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Edexcel

Mark Scheme (Results)

Summer 2025

Pearson Edexcel GCE  
In Geography (9GE0)  
Paper 1

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## 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
<p><b>1 (a)</b></p> <p><b>(i)</b></p> <p><b>(ii)</b></p> <p><b>(iii)</b></p>	<p style="text-align: center;"><b>AO3 (4 marks)</b></p> <p>1.44</p> <p>6.64</p> <p>Accept that a candidate may incorrectly answer (i), scoring 0 marks, but then use their answer to <b>correctly</b> calculate <math>\sum (x_i - \mu)^2</math>. Here they must be awarded 1 mark.</p> <p>For example, if the candidate incorrectly answers (i) as -1.44, their answer of 3.76 for (ii) is correct, so award 1 mark.</p> <p>1 mark for substituting into the the equation,</p> $SD = \sqrt{\frac{\sum (x_i - \mu)^2}{n-1}}$ <p>SD = <math>\sqrt{(6.64/11)}</math></p> <p>Or accept</p> <p>0.77694</p> <p>0.7769</p> <p>0.776</p> <p>Then 1 mark for rounding</p> <p><b>Standard deviation is 0.78</b> to two decimal places</p> <p>No working out is required for full marks (2 marks).</p> <p>Where the wrong answer is given, 1 mark can be awarded for a correct method.</p> <p>If their answer in (ii) is the correct addition of the 11 values from Figure 1, plus their incorrect answer to (i), and the candidate uses this value correctly in the Standard Deviation equation, award 1 mark. Award a second mark for the correct rounding of this calculation.</p> <p>For example, if the candidate has an answer for (ii) of 3.76, their answer of 0.58 is correct and so is worth 2 marks.</p>	<p><b>(1)</b></p> <p><b>(1)</b></p> <p><b>(1)</b></p> <p><b>(1)</b></p>

Question number	Indicative content <b>Assess the importance of community preparedness in influencing the vulnerability of people to tectonic hazards.</b>
1(b)	<p style="text-align: center;"><b>AO1 (3 marks)/AO2 (9 marks)</b></p> <p><b>Marking instructions</b> 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 <b>only</b> AO1 without any AO2 should be awarded marks as follows:</p> <ul style="list-style-type: none"> <li>• Level 1 AO1 performance: 1 mark</li> <li>• Level 2 AO1 performance: 2 marks</li> <li>• Level 3 AO1 performance: 3 marks.</li> </ul> <p><b>Indicative content guidance</b> 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:</p> <p><b>AO1</b></p> <ul style="list-style-type: none"> <li>• Strategies to modify vulnerability and resilience include education, community preparedness and hi- tech monitoring, prediction as well as adaptation.</li> <li>• Strategies to modify loss include emergency, short- and longer-term aid and insurance and the actions of affected communities themselves.</li> <li>• Strategies to modify the event include land-use zoning, hazard – resistant design and engineering defences as well as diversion of lava flows.</li> </ul> <p><b>AO2</b></p> <ul style="list-style-type: none"> <li>• Vulnerability can be defined as a community’s susceptibility to hazards created by tectonic events.</li> <li>• There are various hazards created by tectonic events such as earthquakes and volcanic eruptions as well as secondary hazards such as tsunami, lahars and jökulhlaups.</li> <li>• Community preparedness can be thought of the actions of individuals and groups to prepare for a tectonic hazard and so reduce their vulnerability to that hazard.</li> <li>• In the US residents are encouraged to drop cover and hold on in an earthquake whilst the USGS produce books such as ‘Putting down roots in earthquake country’ and the development of ‘Seven steps to safety’.</li> <li>• In addition education can reduce vulnerability to the earthquake hazard as it not only prepares communities to reduce their vulnerability but also helps them become first responders to the tectonic event. In Japan the National Earthquake Day helps educate all communities to the precautions to take once an earthquake has occurred such as moving to open spaces and using earthquake hats. This proved effective in reducing the fatalities caused by the Tohoku earthquake in 2011.</li> <li>• Similarly, education of the likelihood of a volcanic eruption and the need to evacuate has proved to be effective for reducing the</li> </ul>

Question number	<b>Indicative content</b> <b>Assess the importance of community preparedness in influencing the vulnerability of people to tectonic hazards.</b>
	<p>vulnerabilities of communities both in Mnt Pinatubo and the Soufrierre hills volcano in the island of Montserrat.</p> <ul style="list-style-type: none"> <li>• Yet education was not able to reduce the vulnerability of all communities in these areas. Despite the education and warnings given there were 'Holdouts' in Salem and the Arteta people in Mnt Pinatubo who remained on the volcano with devastating consequences.</li> <li>• Since the mega disaster of the 2004 Indian ocean tsunami there is now much greater education on how to reduce communities vulnerability to the tsunami threat.</li> <li>• Yet the level of development is also a key factor as it influences the community's access to education as well as their resilience to tectonic hazards.</li> <li>• Furthermore communities with a higher level of development will have better access to housing, healthcare and income opportunities and so reduce the community's vulnerability. Crucially in the management of the eruption of Pinatubo it was the lack of housing and other income opportunities that was a factor in leading to the Aeta people decision to remain in the vicinity of the eruption.</li> <li>• The level of development also influences all stages of the stages in the hazard management cycle (response, recovery, mitigation, preparedness) all of which may influence the vulnerability of communities.</li> <li>• For instance, the level of development influences the affordability of strategies such as land-use zoning as well as hazard – resistant design and engineering defences such as aseismic buildings found in the USA as well as Japan.</li> <li>• Reward those who examine the criteria for what they understand by the term vulnerability.</li> </ul> <p><b>Accept other assessments of the importance of community preparedness in influencing the vulnerability of people to tectonic hazards.</b></p>

<b>Level</b>	<b>Mark</b>	<b>Descriptor</b>
	<b>0</b>	No rewardable material.
<b>Level 1</b>	<b>1-4</b>	<ul style="list-style-type: none"> <li>• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1)</li> <li>• Applies knowledge and understanding of geographical information/ideas, making limited logical connections/relationships. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to produce an interpretation with limited relevance and/or support. (AO2)</li> <li>• 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)</li> </ul>
<b>Level 2</b>	<b>5-8</b>	<ul style="list-style-type: none"> <li>• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1)</li> <li>• Applies knowledge and understanding of geographical information/ideas logically, making some relevant connections/relationships. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to produce a partial but coherent interpretation that is mostly relevant and supported by evidence. (AO2)</li> <li>• 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)</li> </ul>
<b>Level 3</b>	<b>9-12</b>	<ul style="list-style-type: none"> <li>• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1)</li> <li>• Applies knowledge and understanding of geographical information/ideas logically, making relevant connections/relationships. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to produce a full and coherent interpretation that is relevant and supported by evidence. (AO2)</li> <li>• 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)</li> </ul>

<b>Question number</b>	<b>Indicative content</b> <b>Explain the role of valley glaciers in the formation of this landscape.</b>
<b>2(a)</b>	<p style="text-align: center;"><b>AO1 – (3 marks)/AO2 – (3 marks)</b></p> <p><b>Marking instructions</b> Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below.</p> <p><b>Indicative content guidance</b> 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:</p> <p><b>AO1</b></p> <ul style="list-style-type: none"> <li>• Glaciers alter landscapes by a number of processes.</li> <li>• Details of erosion, entrainment, transport and deposition.</li> <li>• The processes leading to the formation of landforms associated with cirque and valley glaciers (arêtes, glacial troughs/ U-shaped valley, truncated spurs/hanging valleys).</li> </ul> <p><b>AO2</b></p> <ul style="list-style-type: none"> <li>• The photograph shows a glacial trough/ U-shaped valley with a meandering misfit stream in the trough.</li> <li>• There is evidence of scree on the right hand side and possibly on the left hand side.</li> <li>• There is evidence of a possible arête but the trough tops are mostly rounded suggesting that at some stage they were covered in ice.</li> <li>• There are possible depositional features on the trough floor such as moraines of different types. Accept eyot formation, with possible drumlins and erratics to be seen.</li> <li>• Expect details of how valley glaciers are constrained and so through movement erode the side and base of the pre-existing valley.</li> <li>• Expect details of the processes of movement of valley glaciers.</li> <li>• Expect details of entrainment and details of glacial erosion processes.</li> <li>• Expect details on scree formation.</li> </ul> <p><b>Accept other explanations of the role of valley glaciers in the formation of this landscape.</b></p>

<b>Level</b>	<b>Mark</b>	<b>Descriptor</b>
	0	No rewardable material.
<b>Level 1</b>	<b>1–2</b>	<ul style="list-style-type: none"> <li>• Demonstrates isolated or generic elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1)</li> <li>• Applies knowledge and understanding to geographical information inconsistently. Connections/relationships between stimulus material and the question may be irrelevant. (AO2)</li> </ul>
<b>Level 2</b>	<b>3–4</b>	<ul style="list-style-type: none"> <li>• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1)</li> <li>• Applies knowledge and understanding to geographical information to find some relevant connections/relationships between stimulus material and the question. (AO2)</li> </ul>

<b>Level</b>	<b>Mark</b>	<b>Descriptor</b>
<b>Level 3</b>	<b>5-6</b>	<ul style="list-style-type: none"><li>• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1)</li><li>• Applies knowledge and understanding to geographical information logically to find fully relevant connections/relationships between stimulus material and the question. (AO2)</li></ul>

Question number	Indicative content <b>Explain the influence of geology in the formation of this knock and lochan landscape.</b>
2(b)	<p style="text-align: center;"><b>A01 (3 marks)/A02 (3 marks)</b></p> <p><b>Marking instructions</b> Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below.</p> <p><b>Indicative content guidance</b> 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:</p> <p><b>A01</b></p> <ul style="list-style-type: none"> <li>• The formation of landforms due to ice sheet scouring (knock and lochan) and the influence of differential geology.</li> <li>• Glacial landforms develop at macro-, meso- and micro-scales with distinctive morphologies in process environments, such as sub-glacial, marginal, proglacial and periglacial.</li> </ul> <p><b>A02</b></p> <ul style="list-style-type: none"> <li>• The photo shows an area of small lakes (lochans) as well as rounded upstanding areas that appear to have more resistant geology (knocks).</li> <li>• Candidates may identify the feature in the foreground as a roches moutonnées.</li> <li>• There also appears to be intense post glacial weathering occurring on the upstanding areas of more resistant geology.</li> <li>• These are created when ice sheets through intense erosion over deepen some areas creating the lochs and leave other areas as upstanding hills known as knocks.</li> <li>• Theory suggests the less resistant geology is caused by intense weathering of jointed rock.</li> <li>• This is caused by the ice sheets eroding the area through areal scouring as opposed to abrasion or fracturing.</li> <li>• It is also associated with the entrainment of material through regelation.</li> <li>• The landscape is also the result of differential geology with more resistant bedrock as the upstanding hills or knocks.</li> <li>• Reward those candidates who discuss mechanisms of erosion of unbounded ice as opposed to constrained ice.</li> </ul> <p><b>Accept other explanations of the influence of geology in the formation of this knock and lochan landscape.</b></p>

<b>Level</b>	<b>Mark</b>	<b>Descriptor</b>
	0	No rewardable material.
<b>Level 1</b>	<b>1–2</b>	<ul style="list-style-type: none"> <li>• Demonstrates isolated or generic elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1)</li> <li>• Applies knowledge and understanding to geographical information inconsistently. Connections/relationships between stimulus material and the question may be irrelevant. (AO2)</li> </ul>
<b>Level 2</b>	<b>3–4</b>	<ul style="list-style-type: none"> <li>• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1)</li> <li>• Applies knowledge and understanding to geographical information to find some relevant connections/relationships between stimulus material and the question. (AO2)</li> </ul>
<b>Level 3</b>	<b>5–6</b>	<ul style="list-style-type: none"> <li>• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1)</li> <li>• Applies knowledge and understanding to geographical information logically to find fully relevant connections/relationships between stimulus material and the question. (AO2)</li> </ul>

Question number	Indicative content <b>Explain why meltwater creates distinctive depositional fluvio-glacial landforms.</b>
2 (c)	<p style="text-align: center;"><b>AO1 – (8 marks)</b></p> <p><b>Marking instructions</b> Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below.</p> <p><b>Indicative content guidance</b> 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:</p> <p><b>AO1</b></p> <ul style="list-style-type: none"> <li>• The distinctiveness can be associated with the form, position and the deposits forming the feature as well as the distinction between ice contact and pro-glacial features.</li> <li>• Eskers are linear features that often show a close correspondence with the recent direction of ice movement. Eskers are often formed within ice-walled tunnels by meltwater reworking sediment (often coarse-grained, water-laid sand and gravel) that was found at the base of the glacier. Eskers often form at the time of the glacial maximum when glacier movement is slow. Once the retaining ice walls have melted away, these meltwater reworked debris are deposited as distinctive long winding ridges such as those found in Rothiemurchus. They are also distinctive to glacial deposits as they are stratified and sorted and often have distinct bedding of the sediments.</li> <li>• Kames are irregularly shaped hills consisting of sand, gravel and till. They are associated with a retreating glacier when material resting on the glacier is reworked by meltwater. Kames form in zones of melting ice such as crevasses, moulins and larger cavities. As the ice melts, the kame begins to emerge as a low hill such as those found in Gleann Einich. Bedded and sorted sand and gravel predominates but often sharp lateral variations are apparent in the calibre of the material, indicating rapid changes in flow velocity. They are distinctive as they have an irregular pattern as compared to drumlins which often occur in swarms.</li> <li>• Kame terraces are also thought to be landforms formed that are parallel to the ice flow. Kame terraces form when sediment accumulates in ponds and lakes trapped between lobes of glacier ice or between a glacier and the valley side. As the glacier retreats they are deposited on the valley sides. Typically, the sediment comprises well-bedded and sorted sand and gravel. They are distinctive as they can form steps leading down to the valley floor.</li> <li>• Kettle holes are formed by blocks of ice that are separated from the main glacier. The isolated blocks of ice then become partially or wholly buried in glacial meltwater outwash material. When the ice blocks eventually melt they leave behind holes or depressions that fill with water to become kettle holes such as Lochan Deo.</li> <li>• Pro-glacial lakes are ephemeral lakes created where glacier ice blocks a valley or embayment and ponds the glacial meltwater. The lakes may drain through the ice barrier or via spillways through cols. Drainage of these lakes may form sculpted bedrock surfaces and leave behind poorly-sorted boulder gravels.</li> <li>• Sandurs/ outwash plains are found in glaciated areas, such as Svalbard, Kerguelen Islands, and Iceland. Glaciers and icecaps</li> </ul>

	<p>contain large amounts of silt and sediment, picked up as they erode the underlying rocks when they move slowly downhill, and at the snout of the glacier, meltwater can carry this sediment away from the glacier and deposit it on a broad plain. The material in the sandur/outwash plain is often size-sorted by the water runoff of the melting glacier with the finest materials, like silt, being the most distantly re-deposited, whereas larger boulders are the closest to the original terminus of the glacier.</p> <p><b>Accept other explanations of why meltwater creates distinctive depositional fluvio-glacial landforms.</b></p>
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<b>Level</b>	<b>Mark</b>	<b>Descriptor</b>
	0	No rewardable material.
<b>Level 1</b>	<b>1–2</b>	<ul style="list-style-type: none"> <li>• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1)</li> <li>• Understanding addresses a narrow range of geographical ideas, which lack detail. (AO1)</li> </ul>
<b>Level 2</b>	<b>3–5</b>	<ul style="list-style-type: none"> <li>• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1)</li> <li>• Understanding addresses a range of geographical ideas, which are not fully detailed and/or developed. (AO1)</li> </ul>
<b>Level 3</b>	<b>6–8</b>	<ul style="list-style-type: none"> <li>• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1)</li> <li>• Understanding addresses a broad range of geographical ideas, which are detailed and fully developed. (AO1)</li> </ul>

Question number	Indicative content <b>Evaluate the view that the management of glaciated landscapes should always prioritise preservation over economic exploitation.</b>
2(d)	<p style="text-align: center;"><b>AO1 (5 marks)/AO2 (15 marks)</b></p> <p><b>Marking instructions</b> 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 <b>only</b> AO1 without any AO2 should be awarded marks as follows:</p> <ul style="list-style-type: none"> <li>• Level 1 AO1 performance: 1 mark</li> <li>• Level 2 AO1 performance: 2 marks</li> <li>• Level 3 AO1 performance: 3 marks.</li> <li>• Level 4 AO1 performance: 4–5 marks.</li> </ul> <p><b>Indicative content guidance</b> 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:</p> <p><b>AO1</b></p> <ul style="list-style-type: none"> <li>• Glaciated landscapes face varying degrees of challenges from human activities (leisure and tourism, reservoir construction, urbanisation).</li> <li>• Human activity can also degrade the landscape and fragile ecology of glaciated landscapes (soil erosion, trampling, landslides, deforestation).</li> <li>• Different stakeholders (conservationists, local and regional government, global organisations, NGOs) are involved in managing the challenges posed by glaciated landscapes, using a spectrum of approaches from protection through to sustainable management and multiple economic use.</li> <li>• Legislative frameworks are used to protect and conserve landscapes by conservation and management at a variety of scales.</li> </ul> <p><b>AO2</b></p> <ul style="list-style-type: none"> <li>• Expect evaluation of a range of management approaches.</li> <li>• Active glaciated landscapes often face economic challenges.</li> <li>• A key global management strategy that has successfully preserved, although not yet tested, an active glaciated landscape is the Antarctic Treaty System (ATS). Through a global agreement the threats to this landscape have been effectively reduced by stopping any resource exploitation as well as freezing all sovereignty claims.</li> <li>• Furthermore the treaty has also managed the threat of tourism in this active glaciated landscape. Although there are 40,000 visitors to Antarctica per year, due to protocols adopted in 1966 and subsequently added to in the Antarctic Treaty System there is now a framework to manage tourism in Antarctica reducing the potential for damage to the landscape. Furthermore, strict protocols have meant that all waste is removed from this area, even wastewater, and so any damage is being minimized.</li> <li>• Yet other attempts to manage other active landscapes have prioritised economic exploitation resulting in environmental damage. Arctic tourism has increased from 1 million in 1990s to over 2 million in 2024. This provides income opportunities in areas where there are</li> </ul>

Question number	Indicative content <b>Evaluate the view that the management of glaciated landscapes should always prioritise preservation over economic exploitation.</b>
	<p>few others and as a result in areas such as the Arctic new port facilities such as at Honningsvåg and roads such as the E69 for visitors to see North Cape have been built which have degraded the landscape.</p> <ul style="list-style-type: none"> <li>• Yet glaciated landscapes also face environmental challenges and often these are managed with environmental considerations as opposed to economic considerations.</li> <li>• Recent studies showing that most glaciers are currently retreating with only maritime glaciers in Scandinavia showing glacial advances. This retreat will threaten landscapes due to the changes in the hydrological cycle that this will bring as well as the increased chance of glacial outburst floods.</li> <li>• Yet this is being managed by the Paris Agreement Climate change accord and the COP28 agreement. As a result of there being no legally binding obligations as well as the fact that all signatories have pledged to reduce carbon emissions it avoids a key criticism of the Kyoto protocol that allowed some of the world’s biggest polluters to avoid having to reduce their carbon emissions.</li> <li>• Many countries have therefore initiated plans to reduce carbon emissions and so meet the agreement. This will therefore reduce the contextual threat of global warming.</li> <li>• However, relict landscapes are often managed due to economic considerations. Deforestation on exposed slopes has 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 landscapes in Andean areas.</li> <li>• Furthermore urbanisation, mineral exploitation and reservoir construction also pose threats to relict glaciated landscapes with pollution and toxic waste being threats from hastily built urban areas and the damage to the landscape of glaciated areas through mineral exploitation and reservoir construction often taking decades to recover.</li> <li>• Yet many relict areas have also been successfully managed at a regional level and local level. The LDNPA has a five-year management plan as well as initiatives such as Fix the Fells.</li> <li>• Accept feedback loops and tipping points.</li> <li>• Overall it is often the case that at a regional or global scale the main aim is preservation, whilst at a more local scale there are often greater pressures leading to approaches that try to manage economic exploitation.</li> </ul> <p><b>Accept other evaluations of the view that the management of glaciated landscapes should always prioritise preservation over economic exploitation.</b></p>

<b>Level</b>	<b>Mark</b>	<b>Descriptor</b>
	<b>0</b>	No rewardable material.
<b>Level 1</b>	<b>1–5</b>	<ul style="list-style-type: none"> <li>• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1)</li> <li>• Applies knowledge and understanding of geographical ideas, making limited and rarely logical connections/relationships. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to produce an interpretation with limited coherence and support from evidence. (AO2)</li> <li>• 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)</li> </ul>
<b>Level 2</b>	<b>6–10</b>	<ul style="list-style-type: none"> <li>• Demonstrates geographical knowledge and understanding, which is occasionally relevant and may include some inaccuracies. (AO1)</li> <li>• Applies knowledge and understanding of geographical information/ideas with limited but logical connections/relationships. (AO2)</li> <li>• 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)</li> <li>• Applies knowledge and understanding of geographical information/ideas to come to a conclusion, partially supported by an unbalanced argument with limited coherence. (AO2)</li> </ul>
<b>Level 3</b>	<b>11–15</b>	<ul style="list-style-type: none"> <li>• Demonstrates geographical knowledge and understanding, which is mostly relevant and accurate. (AO1)</li> <li>• Applies knowledge and understanding of geographical information/ideas to find some logical and relevant connections/relationships. (AO2)</li> <li>• Applies knowledge and understanding of geographical ideas in order to produce a partial but coherent interpretation that is supported by some evidence. (AO2)</li> <li>• 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)</li> </ul>
<b>Level 4</b>	<b>16–20</b>	<ul style="list-style-type: none"> <li>• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1)</li> <li>• Applies knowledge and understanding of geographical information/ideas to find fully logical and relevant connections/relationships. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to produce a full and coherent interpretation that is supported by evidence. (AO2)</li> <li>• 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)</li> </ul>

Question number	Indicative Content Explain the role of destructive waves in the formation of this landscape.
3(a)	<p style="text-align: center;"><b>AO1 (3 marks)/AO2 (3 marks)</b></p> <p><b>Marking instructions</b> Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below.</p> <p><b>Indicative content guidance</b> 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:</p> <p><b>AO1</b></p> <ul style="list-style-type: none"> <li>• Different wave types (constructive/destructive)</li> <li>• Rocky coasts (high and low relief) result from resistant geology (withstands erosive forces of sea, rain and wind), often in a high-energy environment.</li> <li>• The importance of erosion processes (hydraulic action, corrosion, abrasion, attrition) and how they are influenced by wave type, size and lithology.</li> <li>• Geological structure (jointing, dip, faulting, folding) is an important influence on coastal morphology and erosion rates, and also on the formation of cliff profiles.</li> <li>• Erosion creates distinctive coastal landforms (wave cut notch, wave cut platforms, cliffs, the cave-arch-stack-stump sequence).</li> <li>• Sea level change has produced emergent coastlines (raised beaches with fossil cliffs)</li> </ul> <p><b>AO2</b></p> <ul style="list-style-type: none"> <li>• The photo shows a sea stack, vertical cliff, wave-cut platform and perhaps a talus scree slope.</li> <li>• There is also evidence isostatic rebound as the foot of the cliff is stable and vegetated.</li> <li>• A destructive wave is one which has a greater backwash than swash, has a high wave height and a short wavelength.</li> <li>• They are often associated with high energy coasts and erosion.</li> <li>• Expect details of erosional processes such as hydraulic action, corrosion, abrasion.</li> <li>• The question states role so expect: <ul style="list-style-type: none"> <li>• Details of impact of geological structure;</li> <li>• Details of impact of sub-aerial processes;</li> <li>• Details of impact of sea level change.</li> </ul> </li> </ul> <p><b>Accept other explanations of the role of destructive waves in the formation of this landscape.</b></p>

<b>Level</b>	<b>Mark</b>	<b>Descriptor</b>
	0	No rewardable material.
<b>Level 1</b>	<b>1–2</b>	<ul style="list-style-type: none"> <li>• Demonstrates isolated or generic elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1)</li> <li>• Applies knowledge and understanding to geographical information inconsistently. Connections/relationships between stimulus material and the question may be irrelevant. (AO2)</li> </ul>
<b>Level 2</b>	<b>3–4</b>	<ul style="list-style-type: none"> <li>• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1)</li> <li>• Applies knowledge and understanding to geographical information to find some relevant connections/relationships between stimulus material and the question. (AO2)</li> </ul>
<b>Level 3</b>	<b>5–6</b>	<ul style="list-style-type: none"> <li>• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1)</li> <li>• Applies knowledge and understanding to geographical information logically to find fully relevant connections/relationships between stimulus material and the question. (AO2)</li> </ul>

Question number	Indicative content Explain the influence of constructive waves in the formation of this landscape.
3(b)	<p style="text-align: center;"><b>A01 (3 marks)/A02 (3 marks)</b></p> <p><b>Marking instructions</b> Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below.</p> <p><b>Indicative content guidance</b> 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:</p> <p><b>A01</b></p> <ul style="list-style-type: none"> <li>• Different wave types (constructive/destructive)</li> <li>• Transportation and deposition processes produce distinctive coastal landforms (beaches, spits, bars)</li> <li>• These landforms can be stabilised by plant succession.</li> </ul> <p><b>A02</b></p> <ul style="list-style-type: none"> <li>• The photo shows a bar with a wide beach to the right of the photograph with a lagoon behind.</li> <li>• Constructive waves are ones which have a greater swash than backwash, has a low wave height and a long wavelength.</li> <li>• They are often associated with low energy environments and the creation of depositional features.</li> <li>• Expect explanations of the formation of beaches, spits and bars likely to include gravity settling.</li> <li>• Yet longshore drift and sediment transportation processes (saltation, traction, suspension) have also been responsible for the creation of the bar.</li> <li>• Fluvial processes have also been responsible for the creation of the lagoon.</li> <li>• Vegetation is helping to stabilise sediment on the bar.</li> <li>• Accept that the lagoon sits within a ria and so accept explanations of ria formation and submergent coasts.</li> <li>• Accept that as with many shingle banks the bar was likely to have originated as a barrier beach formed from glacial deposits which has then been washed inland due to rising sea levels.</li> </ul> <p><b>Accept other explanations of the influence of constructive waves in the formation of this landscape.</b></p>

<b>Level</b>	<b>Mark</b>	<b>Descriptor</b>
	0	No rewardable material.
<b>Level 1</b>	<b>1–2</b>	<ul style="list-style-type: none"> <li>• Demonstrates isolated or generic elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1)</li> <li>• Applies knowledge and understanding to geographical information inconsistently. Connections/relationships between stimulus material and the question may be irrelevant. (AO2)</li> </ul>
<b>Level 2</b>	<b>3–4</b>	<ul style="list-style-type: none"> <li>• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1)</li> <li>• Applies knowledge and understanding to geographical information to find some relevant connections/relationships between stimulus material and the question. (AO2)</li> </ul>
<b>Level 3</b>	<b>5–6</b>	<ul style="list-style-type: none"> <li>• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1)</li> <li>• Applies knowledge and understanding to geographical information logically to find fully relevant connections/relationships between stimulus material and the question. (AO2)</li> </ul>

Question number	Indicative content Explain why sub-aerial processes influence the rate of coastal recession.
3(c)	<p style="text-align: center;"><b>AO1 (8 marks)</b></p> <p><b>Marking instructions</b> Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below.</p> <p><b>Indicative content guidance</b> 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:</p> <p><b>AO1</b></p> <ul style="list-style-type: none"> <li>• Subaerial process can be divided into two – weathering and mass movement.</li> <li>• Weathering can be defined as the breakdown of rock in situ i.e. without movement.</li> <li>• Freeze/thaw (physical weathering) is where water freezes and expands by 9%, cracking the rock. Cycles of freezing and thawing, either overnight or over a few days are the most effective conditions for this weathering. Freeze/thaw weathering often leads to blockfall and creates the talus scree found at the bottom of vertical slopes. It is therefore influences the rate of coastal recession particularly on well jointed rocks.</li> <li>• Carbonation (chemical weathering) is where carbon dioxide reacts with rainwater to form carbonic acid. This reacts with the minerals of rocks which then breakdown. Calcite and Dolomite minerals are the most readily broken down and therefore limestone and chinks are the most commonly affected by these processes. The chalk on Culver cliff on the Isle of Wight is particularly impacted by these processes where the high rainfall on this side of the Island dissolves the rock and so influences the rate of coastal recession.</li> <li>• Tree root weathering (biological weathering) takes place on vegetated cliffs where tree roots grow into the rock exploiting the joints and the bedding planes of the rock. As the tree grows the root grows and levers out large block of the rock. On the Isle of Wight, vegetated cliffs of the Landslip are likely to suffer more from biological weathering than the unvegetated cliffs of Culver cliff and so influences the rate of coastal recession.</li> <li>• Translational slide - On the Undercliff, the combination of heavy winter rain that lubricates the ancient landslide and trigger causes of landslides from the top of the undercliff or erosion at the toe of the undercliff cause the ancient landslide to move in the form of mass movement called a translational slide. This is where a large block detached itself from the rest of the rock and moves en-bloc down slope as so influences the rate of coastal recession.</li> <li>• Mudflows are another subaerial process that influences the rate of coastal recession. This is where the rock becomes saturated and loses internal cohesion. It therefore flows down on to the shore and creates an accumulation lobe.</li> <li>• At Compton Bay weak Wealden clays and sands are susceptible to sub-aerial processes as the rock is are easily weathered. This means that when it rains the rock becomes easily saturated. This in turn leads to an arc of failure and rapid mass movement. The whole</li> </ul>

	<p>processes is aided by rapid erosion at the base of the cliff caused by the large destructive waves generated at Compton Bay by the large fetch.</p> <ul style="list-style-type: none"> <li>• Human factors can also affect the rate of coastal recession.</li> </ul> <p><b>Accept other explanations why sub-aerial processes influence the rate of coastal recession.</b></p>
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Level	Mark	Descriptor
	0	No rewardable material.
<b>Level 1</b>	<b>1–2</b>	<ul style="list-style-type: none"> <li>• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1)</li> <li>• Understanding addresses a narrow range of geographical ideas, which lack detail. (AO1)</li> </ul>
<b>Level 2</b>	<b>3–5</b>	<ul style="list-style-type: none"> <li>• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1)</li> <li>• Understanding addresses a range of geographical ideas, which are not fully detailed and/or developed. (AO1)</li> </ul>
<b>Level 3</b>	<b>6–8</b>	<ul style="list-style-type: none"> <li>• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1)</li> <li>• Understanding addresses a broad range of geographical ideas, which are detailed and fully developed. (AO1)</li> </ul>

Question number	Indicative content <b>Evaluate the view that coastal management should always prioritise the environment over economic considerations.</b>
3(d)	<p style="text-align: center;"><b>AO1 (5 marks)/AO2 (15 marks)</b></p> <p><b>Marking instructions</b> 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 <b>only</b> AO1 without any AO2 should be awarded marks as follows:</p> <ul style="list-style-type: none"> <li>• Level 1 AO1 performance: 1 mark</li> <li>• Level 2 AO1 performance: 2 marks</li> <li>• Level 3 AO1 performance: 3 marks.</li> <li>• Level 4 AO1 performance: 4–5 marks.</li> </ul> <p><b>Indicative content guidance</b> 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:</p> <p><b>AO1</b></p> <ul style="list-style-type: none"> <li>• Shoreline Management Policy decisions (No Active Intervention, Strategic Realignment, Hold The Line, Advance The Line) are based on complex judgements (engineering feasibility, environmental sensitivity, land value, political and social reasons)</li> <li>• Cost Benefit Analysis (CBA) and Environmental Impact Assessment (EIA) are used as part of the decision-making process.</li> <li>• Hard engineering approaches (groynes, sea walls, rip rap, revetments, offshore breakwaters) are economically costly and directly alter physical processes and systems.</li> <li>• Sustainable management is designed to cope with future threats (increased storm events, rising sea levels) but its implementation can lead to local conflicts in many countries.</li> <li>• Soft engineering approaches (beach nourishment, cliff re- grading and drainage, dune stabilisation) attempt to work with physical systems and processes to protect coasts and manage risks caused by changes in sea-level.</li> </ul> <p><b>AO2</b></p> <ul style="list-style-type: none"> <li>• In some areas the management policy is driven by the environmental sensitivity of the area. East Head at the mouth of Chichester Harbour is owned by the National Trust and is a Site of Special Scientific Interest (SSSI). This means that using hard defences such as rock groynes would be inappropriate as it would harm the existing biodiversity as well as be visually intrusive. As a result a sustainable approach of planting marram grass on the narrow neck of land called the Hinge was adopted along with annual beach renourishment.</li> <li>• Yet generally the higher the value of the land the more likely the approach will be Advance the Line or Hold the Line and the lower the value of the land the more likely it is to be Strategic Realignment or No Active Intervention. Withernsea is protected as is Hornsea and Mapleton due to the income derived from tourism. However areas</li> </ul>

Question number	Indicative content <b>Evaluate the view that coastal management should always prioritise the environment over economic considerations.</b>
	<p>such as Cowden which have low value agricultural land have a policy of no active intervention.</p> <ul style="list-style-type: none"> <li>• It is not just tourism where economic considerations is the key factor in determining the management approach. London Docklands contains billions of investment and so is protected not only by sea walls but also the Thames Barrier.</li> <li>• Yet there are also political reasons. This is when an approach is adopted that reflects political considerations such as the need to ensure that there is continued accessibility between two different areas along the coast or for vital infrastructure such as Easington Gas terminal.</li> <li>• However, there are also physical factors such as the practicality or feasibility of building sea defences. For instance on the Isle of Wight this is occurring on the Undercliff. This is an existing 10,000 year old landslip complex that contains both Black Gang Chine amusement park, the Undercliff road and the camp site at Niton. After the landslides of 1994 and subsequent erosion at the base of the cliffs and further mass movement it was decided to adopt a No Active Intervention policy due to engineering feasibility as it is impossible to stop the landslides occurring in this area due to the geological history.</li> <li>• Overall it is often the case that economic considerations are the most important factor influencing coastal management decisions.</li> </ul> <p><b>Accept other evaluations of the view that coastal management should always prioritise the environment over economic considerations.</b></p>

<b>Level</b>	<b>Mark</b>	<b>Descriptor</b>
	<b>0</b>	No rewardable material.
<b>Level 1</b>	<b>1–5</b>	<ul style="list-style-type: none"> <li>• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1)</li> <li>• Applies knowledge and understanding of geographical ideas, making limited and rarely logical connections/relationships. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to produce an interpretation with limited coherence and support from evidence. (AO2)</li> <li>• 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)</li> </ul>
<b>Level 2</b>	<b>6–10</b>	<ul style="list-style-type: none"> <li>• Demonstrates geographical knowledge and understanding, which is occasionally relevant and may include some inaccuracies. (AO1)</li> <li>• Applies knowledge and understanding of geographical information/ideas with limited but logical connections/relationships. (AO2)</li> <li>• 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)</li> <li>• Applies knowledge and understanding of geographical information/ideas to come to a conclusion, partially supported by an unbalanced argument with limited coherence. (AO2)</li> </ul>
<b>Level 3</b>	<b>11–15</b>	<ul style="list-style-type: none"> <li>• Demonstrates geographical knowledge and understanding, which is mostly relevant and accurate. (AO1)</li> <li>• Applies knowledge and understanding of geographical information/ideas to find some logical and relevant connections/relationships. (AO2)</li> <li>• Applies knowledge and understanding of geographical ideas in order to produce a partial but coherent interpretation that is supported by some evidence. (AO2)</li> <li>• 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)</li> </ul>
<b>Level 4</b>	<b>16–20</b>	<ul style="list-style-type: none"> <li>• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1)</li> <li>• Applies knowledge and understanding of geographical information/ideas to find fully logical and relevant connections/relationships. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to produce a full and coherent interpretation that is supported by evidence. (AO2)</li> <li>• 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)</li> </ul>

Question number	Indicative content <b>Explain one reason why the global water budget limits water availability for human use.</b>	Mark
4(a)	<p style="text-align: center;"><b>AO1 – 2 marks/AO2 – 1 marks</b></p> <p>Award <b>1 AO2 mark</b> for analysing the resource to identify one possible reason and a further <b>2 AO1 marks</b> expansion up to a maximum of 3 marks to explain one reason why the global water budget limits water availability for human use.. For example:</p> <ul style="list-style-type: none"> <li>• 97.5% of the Earth’s water is sea water (1) and cannot be used for irrigation (1) as sea water will poison many crops (1).</li> <li>• 70% of the 2.5 % of the world’s freshwater (1) is stored in ice /cryosphere (1) which cannot be used in its solid state / is a decreasing source due to global warming (1).</li> </ul> <p><b>Accept other explanations of why the global water budget limits water availability for human use.</b></p>	<b>(3)</b>

Question number	Indicative content <b>Explain the possible impacts of climate change on river discharge.</b>
4(b)	<p style="text-align: center;"><b>AO1 (6 marks)</b></p> <p><b>Marking instructions</b> Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below.</p> <p><b>Indicative content guidance</b></p> <p>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:</p> <p><b>AO1</b></p> <ul style="list-style-type: none"> <li>• Climate change is thought to be highest in Arctic regions and as a result the total annual river discharge of Arctic rivers will therefore increase as a result of the increases in precipitation.</li> <li>• In contrast climate change may bring forward the spring snow melt as a result of changes to the global circulation and so rivers which drain mountain areas such as the Colorado or the Rhône will have a higher April mean discharge but a lower peak in June.</li> <li>• Climate change may increase autumn rainfall in the northern hemisphere and so rivers which drain chalk uplands in southern England may experience earlier peak discharges in winter as opposed to early spring.</li> <li>• Climate change may lead to loss of rainforest and so reduction in interception and evapotranspiration and an increase in surface runoff. Discharge of rivers such as the Amazon or Congo may increase.</li> <li>• Reward those who explain the spatial or temporal differences in the impacts of climate change on river discharge, for example, discharge is greater where there is snow melt.</li> </ul> <p><b>Accept other explanations of the possible impacts of climate change on river discharge.</b></p>

<b>Level</b>	<b>Mark</b>	<b>Descriptor</b>
	0	No rewardable material.
<b>Level 1</b>	<b>1–2</b>	<ul style="list-style-type: none"> <li>• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate. (AO1)</li> <li>• Understanding addresses a narrow range of geographical ideas. (AO1)</li> <li>• Understanding of geographical ideas lacks detail. (AO1)</li> </ul>
<b>Level 2</b>	<b>3–4</b>	<ul style="list-style-type: none"> <li>• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1)</li> <li>• Understanding addresses a range of geographical ideas. (AO1)</li> <li>• Understanding of geographical ideas is not fully detailed and/or developed. (AO1)</li> </ul>
<b>Level 3</b>	<b>5–6</b>	<ul style="list-style-type: none"> <li>• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1)</li> <li>• Understanding addresses a broad range of geographical ideas, which are detailed and fully developed. (AO1)</li> </ul>

<b>Question number</b>	<b>Indicative content</b> <b>Explain the costs and benefits of developing unconventional fossil fuel energy resources.</b>
4(c)	<p style="text-align: center;"><b>AO1 (8 marks)</b></p> <p><b>Marking instructions</b> Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below.</p> <p><b>Indicative content guidance</b> 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:</p> <ul style="list-style-type: none"> <li>• In Canada tar sands use offers well paid employment and makes Canada more energy secure. This therefore increases the standard of living of those directly employed in the industry as well as where jobs are created through the multiplier effect or cumulative causation.</li> <li>• Furthermore as Canada is more energy secure they are therefore less exposed to fluctuations in world energy prices, such as those seen in 2022 after the Russian invasion of Ukraine, and so both employees and Canadian citizens benefit from the development of unconventional fossil fuel sources of energy.</li> <li>• The extraction of tar sands has immense environmental impacts. Globally, due to the energy needed for steaming the bitumen and then the subsequent use of the oil, there are large amounts of CO<sub>2</sub> released leading to increased global warming. The need for huge amounts of water reduces river flows and reduces biodiversity in nearby rivers and there is often pollution of local river sources also leading to a drop in biodiversity. Removal of the boreal forest for extracting tar sands reduces the amount of habitat available and so reduces biodiversity.</li> <li>• The development of oil shale and gas through fracking increases employment in the area and has made the US the largest producer of oil and gas in the world. It also makes the US more energy secure.</li> <li>• Crucially as the rights to the oil/gas lie with the landowner many farmers/indigenous people have become wealthy as a result of selling their mineral rights and so these players benefit.</li> <li>• Furthermore electricity prices in North Dakota are now amongst the lowest in the world and this has attracted German energy firms to relocate to the Dakotas, so TNCs also benefit from the development of unconventional fossil fuel energy resources.</li> <li>• Environmental impact of hydraulic fracturing in the United States and UK has been an issue of public concern, including the potential contamination of ground and surface water, and the release of gases and hydraulic fracturing chemicals.</li> <li>• Other areas such as the Shetland Islands have unconventional fossil fuels but these could cause disruption to the local marine ecosystem and impact those whose livelihoods depend on the local fisheries. Players such as local fisherman may therefore have a substantial cost due to the development of unconventional fossil fuel resources.</li> <li>• This area is also vulnerable ecologically to further exploration as there are cold water corals which would be destroyed if drilling went ahead.</li> <li>• Accept that the development of unconventional fossil fuels will cause further climate change and as a result have global implications.</li> </ul> <p><b>Accept other explanations of the costs and benefits of developing unconventional fossil fuel energy resources.</b></p>

<b>Level</b>	<b>Mark</b>	<b>Descriptor</b>
	0	No rewardable material.
<b>Level 1</b>	<b>1–2</b>	<ul style="list-style-type: none"> <li>• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1)</li> <li>• Understanding addresses a narrow range of geographical ideas, which lack detail. (AO1)</li> </ul>
<b>Level 2</b>	<b>3–5</b>	<ul style="list-style-type: none"> <li>• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1)</li> <li>• Understanding addresses a range of geographical ideas, which are not fully detailed and/or developed. (AO1)</li> </ul>
<b>Level 3</b>	<b>6–8</b>	<ul style="list-style-type: none"> <li>• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1)</li> <li>• Understanding addresses a broad range of geographical ideas, which are detailed and fully developed. (AO1)</li> </ul>

Question number	Indicative content Assess the extent to which future demand for water can be met using sustainable approaches.
4(d)	<p style="text-align: center;"><b>AO1 (3 marks)/AO2 (9 marks)</b></p> <p><b>Marking instructions</b> 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 <b>only</b> AO1 without any AO2 should be awarded marks as follows:</p> <ul style="list-style-type: none"> <li>• Level 1 AO1 performance: 1 mark</li> <li>• Level 2 AO1 performance: 2 marks</li> <li>• Level 3 AO1 performance: 3 marks.</li> </ul> <p><b>Indicative content guidance</b> 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:</p> <p><b>AO1</b></p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• The value of more sustainable schemes of restoration of water supplies and water conservation (smart irrigation, recycling of water)</li> <li>• Water sharing treaties and frameworks (United Nations Economic Commission for Europe (UNECE), Water Convention, Helsinki, and the Water Framework Directive and Hydropower, Berlin).</li> </ul> <p><b>AO2</b></p> <ul style="list-style-type: none"> <li>• It is estimated that water demand will increase by 55% by the year 2050 to 5500 km<sup>3</sup> of water.</li> <li>• Yet water supplies are finite and so many authors have suggested that future water supplies can be managed through sustainable approaches.</li> <li>• Conservation schemes do not actually increase supply, but makes water resources go further so shortages or insecurity are reduced. It also makes no further demand on supplies so possibly viewed as most sustainable as it needs no new infrastructure. In addition it has a reduced impact on biodiversity as it requires less additional extraction and so is seen as environmentally sustainable.</li> <li>• Other sustainable approaches such as water butts harvest rainwater that would otherwise simply be runoff / go into drains, thus reducing the need to use treated water from taps.</li> <li>• However, whilst this can maintain supplies it has limited use in meeting the increase in demand.</li> <li>• Water restoration such as ground water recharge is where ground water levels are maintained by balancing recharge (putting water back into the ground) with extraction and as a result all the users of the ground water can benefit. In Rajasthan India, Coke has made large</li> </ul>

Question number	Indicative content <b>Assess the extent to which future demand for water can be met using sustainable approaches.</b>
	<p>recharge wells that take the monsoon rains directly down into the groundwater and recharge the levels thereby reducing water insecurity for the local farmers. This is, however, dependent on not taking too much water out and only using that which has rained the year before.</p> <ul style="list-style-type: none"> <li>• Recycling uses water that has already been used for showers for flushing toilets. This is effective as it uses water twice so is more efficient and so reduces demand for water and so reduced water insecurity. It is also sustainable as it is reducing the need for current resources. However some people may be put off by this idea (unhygienic etc) and it might require re-plumbing or other adaptations and so is more expensive than water conservation.</li> <li>• Grey water is where rainwater is collected in gutters and pipes and then filtered and then put back into the house to be used for toilets and washing machines. This means that individuals can take advantage of the rain that falls and use it in their house but it cannot be used for drinking water, is expensive and cannot be used in shared accommodation</li> <li>• There are also small scale sustainable schemes that can also meet the increase in demand Gravity flow water schemes are when small tanks which tap water in the hills and pipe it to villages below. They are sustainable as they are low cost as they are less than \$1000, easy to build and repair and so can be made and maintained by the local people themselves and so will last into the future.</li> <li>• Yet whilst these schemes work on a small scale they are unlikely to meet the growing needs both in developed and developing countries and as a result hard engineering schemes such as dams and reservoirs as well as water transfers will also be needed to meet this demand.</li> <li>• <b>Accept other assessments of the extent to which future demand for water can be met using sustainable approaches.</b></li> </ul>

<b>Level</b>	<b>Mark</b>	<b>Descriptor</b>
	0	No rewardable material.
<b>Level 1</b>	<b>1–4</b>	<ul style="list-style-type: none"> <li>• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate. (AO1)</li> <li>• Applies knowledge and understanding to geographical information/ideas, making limited logical connections/relationships. (AO2)</li> <li>• Applies knowledge and understanding to geographical information/ideas to produce an interpretation that is not relevant and/or supported by evidence. (AO2)</li> <li>• 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)</li> </ul>
<b>Level 2</b>	<b>5–8</b>	<ul style="list-style-type: none"> <li>• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1)</li> <li>• Applies knowledge and understanding to geographical information/ideas logically, making some relevant connections/relationships. (AO2)</li> <li>• Applies knowledge and understanding to geographical information/ideas to produce a partial but coherent interpretation that is mostly relevant and supported by evidence. (AO2)</li> <li>• 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)</li> </ul>
<b>Level 3</b>	<b>9–12</b>	<ul style="list-style-type: none"> <li>• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1)</li> <li>• Applies knowledge and understanding to geographical information/ideas logically, making relevant connections/relationships. (AO2)</li> <li>• Applies knowledge and understanding to geographical information/ideas to produce a full and coherent interpretation that is relevant and supported by evidence. (AO2)</li> <li>• 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)</li> </ul>

Question number	Indicative content <b>Evaluate the view that global agreements are essential in order to reduce further planetary warming.</b>
4(e)	<p style="text-align: center;"><b>AO1 (5 marks)/AO2 (15 marks)</b></p> <p><b>Marking instructions</b> 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:</p> <ul style="list-style-type: none"> <li>• Level 1 AO1 performance: 1 mark</li> <li>• Level 2 AO1 performance: 2 marks</li> <li>• Level 3 AO1 performance: 3 marks.</li> <li>• Level 4 AO1 performance: 4–5 marks.</li> </ul> <p>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:</p> <p><b>AO1</b></p> <ul style="list-style-type: none"> <li>• Re-balancing the carbon cycle could be achieved through mitigation (carbon taxation, renewable switching, energy efficiency, afforestation, carbon capture and storage)</li> <li>• This requires global scale agreement and national actions both of which have proved to be problematic.</li> <li>• Renewable and recyclable energy (nuclear power, wind power and solar power) could help decouple fossil fuel from economic growth; these energy sources have costs and benefits economically, socially, and environmentally and in terms of their contribution they can make to energy security.</li> <li>• Radical technologies, including carbon capture and storage and alternative energy sources (hydrogen fuel cells, electric vehicles) could reduce carbon emissions but uncertainty exists as to how far this is possible.</li> </ul> <p><b>AO2</b></p> <ul style="list-style-type: none"> <li>• Carbon emissions have grown from 290 ppm to 420 ppm since the industrial revolution. As a result there have been a variety of global, regional and national approaches designed to re-balance the carbon cycle.</li> <li>• The first global agreements originated from the World Environment conference held in Brazil in 1992. Agenda 21 in the Rio convention meant that countries pledged to reduce CO<sub>2</sub> levels to reduce the problem. Agenda 21 was therefore adopted by law in all signatory countries such as the UK.</li> <li>• Yet a key problem was that was that not all countries signed up to the Agenda. Another difficulty was in policing the agreement as it was not legally binding - there were no sanctions if countries did not adhere to Agenda 21. Finally, there was no target – just small reductions in the levels of CO<sub>2</sub> produced.</li> </ul>

Question number	<b>Indicative content</b> <b>Evaluate the view that global agreements are essential in order to reduce further planetary warming.</b>
	<ul style="list-style-type: none"> <li>• As a result the next international agreement was the Kyoto agreement of 1997 and the subsequent Den Haag ('Kyoto Light') conference. Developed countries agreed to reduce emission on average by 5% of 1990 values between the years 2008 and 2012. Poor countries were exempted from the deal.</li> <li>• This agreement ran into trouble when it became clear that the impacts on the US (a reduction of 7% of their 1990 emissions actually means cutting present emissions by 30%) were going to cripple the US economy. Such a reduction would reduce the US economy by 2-4% of GDP – as much as the recession of the 1970's. In addition the US was also worried that other developing countries such as India and China would not have to comply with the agreement and therefore would outcompete the US.</li> <li>• The Paris Agreement of 2015 and subsequent statement from COP 26 held in Glasgow and Cop 28 was hailed as a significant step as signatory countries pledged to reduce their greenhouse gas emissions by a certain future date. The UK has pledged to reduce emissions by 100% by 2050 through energy efficiency, banning petrol and diesel cars and the use of renewables.</li> <li>• This would reduce the amounts of greenhouse gases reduced and keep global warming below 2C.</li> <li>• Yet few European countries even met their Kyoto agreements whilst the Paris 2015 agreement is based on each country setting its own targets which are not binding or enforceable in international law. The agreement provides no consequences if countries do not meet their commitments and so the withdrawal of key signatories such as the US might lead to the collapse of the agreement reducing the efficacy of the strategy in reducing the risks posed by the degradation of the carbon cycle.</li> <li>• Furthermore since 1992 CO2 concentrations have risen from 356 ppm to 421ppm highlighting the lack of effectiveness of global agreements to date.</li> <li>• As a result many countries are adopting other ways in which to rebalance the carbon cycle.</li> <li>• According to the IEA renewables are predicted to account for 36% of the total reduction in CO2 emissions if the UN sustainable development (Goal 13) is to be met therefore showing that the use of renewables is a key element in the implementation COP21 agreed in Paris 2015 which aims to rebalance the carbon cycle by cutting global emissions to below 20 Gt per year by 2040 and so reduces the risks of further planetary warming.</li> <li>• In particular renewables have a vital role to play in the creation of low carbon electricity with recent developments of solar photovoltaics (PV) allowing renewables to account for two-thirds of global new net electricity capacity additions thus reducing the contribution of fossil fuels to the world's increasing demand for electric power.</li> <li>• Furthermore renewables also play a vital role on the switch to electric vehicles as the CO2 emissions saved by using such vehicles can only be realised if the electricity used to recharge the vehicles is itself obtained from carbon free sources.</li> <li>• Despite these key roles energy efficiency and other sources will deliver far more of the carbon reduction needed to keep the temperature of the earth well below 2C than the treaty envisages.</li> </ul>

Question number	<b>Indicative content</b> <b>Evaluate the view that global agreements are essential in order to reduce further planetary warming.</b>
	<ul style="list-style-type: none"> <li>• Indeed, this already proved to have been key in reducing the rate of rising emissions as since 2000 energy emissions have been responsible for as reduction of 12% of CO2 emissions had not such efficiencies been in place. Crucially CO2 energy intensity is set to decline at a rate of over 2 % per year and so will allow continued economic development whilst meeting the COP28 targets.</li> <li>• The use of biofuels which are expected to represent over 90% of total energy consumption for vehicles not using fossil fuels by the end of the target date as in contrast to VHHD countries where electricity charging stations are being developed, in other LHD and HMHD it will be simpler to replace fossil fuels such as petrol and diesel with bioethanol and biodiesel.</li> <li>• In addition it also seems clear that if these reduction in CO2 are to be achieved as well as the use of renewables, efficiency and biofuels there will also be the need for the addition of carbon sinks. All players recognise the need for afforestation as well as CCS technology to be developed alongside renewables if COP28 is to be met which therefore reduces the risks of further planetary warming.</li> <li>• It is therefore clear that the role of global agreements is to encourage individual countries to pursue different routes to reducing carbon emissions and so in that sense they are indeed essential.</li> </ul> <p><b>Accept other evaluations of the view that global agreements are essential in order to reduce further planetary warming.</b></p>

Level	Mark	Descriptor
	0	No rewardable material
Level 1	1-5	<ul style="list-style-type: none"> <li>• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1)</li> <li>• Applies knowledge and understanding of geographical information/ideas, making limited and rarely logical connections/relationships. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to produce an interpretation with limited relevance and/or support. (AO2)</li> <li>• 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)</li> </ul>
Level 2	6-10	<ul style="list-style-type: none"> <li>• Demonstrates geographical knowledge and understanding, which is occasionally relevant and may include some inaccuracies. (AO1)</li> <li>• Applies knowledge and understanding of geographical information/ideas with limited but logical connections/relationships. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to produce a partial interpretation that is supported by some evidence but has limited coherence. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to come to a conclusion, partially supported by an unbalanced argument with limited coherence. (AO2)</li> </ul>
Level 3	11-15	<ul style="list-style-type: none"> <li>• Demonstrates geographical knowledge and understanding, which is mostly relevant and accurate. (AO1)</li> <li>• Applies knowledge and understanding of geographical information/ideas to find some logical and relevant connections/relationships. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to produce a partial but coherent interpretation that is supported by some evidence. (AO2)</li> <li>• 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)</li> </ul>
Level 4	16-20	<ul style="list-style-type: none"> <li>• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1)</li> <li>• Applies knowledge and understanding of geographical information/ideas to find fully logical and relevant connections/relationships. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to produce a full and coherent interpretation that is supported by evidence. (AO2)</li> <li>• 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)</li> </ul>