performance: 2 marks • Level 3 AO1 performance: 3 marks. • Level 4 AO1 performance: 4–5 marks. **Indicative content guidance** The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include: **AO1** • Local factors increase flood risk on some low-lying and estuarine coasts (height, degree of subsidence, vegetation removal); global sea level rise further increases risk (Bangladesh or the Maldives). • Storm surge events can lead to severe coastal flooding with dramatic short-term impacts (depressions, tropical cyclones). • Economic losses (housing, businesses, agricultural land, infrastructure) and social losses (relocation, loss of livelihood, amenity value) from coastal recession can be significant, especially in areas of dense coastal developments. • Coastal flooding and storm surge events can have serious economic and social consequences for coastal communities in both developing and developed countries. • Climate change may create environmental refugees in coastal areas. **AO2** • One of the key reasons why developed countries often have greater consequences from coastal flooding is the high population density that live in high value homes close to the coast. Coastal flooding in the Netherlands is set to cost 0.41 percent of its GDP due to the future flood risk from climate change. • Other developed countries such as the USA also suffer from coastal flooding events caused by tropical storms leading to high economic consequences. Hurricane Sandy led to the deaths of 44 people and cost an estimated $19 billion in damages and over 69,000 residential units were damaged. • As a key consequence of coastal flooding is the impact on the economic infrastructure that may be inundated, many developed countries often have high costs of management to reduce this threat.

Question number	Indicative content **Evaluate the view that the higher the level of economic development the greater the consequences of coastal flooding.**
	This is highlighted 1.5 billion (in 2022 money) spent on the Thames barrier that protects London from flooding. • There are often also perceived social consequences of coastal flooding in developed countries. Developed countries such as the UK also protect other lower value areas from flooding. The Environment Agency spent £4.4 billion in the five-year period 2106 to 2021 protecting coastal communities from flooding. • Yet one of the key ways in which coastal flooding has greater consequences to developing countries is that those communities living in low lying islands in the Pacific cannot afford to build sea defences and cannot abandon the coastal areas as there is a lack of alternative land to settle on. • Furthermore communities in developing countries are also far more likely to be dependent upon primary activities such as farming and so communities in countries such as Tuvalu, Kiribati and the Marshal Islands are likely to suffer greater consequences as sea level rise will inundate agricultural lands with saltwater destroying crops as well as increases water insecurity as sources of fresh drinking water are reduced. • Coastal communities in some developing countries are also likely to have faster growing population densities increasing the risk such as communities living in the chards of Bangladesh where 1.056 million hectares (4,077 square miles) have been lost since 2009. • Overall, although there are serious social consequences to developing countries from coastal flooding, these are often less absolute economic consequences than their counterparts in developed countries. • Accept the view that there are greater consequences in developing countries due to the lack of management compared to developed. **Accept other evaluations of the view the higher the level of economic development the greater the consequences of coastal flooding.**

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	**1–5**	• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1) • Applies knowledge and understanding of geographical ideas, making limited and rarely logical connections/relationships. (AO2) • Applies knowledge and understanding of geographical information/ideas to produce an interpretation with limited coherence and support from evidence. (AO2) • Applies knowledge and understanding of geographical information/ideas to produce an unsupported or generic conclusion, drawn from an argument that is unbalanced or lacks coherence. (AO2)

Level	Mark	Descriptor
Level 2	**6–10**	• Demonstrates geographical knowledge and understanding, which is occasionally relevant and may include some inaccuracies. (AO1) • Applies knowledge and understanding of geographical information/ideas with limited but logical connections/relationships. (AO2) • Applies knowledge and understanding of geographical ideas in order to produce a partial interpretation that is supported by some evidence but has limited coherence. (AO2) • Applies knowledge and understanding of geographical information/ideas to come to a conclusion, partially supported by an unbalanced argument with limited coherence. (AO2)
Level 3	**11–15**	• Demonstrates geographical knowledge and understanding, which is mostly relevant and accurate. (AO1) • Applies knowledge and understanding of geographical information/ideas to find some logical and relevant connections/relationships. (AO2) • Applies knowledge and understanding of geographical ideas in order to produce a partial but coherent interpretation that is supported by some evidence. (AO2) • Applies knowledge and understanding of geographical information/ideas to come to a conclusion, largely supported by an argument that may be unbalanced or partially coherent. (AO2)
Level 4	**16–20**	• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1) • Applies knowledge and understanding of geographical information/ideas to find fully logical and relevant connections/relationships. (AO2) • Applies knowledge and understanding of geographical information/ideas to produce a full and coherent interpretation that is supported by evidence. (AO2) • Applies knowledge and understanding of geographical information/ideas to come to a rational, substantiated conclusion, fully supported by a balanced argument that is drawn together coherently. (AO2)

Question number	Indicative content **Suggest one possible impact of the changes shown on forest ecosystems.**	Mark
4(a)	**AO1 – 2 marks/AO2 – 1 marks** Award **1 AO2 mark** for analysing the resource to identify the impact on forest ecosystems caused by the changes in precipitation and a further **2 AO1 marks** expansion up to a maximum of 3 marks to explain these impacts. For example: • Summer precipitation totals will decrease by 35% by 2100 (1). This will reduce soil moisture (1) and so increase water stress and so risk of disease for forests (1). • Summer precipitation totals will decrease by 35% by 2100 (1). This reduces photosynthesis (1) and so reduces primary productivity (1). • Summer precipitation totals will decrease by 35% by 2100(1). Reductions in photosynthesis (1) reduces primary productivity (1) reduces population numbers of secondary consumers (1) **Accept other explanations for the impact of changes on forest ecosystems.**	**(3)**

Question number	Indicative content Explain why hard engineering may increase the risk of river flooding in some places.
4(b)	**AO1 (6 marks)** **Marking instructions** Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below. **Indicative content guidance** The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include: **AO1** • Channelisation speeds up flow of water downstream and so reduces the height of the flood wave but can transfer flood water from one protected area to another unprotected area causing flooding for one community at the expense of another. • Levees encourage development in floodplains and so increase risk. • If levees fail the subsequent flood wave is far higher and more destructive than if the levees had not been constructed. • The construction of diversion spill ways can increase flood risk at the point where the spillway re-joins the river as a result of increased discharge. • As with channelisation areas further downstream are at greater risk of flooding as all of the flood wave is transferred downstream. • The building of wing dikes such as on the river Mississippi which slows down channel flow has been linked to the increasing risk of river flooding. • Allow increased risk of flooding upstream due to the development of mega dams in times of heavy rain. • Allow increased risk of flooding caused by the development of hard engineering during the construction phase. • Reward those candidates who establish that this is in only some places and hard engineering can reduce the flood risk in other areas. **Accept other explanations of why hard engineering may increase the risk of river flooding in some places.**

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	**1–2**	• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate. (AO1) • Understanding addresses a narrow range of geographical ideas. (AO1) • Understanding of geographical ideas lacks detail. (AO1)
Level 2	**3–4**	• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1) • Understanding addresses a range of geographical ideas. (AO1) • Understanding of geographical ideas is not fully detailed and/or developed. (AO1)
Level 3	**5–6**	• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1) • Understanding addresses a broad range of geographical ideas. (AO1) • Understanding of the geographical ideas is detailed and fully developed. (AO1)

Question number	Indicative content Explain the role of oceanic photosynthesis on the carbon cycle.
4(c)	**AO1 (8 marks)** **Marking instructions** Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below. **Indicative content guidance** The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include: • Photosynthesis plays a key role in the ocean biological pump. The biological cycle allows carbon dioxide to be sequestered in the ocean through photosynthesis by phytoplankton and other marine biota which converts the carbon dioxide into organic matter (10GtC per year). • This then acts as a biological pump transporting carbon from the surface oceans to the intermediate and deep oceans (10 GtC per year). This occurs when as these biological organisms die, their dead cells, shells and other parts sink into the mid and deep water. In addition, decay of these organism also releases carbon dioxide into this intermediate and deep water. • Thus the role of photosynthesis is to move carbon from the surface oceans where it may vent back into the atmosphere and instead store it the mid and deep ocean store as well as the dissolved carbon store and so maintains a balanced carbon cycle. • Yet other elements of the fast cycle are also important in the ocean carbon cycle. Perhaps the most important is the physical pump. The physical cycle is caused when dissolved carbon dioxide is taken from the surface ocean to the intermediate and deep oceans through downwelling currents (96 GtC per year). • It is also distributed around the planet through the thermohaline circulation. This is the process whereby warm water from the tropics is transported towards the poles. As the colder the water the greater the absorption of CO2 this means that as warm water is transported towards the poles it cools absorbing more CO2. As it does so the salinity also increases and as a results it sinks (down welling) taking CO2 from the surface ocean to the deep ocean. This therefore removes carbon from the upper ocean and removes to the deep ocean. • There is also the upwelling of carbon from intermediate and deep oceans to the surface oceans (105.6 GtC yr-1) through upwelling currents and turbulence created by surface winds allowing carbon previously stored in the intermediate and deep ocean store to return to the surface oceans and then back to the atmosphere. • There is also the solubility cycle which is caused when the carbon dioxide absorbed by the oceans forms carbonic acid which in turn reacts with hydrogen ions to form bicarbonates and then further reactions forms carbonates which are stored in the upper ocean. Some organisms use these carbonates to make shells or skeletons. When these organisms die some material sinks right to the bottom of the ocean and forms the seabed sediment store (1750 GtC) where over time through chemical and physical processes the carbon is transformed to rocks such as limestone. This is a particularly

	important process as it locks up carbon in the long-term carbon cycle and not allows it to return to the surface as the physical pump does. **Accept other explanations of the role of oceanic photosynthesis on the carbon cycle.**

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	**1–2**	• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1) • Understanding addresses a narrow range of geographical ideas, which lack detail. (AO1)
Level 2	**3–5**	• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1) • Understanding addresses a range of geographical ideas, which are not fully detailed and/or developed. (AO1)
Level 3	**6–8**	• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1) • Understanding addresses a broad range of geographical ideas, which are detailed and fully developed. (AO1)

Question number	Indicative content Assess the impact of increasing ocean acidification on people and marine ecosystems.
4(d)	**AO1 (3 marks)/AO2 (9 marks)** **Marking instructions** Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below. Responses that demonstrate **only** AO1 without any AO2 should be awarded marks as follows: • Level 1 AO1 performance: 1 mark • Level 2 AO1 performance: 2 marks • Level 3 AO1 performance: 3 marks. **Indicative content guidance** The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include: **AO1** • Ocean acidification, as a result of its role as a carbon sink, is increasing due to fossil fuel combustion. • It risks crossing the critical threshold for the health of coral reefs and other marine ecosystems that provide vital ecosystem services. • There are threats to human wellbeing, especially in developing regions that depend on marine resources as a food source and for tourism and coastal protection. **AO2** • Since the start of the industrial revolution the pH of the ocean has decreased from 8.25 to 8.14 a 30% increase in H+ ions. This is as a result of the greater absorption of CO2 from the atmosphere as atmospheric CO2 levels have increased from below 300 ppm to over 400 ppm. • This change in pH makes it harder for marine creatures to take up carbonite ions to form the calcium carbonate needed to build their exoskeletons. The two main forms of calcium carbonate used by marine creatures are calcite and aragonite. Decreasing the amount of carbonate ions in the water makes conditions more difficult for both calcite users (phytoplankton and foraminifera) and aragonite users (corals and shellfish). • This then means that the exoskeleton of these species are thinner and as a result the organisms are less healthy. As phytoplankton and foraminifera are at the base of an ocean food chain both biodiversity and food supply is lost as well. • In addition the increase in acidity causes the corals to become stressed and rejects the algae that symbiotically lives with the coral. This then means that the coral struggle for nutrients and so coral bleaching occurs. As the corals no longer exist the food chain is

Question number	Indicative content **Assess the impact of increasing ocean acidification on people and marine ecosystems.**
	destroyed and so fish such as the parrot fish that live in the reefs also die out. • These impacts on marine ecosystems have significant impacts on people. • On a world-wide scale, approximately one billion people are dependent on fish as the principal source of animal protein. In low-income food-deficit countries where the current consumption of sea products is close to half of that of the richest countries, the contribution of fish to total protein in-take is considerable, neighbouring 20%. In certain insular or coastal countries of high population density, fish protein is a deciding dietary contributor, providing at least 50% of total protein intake (Bangladesh, North Korea, Ghana, Guinea, Indonesia, Senegal). Impacts on marine ecosystems will therefore impacts on 1/7th of the world's population. • Yet marine ecosystems such as coral reefs generate $36 billion in global tourism value per year. Over 70 countries and territories have "million dollar reefs", or reefs that generate approximately $1 million per square kilometre. These reefs are generating jobs, and critical foreign exchange earnings for many small island states that have few alternative sources of employment and income. The Maldives are reliant on tourism as tourism provides 22.7% of GDP and attracts over 1.6 million visitors. The Great Barrier reef in Australia is visited by over two million people each year contributing over $5.4 billion a year to the Australian economy, and employs approximately 69,000 people. Changes to ocean acidification will therefore have great impacts on these coastal communities. • Furthermore coral reefs, seagrass and mangrove swamps have a vital role to play in coastal protection with one estimate accounting for $9.0 billion. In the Caribbean, the annual net benefits provided by coral reefs through shoreline protection services were estimated to be $700,000 to $2.2 billion and it is thought that this protected 250 acres at risk of erosion in Jamaica's Montego Bay Marine Park. Changes in the carbon cycle leading to ocean acidification and temperature rise will lead to the loss of these ecosystems and so the loss of the coastal protection offered. • Overall there are significant impacts on marine ecosystems caused by the increase in ocean acidification and the subsequent threats to coastal communities reliant upon but in particular it is coral reef ecosystems that are at greatest threat due to changes in their ability to absorb aragonite as well as the stress that increasing pH puts on the polyps. **Accept other assessments of the impact of increasing ocean acidification on people and marine ecosystems.**

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	**1–4**	• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate. (AO1) • Applies knowledge and understanding to geographical information/ideas, making limited logical connections/relationships. (AO2) • Applies knowledge and understanding to geographical information/ideas to produce an interpretation that is not relevant and/or supported by evidence. (AO2) • Applies knowledge and understanding to geographical information/ideas to produce an unbalanced argument that lacks coherence and makes judgements that are generic and/or unsupported by evidence. (AO2)
Level 2	**5–8**	• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1) • Applies knowledge and understanding to geographical information/ideas logically, making some relevant connections/relationships. (AO2) • Applies knowledge and understanding to geographical information/ideas to produce a partial but coherent interpretation that is mostly relevant and supported by evidence. (AO2) • Applies knowledge and understanding to geographical information/ideas to produce an unbalanced, partially-supported argument that is drawn together with some coherence in order to make judgements. (AO2)
Level 3	**9–12**	• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1) • Applies knowledge and understanding to geographical information/ideas logically, making relevant connections/relationships. (AO2) • Applies knowledge and understanding to geographical information/ideas to produce a full and coherent interpretation that is relevant and supported by evidence. (AO2) • Applies knowledge and understanding to geographical information/ideas to produce a balanced, fully-supported argument that is drawn together coherently in order to make rational judgements. (AO2)

Question number	Indicative content **Evaluate the view that it is inevitable that transboundary water conflicts will increase in the future**.
4(e)	**AO1 (5 marks)/AO2 (15 marks)** **Marking instructions** Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below. Responses that demonstrate only AO1 without any AO2 should be awarded marks as follows: • Level 1 AO1 performance: 1 mark • Level 2 AO1 performance: 2 marks • Level 3 AO1 performance: 3 marks. • Level 4 AO1 performance: 4–5 marks. Indicative content guidance The indicative content below is not prescriptive, and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include: **AO1** • Climate change affects stores and flows, size of snow and glacier mass, reservoirs, lakes, amount of permafrost, soil moisture levels as well as rates of runoff and stream flow with implications for precipitation patterns, river regimes and water stores. • The finite water resource faces pressure from rising demand (increasing population, improving living standards, industrialisation and agriculture), which is increasingly serious in some locations and is leading to increasing risk of water insecurity. • The potential for conflicts to occur between users within a country, and internationally over local and trans-boundary water sources. • Integrated drainage basin management for large rivers (Nile or Colorado) • Water sharing treaties and frameworks (United Nations Economic Commission for Europe (UNECE), Water Convention, Helsinki, and the Water Framework Directive and Hydropower, Berlin). **AO2** • Transboundary conflicts can be within a country such as the conflicts between the upper and lower basin users in the Colorado as well as between countries such as those on the Mekong between China and Vietnam. • A key reason why it is inevitable that transboundary water conflicts will increase in the future is due to climate change. This will disrupt precipitation patterns and so up stream users may see declines in precipitation totals and so reduce the amount of discharge that they allow downstream users creating conflicts. If upper basin users in the Colorado see reduced precipitation or runoff from snowfall they may reduce (or seek to reduce) the amount they release to the lower basin users. • Furthermore, increases in evaporation, particularly in semi-arid regions will also reduce the water available for upstream users and so

Question number	Indicative content **Evaluate the view that it is inevitable that transboundary water conflicts will increase in the future**.
	exacerbate the permitted flows for downstream users. There are already very levels of evaporation from the reservoirs in the lower basin of the Colorado which has already increased salinity levels. Further increases in evaporation will only increase the salinity of water flowing into Mexico.. • Increasing demand for water for increasing population, improving living standards, industrialisation and agriculture will also increase transboundary water conflicts. The increased need for water from the Mekong river for these purposes has led to an increasing number of dams being built on the upper Mekong leading to increased conflicts between the downstream users such as Cambodia and Thailand who have signed a water sharing treaty and Burma and China have yet to sign the treaty. • Another key reason why it is inevitable that transboundary water conflicts will increase in the future is that there are still no international rules for solving disputes nor given the current political climate between the 'west', Russia, China and other nonaligned emerging powers such as India likely to be so. Whilst upstream countries claim territorial sovereignty (it is our water and we will use it how we like), downstream countries claim territorial integrity (we should receive the same amount and quality as we always have had in the past). • There is also an increase in asymmetrical power relationship between the users. The International Boundary and Water Commission (IBWC) managed, through the 1944 United States-Mexico Treaty for Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande, to guarantee the annual flows of water to Mexico. Although this led to the building of a desalinisation plant that treated the water from the Wellton-Mohawk river before returning it to the Colorado River it has not resolved the issues of a lack of water but has made the water less saline. There is still, however, the ongoing issue of ground water extraction. The Aquifer on the Mexican side of the border is very low as US famers over extract the resource. Despite negotiations since 1973 the issue remains unresolved and so transboundary water conflicts between the US and Mexico are likely to increase in the future. • Yet water transboundary water conflicts can be reduced through water treaties. Water treaties can also only be successful where there is little geopolitical tension. Where water crosses from one country to another where relations are poor there the conflict over the use of the water becomes part of the wider geopolitical tensions and as a result the conflicts are less likely to be resolved. • A key reason why some have succeeded is that they are based on the Helsinki Rules which suggested that water sharing between regions should consider natural factors, social and economic needs and downstream impacts amongst other factors. As a result, there have been a variety of treaties such as the Indus Water Treaty (1960) and the Ganges Treaty (1996).

Question number	Indicative content **Evaluate the view that it is inevitable that transboundary water conflicts will increase in the future**.
	• Furthermore, other treaties have had success when they have been part of a wider political union such as the EU Water Framework Directive. This encouraged the development of River Basin Plan. The plan is a detailed account of how the objectives set for the river basin (ecological status, quantitative status, chemical status and protected area objectives) are to be reached within the timescale required. Crucially it insisted that all interested parties are fully involved in this discussion. • Other international institutions have developed the EUWFD such as the United Nations Economic Commission for Europe Framework (UNECE). Signatories to this framework pledged to protect and ensure the quality, quantity and sustainable use of transboundary water resources by facilitating cooperation. A good example of how this can reduce water conflicts is the Drin Basin. • Another framework that has been developed concentrates specifically on those river basins that have dams and reservoirs. This is the Hydropower framework that was developed from a conference held in Berlin to improve technical approaches for good practice in hydropower use Or agreements within a country, e.g., reservoirs in Lake District, Thirlmere and Haweswater supply Manchester. • Allow transboundary to include intra-country boundary conflicts such as those between the different states in the Colorado basin. • Overall the impact of climate change coupled with rising demand for water will increase the risk of transboundary water conflicts. The degree that they are inevitable is dependent upon how many of these can be resolved through water sharing treaties which in turn are dependent upon the prevailing geopolitical circumstances of the conflict. **Accept other evaluations of whether it is inevitable that transboundary water conflicts will increase in the future.**

Level	Mark	Descriptor
	0	No rewardable material
Level 1	1–5	• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1) • Applies knowledge and understanding of geographical information/ideas, making limited and rarely logical connections/relationships. (AO2) • Applies knowledge and understanding of geographical information/ideas to produce an interpretation with limited relevance and/or support. (AO2) • Applies knowledge and understanding of geographical information/ideas to produce an unsupported or generic conclusion, drawn from an argument that is unbalanced or lacks coherence. (AO2)
Level 2	6-10	• Demonstrates geographical knowledge and understanding, which is occasionally relevant and may include some inaccuracies. (AO1) • Applies knowledge and understanding of geographical information/ideas with limited but logical connections/relationships. (AO2) • Applies knowledge and understanding of geographical information/ideas to produce a partial interpretation that is supported by some evidence but has limited coherence. (AO2) • Applies knowledge and understanding of geographical information/ideas to come to a conclusion, partially supported by an unbalanced argument with limited coherence. (AO2)
Level 3	11-15	• Demonstrates geographical knowledge and understanding, which is mostly relevant and accurate. (AO1) • Applies knowledge and understanding of geographical information/ideas to find some logical and relevant connections/relationships. (AO2) • Applies knowledge and understanding of geographical information/ideas to produce a partial but coherent interpretation that is supported by some evidence. (AO2) • Applies knowledge and understanding of geographical information/ideas to come to a conclusion, largely supported by an argument that may be unbalanced or partially coherent. (AO2)
Level 4	16-20	• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1) • Applies knowledge and understanding of geographical information/ideas to find fully logical and relevant connections/relationships. (AO2) • Applies knowledge and understanding of geographical information/ideas to produce a full and coherent interpretation that is supported by evidence. (AO2) • Applies knowledge and understanding of geographical information/ideas to come to a rational, substantiated conclusion, fully supported by a balanced argument that is drawn together coherently. (AO2)

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