INTERNATIONAL AS
GEOGRAPHY
GG01B

Paper 1B Physical Geography 1 Coastal Systems and Landscapes

Mark scheme

June 2023

Version: 1.0 Final

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same, correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this mark scheme are available from oxfordaqaexams.org.uk.

International AS Geography mark scheme

How to mark

Aims

When you are marking your allocation of scripts your main aims should be to:

- recognise and identify the achievements of students
- place students in the appropriate mark band and in the appropriate part of that mark band (high, low, middle) for **each** Assessment Objective
- record your judgements with brief notes, annotations and comments that are relevant to the mark scheme and make it clear to other examiners how you have arrived at the numerical mark awarded for each Assessment Objective
- ensure comparability of assessment for all students, regardless of question or examiner.

Approach

It is important to be **open-minded** and **positive** when marking scripts.

The specification recognises the variety of experiences and knowledge that students will have. It encourages them to study geography in a way that is relevant to them. The questions have been designed to give them opportunities to discuss what they have found out about geography. It is important to assess the quality of **what the student offers**.

Do not mark scripts based on the answer **you** would have written. The mark schemes have been composed to assess **quality of response** and not to identify expected items of knowledge.

Assessment Objectives

This component requires students to:

AO1	Demonstrate knowledge and understanding of places, environments, concepts, processes, interactions and change, at a variety of scales.
AO2	Apply knowledge and understanding in different contexts to interpret, analyse and evaluate geographical information and issues.
AO3	Use a variety of relevant quantitative, qualitative and fieldwork skills to: • investigate geographical questions and issues • interpret, analyse and evaluate data and evidence • construct arguments and draw conclusions.

The marking grids

Do not think of levels equaling grade boundaries.

Depending on the part of the examination, the levels will have different mark ranges assigned to them. This will reflect the different weighting of Assessment Objectives in particular tasks and across the examination as a whole.

Using the grids

Having familiarised yourself with the descriptors and indicative content, read through the answer and annotate it (as instructed below) to identify the qualities that are being looked for and that it shows. You can now check the levels and award a mark.

Step 1 Determine a level

Start at the lowest level of the mark scheme and use it as a ladder to see whether the answer meets the descriptors for that level. The descriptors for the level indicate the different qualities that might be seen in the student's answer for that level. If it meets all the descriptors for the lowest level then go to the next one and decide if it meets this level, and so on, until you have a match between the level descriptors and the answer. With practice and familiarity you will find that for better answers you will be able to skip through the lower levels of the mark scheme quickly.

When assigning a level you should look at the overall quality of the answer and not look to pick holes in small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best-fit approach for defining the level and then use the variability of the response to help decide the mark within the level.

Step 2 Determine a mark

Once you have assigned a level you need to decide on the mark.

It is often best to start in the middle of the level's mark range and then check and adjust. If there is a lot of indicative content fully identifiable in the work you need to give the highest mark in the level. If only some is identifiable or it is only partially fulfilled, then give the lower mark.

The exemplar materials used during standardisation will also help. There will be an answer in the standardising materials that will correspond with each level of the mark scheme. This answer will have been awarded a mark by the lead examiner. You can compare the student's answer with the example to determine if it is of the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the lead examiner's mark on the example.

You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

In addition to the levels descriptors, question specific indicative content is provided as a guide for examiners. This is not intended to be exhaustive and you must credit other valid points.

An answer that contains nothing of relevance to the question must be awarded no marks.

Annotating scripts

You should write a summative comment at the end for each Assessment Objective and indicate the marks for each Assessment Objective being tested at the end of the answer in the margin in sequence. It is vital that the way you arrive at a mark should be recorded on the script. This will help you with making accurate judgements and it will help any subsequent markers to identify how you are thinking. Please do not write negative comments about students' work or their alleged aptitudes.

Section A – Living with Hazards   **Total for this section: 40 marks**

Question	Part	Marking guidance	Total marks
01	1	**Which of the following describes how deep-sea trenches are formed?** Key – D: Subduction of the denser tectonic plate at a destructive margin leads to the bending of that plate at the point of collision.	**1** **AO1=1**

Question	Part	Marking guidance	Total marks
01	2	**'Following the 2018 wildfires in California, local officials voted on forest management laws. Residents then protested about being automatically enrolled onto emergency wildfire notification systems.'** **The statement above outlines which impact of the hazard?** Key – D: Secondary political	**1** **AO1=1**

Question	Part	Marking guidance	Total marks
01	3	**Which of the following is an example of preparedness to reduce the impact of a tropical storm?** Key – A: Computer-based models to identify, track and communicate about the potential of the tropical storm.	**1** **AO1=1**

Question	Part	Marking guidance	Total marks
01	4	**Which of the following would be most likely to result in many casualties from falling debris during an earthquake?** Key – D: A shallow focus earthquake in a densely populated area with many high-rise buildings.	**1** **AO1=1**

Question	Part	Marking guidance	Total marks
01	5	**'Following the volcanic eruption of Mount Semeru, government agencies evacuated areas at risk of mudflows and distributed surgical masks to reduce ash inhalation.'** **The statement above describes which stage of the hazard management cycle for this volcanic eruption?** Key – D: Response	**1** **AO1=1**

Question	Part	Marking guidance	Total marks
02		**Figure 1** shows the impacts of Tropical Cyclone Seroja (2021) in Timor-Leste and part of Indonesia*.* **Analyse the information shown in Figure 1.**	6 AO3=6

Level	Marks	Descriptor
2	4–6	**AO3** – Clear selection and analysis of the evidence that has been provided linked to tropical storm and rainfall to the warnings and impacts.
1	1–3	**AO3** – Some basic selection and analysis of the evidence that has been provided linked to the tropical storm, rainfall, warnings and impacts.
0	0	No creditable content.

Indicative Content

There are a variety of ways of approaching this unseen material. Students must select the relevant information from the map and look at patterns and relationships between the path and rainfall associated with the tropical storm and the warnings issued/impacts. Students should look at the figure and see anomalies and links between the information.

AO3

- The tropical storm remains at 63–93 km/h throughout its path – it does circle the Indonesian island with Rote Ndao (on the 4th April at 65 km/h) which received three weather warnings including strong wind watch.
- The Indonesian islands of Timor and Rote both have a storm surge of <1 m – the storm did make landfall on the 4th April near the town on Kupang – there was a flood advisory in this area.
- Areas with 500% of normal rainfall tend to fall within 150 km of the tropical storms track – some exceptions include Wetar to the north and Flores to the north-west.
- Timor-Leste receives significantly less rain than areas in Indonesia – with the exception of West Sumba.
- The weather warnings do not differ with proximity to the tropical storms track – areas 300 km or more away such as Bima and Manggarai receive the same three warnings as Rote which is less than 20 km from the storm's track.
- The impacts are significantly greater in Indonesia.

Question	Part	Marking guidance	Total marks
03		**Evaluate the success of the human responses to a recent seismic event that you have studied.** **AO1** – Knowledge and understanding of responses to seismic hazards, evidenced by a recent event. **AO2** – Application of knowledge and understanding to evaluate the response to the seismic event.	9 AO1=4 AO2=5

Level	Marks	Descriptor
3	7–9	**AO1** – Demonstrates detailed knowledge and understanding of concepts, processes, interactions and change associated with responses to seismic events. **AO2** – Applies detailed knowledge and understanding to the novel situation, offering detailed analysis and evaluation, drawn appropriately from the context provided. Connections and relationships between different aspects of study are thorough and relevant.
2	4–6	**AO1** – Demonstrates clear knowledge and understanding of concepts, processes, interactions and change associated with responses to seismic events. **AO2** – Applies clear knowledge and understanding to the novel situation, offering clear analysis and evaluation, drawn appropriately from the context provided. Connections and relationships between different aspects of study are evident and relevant.
1	1–3	**AO1** – Demonstrates basic knowledge and understanding of concepts, processes, interactions and change associated with responses to seismic events. **AO2** – Applies limited knowledge and understanding to the novel situation, offering some basic analysis and evaluation, drawn from the context provided. Connections and relationships between different aspects of study are basic and of limited relevance.
0	0	No creditable content.

Indicative Content

There are a variety of ways of approaching this question. The response will depend on the seismic event studied. If a non-seismic event is selected such as a tropical storm then the response will be limited to no higher than a level 2.

Candidates should review the responses to the event and whether the responses mitigated any issues.

AO1

- Nature, forms and potential impacts of hazards.
- Understanding that response is part of the hazard management cycle and the Park model of human response to hazards.
- Hazard perception and its economic and cultural determinants; characteristic human responses.
- Knowledge of the nature of seismicity and forms of seismic hazard.
- Understanding the impacts and responses to seismic hazards/the chosen seismic event:
  - impacts can be primary, secondary or long term
  - primary impacts are a direct result of the seismic activity such as immediate deaths, landslides, ground shaking
  - secondary impacts are direct consequences such as fires from gas pipes being broken, spread of communicable disease in camps, disorder and rioting
  - long-term impacts include economic losses from not being able to rebuild and resume work and trauma for those impacted.
- Knowledge of short and long-term responses to seismic events/the chosen seismic event.
- Understanding that other factors influence impacts and response to the chosen seismic event such as:
  - magnitude of the earthquake
  - locational geography
  - level of development, education, societal norms
  - previous experience and history of seismic events.
- Human response to hazards varies by event and even within an event – hazards disrupt life and this deterioration is explained using the Park model.
- Understanding of the range of responses and factors influencing these eg political instability in Haiti following the assassination of their president had potential to impact the value of aid in responding to the 2021 earthquake.
- Knowledge and understanding of the impacts and human responses to seismic hazards as evidenced by a recent seismic event.

AO2

- Linking preparation and experience of seismic events to the response:
  - structural preparations such as buildings with oil dampers and swaying central columns may be found in places like Japan, whereby the residents are experienced at being prepared and therefore the responses to seismic events are helped by mitigation
  - large-scale preparations such as education on evacuation procedures and earthquake drills are experienced across the country which helped reduce the impacts of the Chiba 2021 and Fukushima 2022 earthquakes.
- Analysis of how different responses influence the impacts of seismic hazards.
- Analysis of how other factors may influence impacts and responses.
- The relative importance of different elements of response to seismic hazards.
- Example of a recent seismic event to evaluate the success of the response:
  - eg Haiti 2021 earthquake response was hindered due to the political conditions in the country at the time and the previous response to the 2011 earthquake. The rebuilding from the 2011 earthquake was patchy, and despite plans to make structures sounder for seismic events (and cyclones) funding, expertise and leadership meant that some areas were not structurally sound – this was

compounded by the COVID-19 pandemic. The assassination of their President meant the response was uncoordinated and still resulted in over 2000 casualties. The earthquake also occurred during the pandemic

o whilst the Japanese Chiba 2021 and Fukushima 2022 earthquakes had a good response as people were prepared and prior mitigation reduced the need for emergency aid, there were still some weaknesses in the response – elderly people struggled to complete earthquake drills and many homes were prone to flooding from liquefaction.

- Discussion and evidence provided to evaluate whether response to the recent seismic event (or other factors) were successful.

Question	Part	Marking guidance	Total marks
04		**'Multi-hazardous environments present greater risks to the economy than to the environment.'** **Evaluate this statement with reference to a case study of a multi-hazardous environment that you have studied.** **AO1** – Knowledge of nature and the social, economic and environmental risks presented. Knowledge of how human qualities and human responses contribute to its continuing human occupation. **AO2** – Application of knowledge and understanding to evaluate whether the economic risks of multi-hazardous environments are bigger than environmental.	**20** **AO1=10** **AO2=10**

Level	Marks	Descriptor
4	16–20	**AO2** – Detailed evaluative conclusion that is rational and firmly based on knowledge and understanding which is applied to the context of the question. **AO2** – Detailed, coherent and relevant analysis and evaluation in the application of knowledge and understanding throughout. **AO2** – Full evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts. **AO1** – Detailed, highly relevant and appropriate knowledge and understanding of place(s) and environments used throughout. **AO1** – Full and accurate knowledge and understanding of key concepts and processes throughout. **AO1** – Detailed awareness of scale and temporal change which is well integrated where appropriate.
3	11–15	**AO2** – Clear evaluative conclusion that is based on knowledge and understanding which is applied to the context of the question. **AO2** – Generally clear, coherent and relevant analysis and evaluation in the application of knowledge and understanding. **AO2** – Generally clear evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts. **AO1** – Generally clear and relevant knowledge and understanding of place(s) and environments. **AO1** – Generally clear and accurate knowledge and understanding of key concepts and processes. **AO1** – Generally clear awareness of scale and temporal change which is integrated where appropriate.

2	6–10	**AO2** – Some sense of an evaluative conclusion partially based upon knowledge and understanding which is applied to the context of the question.
		AO2 – Some partially relevant analysis and evaluation in the application of knowledge and understanding.
		AO2 – Some evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts.
		AO1 – Some relevant knowledge and understanding of place(s) and environments which is partially relevant.
		AO1 – Some knowledge and understanding of key concepts, processes and interactions and change.
		AO1 – Some awareness of scale and temporal change which is sometimes integrated where appropriate. There may be a few inaccuracies.
1	1–5	**AO2** – Very limited and/or unsupported evaluative conclusion that is loosely based upon knowledge and understanding which is applied to the context of the question.
		AO2 – Very limited analysis and evaluation in the application of knowledge and understanding. This lacks clarity and coherence.
		AO2 – Very limited and rarely logical evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts.
		AO1 – Very limited relevant knowledge and understanding of place(s) and environments.
		AO1 – Isolated knowledge and understanding of key concepts and processes.
		AO1 – Very limited awareness of scale and temporal change which is rarely integrated where appropriate. There may be a number of inaccuracies.
0	0	No creditable content.

Indicative Content

Content will depend on the multi-hazardous environment chosen and the associated hazards.

Candidates should look at the value of the impacts the hazards play on the economy and environment and make a judgement.

If a student does not refer to an example of a multi-hazardous environment the response will be limited to no higher than a level 2.

AO1

- Nature, forms and potential impacts of natural hazards: seismic, volcanic, storm hazards and wildfires.
- Hazard perception and its determinants may shape the response to and therefore impacts of different hazards eg communities in Japan operate risk sharing and adjustment, therefore the economic and environmental impacts of the hazard may be minimised.
- Impacts of natural hazards can be primary, secondary, economic, environmental, political and social – there may be some overlap and connection between these categories.
- Short and long-term responses, including mitigation and preparation influence hazard impact. Risk management is designed to reduce the impacts of the different hazards experienced.
- Preparedness, adaptation and mitigation are common responses to hazards.
- There is no one set response to a natural hazard and these are determined by governments and individuals.
- Other factors such as the level of development of an area will influence how well hazards can be prepared for and managed (eg may lack wealth and technology).
- Multi-hazardous environments contain two or more different hazards from different hazard groups such as hydrological, geophysical and atmospheric. Different hazards interact with each other and may exacerbate impacts – such as significant periods of tropical storms and associated wet weather making slopes of volcanic and seismic regions more prone to landslides, avalanches and liquefaction.
- Some comparison of different impacts:
  o eg the Californian coast has experienced recent wildfires and is prone to earthquakes. The earthquakes are relatively common – but often low intensity swarms. These have potential to create large economic impacts on built-up areas, whereas wildfires had significant economic cost to home-owners and environmental impacts of forest and habitat loss.
- Place knowledge of the multi-hazard environment and the relative impacts of hazards experienced there.
- Knowledge of economic and environmental risks – including risks to the built environment.

AO2

- Analysis and explanation of the interactions between nature and underlying causes of hazards within a multi-hazardous environment and the impacts.
- Analysis and explanation of the interactions between hazard experience, perception and response within a multi-hazardous environment and the impacts.
- Analysis of different hazards within the multi-hazardous environment and their impacts on the environment and economy – evaluation of these and judgement of which is greater.
- Evaluation of how hazards experienced within a multi-hazardous environment impact the human qualities and responses.
- Evaluation of how human qualities and responses to hazards within a multi-hazardous environment contribute to its continued human occupation.
- Relative comparison between economic impacts and environmental impacts.
- Relative contrasts between the economic and environmental impacts in terms of cost, recovery, scale and the influence on society.

- Analysis of whether economic costs of hazards experienced in a multi-hazardous environment are greater than the environmental impacts:
  - the Californian coast has experienced wildfires between 2018 and 2022. These wildfires have had economic costs to many wealthy individuals including celebrities Caitlyn Jenner and actor Orlando Bloom. The Paradise Wildfires of 2018 impacted 27 000 homes of middle to low-income people – many of whom lived in trailers on the Sierra Hills. The economic losses were significant. Whilst the celebrities were able to publicise on social media their homes were repaired and well insured. Those in trailers worth significantly less felt the economic impact on them more so
  - the wildfire destroyed 153 336 acres of forest and many areas reliant on forestry and agriculture. Whilst this had an impact on the economy the environment was stunted and will not recover within a human lifetime – the economy was, for the best part, able to bounce back. Trees do not quickly grow back and cannot even grow because of soil destruction and erosion caused by fire. Suddenly, invasive and animal-unfriendly weeds and unmanageable grasses spout up and begin to outnumber native brush and plants, hurrying further erosion and even leading to more fires
  - fauna including wolves, mountain lions, rodents, rabbits, small birds and other indigenous animals which relied on California's native vegetation experienced trouble finding enough food to live
  - whilst California is prone to earthquakes, these are often low intensity swarms. These have potential to create large economic impacts on built-up areas, but perhaps less impact on natural environments due to the nature of the coastline – major cities are found on fault lines.

Section B – Coastal Systems and Landscapes   **Total for this section: 40 marks**

Question	Part	Marking guidance	Total marks
05	1	**Which of the following explains the formation of a marine platform?** Key – A: As land rises, gently sloping areas in front of cliffs become exposed above the sea level. These areas were once wave-cut platforms that may be hidden beneath beach deposits.	1 AO1=1

Question	Part	Marking guidance	Total marks
05	2	**Which of the following are all features of low energy coastlines?** Key – A: They are sheltered, have deposition rates that exceed erosion rates **and** generally constructive waves.	1 AO1=1

Question	Part	Marking guidance	Total marks
05	3	**'A long narrow landform, with a number of recurved tips caused by a change in the dominant transport processes over time.'** **The above statement is a description of which coastal landform?** Key – B: Compound spit	1 AO1=1

Question	Part	Marking guidance	Total marks
05	4	**Which of the following defines the concept of shoreline management in coastal environments?** Key – A: A plan written to underpin the decisions and actions for a particular sediment cell. Decisions may include advancing the line or managing retreat.	1 AO1=1

Question	Part	Marking guidance	Total marks
05	5	**Which of the following describes the process of attrition?** Key – D: The gradual wearing away of rock particles by other sediments. Particles hit other particles, making stones smaller and smoother.	1 AO1=1

Question	Part	Marking guidance	Total marks
06		**Figure 2** shows the composition of beach material and average rates of change for selected barrier islands along the east coast of Virginia, USA. **Analyse the information shown in Figure 2.**	6 AO3=6

Level	Marks	Descriptor
2	4–6	**AO3** – Clear selection of evidence from the map provided and appropriate comparison between areas and composition of beach material. Making appropriate use of specific data to support the analysis.
1	1–3	**AO3** – Some basic selection of evidence from the map images provided. Isolated or basic ideas.
0	0	No creditable content.

Indicative Content

There is a variety of ways of approaching this unseen material. Students should analyse the composition of beach material sizes along the barrier islands and its relationship with the rate of erosion. Patterns and distribution in beach material should be analysed in relation to erosion rates.

AO3

- Fine sand is the dominant beach material in all of the barrier islands accounting for between 40–76% approximately – least in the north at Fishing point and greatest in the south on Parramore Island.
- The further south, the greater the percentage of fine sand, however Wallops Island is potentially an anomaly and despite being the 2nd most northerly point it has the 2nd highest percentage of fine sand, approximately 70% of beach material.
- Rates of erosion are greater in the south – the highest being Parramore Island, with higher percentages of fine sand. Deposition occurs in the north and contains higher proportions of coarse and very coarse sand at Fishing Point (12 and 3% approximately) – this is dissimilar to Wallops Island, despite both experiencing deposition.
- The further south the least variation in beach material – Parramore Island in the south has 75% fine sand and 20% medium sand – the amount of very coarse sand is less than 1% approximately.
- Areas further north such as Fishing Point and Assawoman Island have more variation and are less dominated by one type of beach material.
- Limited amounts of coarse and very coarse sand occur on all of the islands, and account for no more than 4% of any barrier island – the highest percentage occurring at Fishing Point in the north and both Parramore Island and Wallops Island having less than 1% coarse sand.
- Metompkin Island and Cedar Island have very similar beach material composition and neighbour each other – both contain approximately 45–50% fine sand and 40% medium sand – both places contain all 5 categories of beach material but have limited amounts of material at the finest and coarsest ends of the spectrum.

Question	Part	Marking guidance	Total marks
07		**Assess the importance of weathering and erosion in the formation of wave-cut platforms.** **AO1** – Knowledge and understanding of coastal landscape development. Knowledge and understanding of geomorphological and distinctively coastal processes. **AO2** – Application of knowledge and understanding of how geomorphological and coastal processes shape landforms. Students may apply their ideas to different landforms.	9 **AO1=4** **AO2=5**

Level	Marks	Descriptor
3	7–9	**AO1** – Demonstrates detailed knowledge and understanding of weathering processes. Detailed ideas on the links between processes and landforms. **AO2** – Applies detailed knowledge and understanding to the novel situation, offering detailed analysis and evaluation, drawn appropriately from the context provided. Connections and relationships between different aspects of study are thorough and relevant.
2	4–6	**AO1** – Demonstrates clear knowledge and understanding of weathering processes. Clear ideas on the links between processes and landforms. **AO2** – Applies clear knowledge and understanding to the novel situation, offering clear analysis and evaluation, drawn appropriately from the context provided. Connections and relationships between different aspects of study are evident and relevant.
1	1–3	**AO1** – Demonstrates basic knowledge and understanding of weathering flooding processes. Basic ideas on the links between processes and landforms. **AO2** – Applies limited knowledge and understanding to the novel situation, offering some basic analysis and evaluation, drawn from the context provided. Connections and relationships between different aspects of study are basic and of limited relevance.
0	0	No creditable content.

Indicative Content

This question requires an understanding of the geomorphological and coastal processes and understanding of the origin and development of landforms and landscapes of coastal erosion. The role of weathering should be assessed against the formation of wave-cut platforms.

AO1

- Landforms are different elements of coastal landscapes.
- Coastal landforms can be grouped into two major types: erosional and depositional.
- Coastal landscapes and landforms are created by coastal systems which interact.
- Coastal systems are influenced by:
  o inputs such as precipitation and wind
  o outputs such as ocean currents
  o geology of the landscape within the sediment cell
  o other interacting natural systems – previous glaciations, river systems, tectonic processes
  o wave energy, tides and currents – constructive and destructive waves
  o the relief and geology of the landscape.
- Weathering is the breakdown of rock 'in situ' or close to the surface. Weathering is important in shaping coastal landscapes.
- Coastal erosion is the breakdown and removal of particles by the sea. Erosion is important in shaping coastal landscapes. The waves and the wind forming the waves influence the rate of erosion.
- Landscapes are formed by a combination of processes.
- The amount and type of weathering is influenced by the weather conditions of the coast and the geology:
  o mechanical weathering is the repeated action that breaks down rock without chemical changes
  o biological weathering breaks down rocks using organic activity
  o chemical weathering involves a chemical reaction to dissolve or break down rocks.
- Knowledge of different processes:
  o weathering
  o mass movement
  o erosion
  o transportation
  o deposition.
- Wave-cut platforms are resultant from erosional coastal action – weather provides substrate and weakens cliff surfaces.
- Knowledge of the formation of wave-cut platforms (including stages of wave-cut notch, overhang, undercutting).
- Erosion from the waves causes processes such as hydraulic action to erode along lines of weakness in geology. This forms undercutting, necessary for the initial stages of a wave-cut platform.
- Knowledge and understanding of the interaction of processes within coastal systems.
- Understanding of the relationship between process, time, landforms and landscapes.

AO2

- A clear explanation of the influence that weathering and erosion have on wave-cut platforms:
  o eg wave-cut platforms are flat or sloping areas of coastline, only exposed at low tide. Whilst predominantly formed by erosion, weathering alongside wave action allows the wave cut notch to be eroded. The cliff face geology is susceptible to chemical weathering such as solution and exposed to mechanical weathering such as wetting and drying. The rocks expand and contract and become weaker with a continuation of this process, which leaves loosened substrate susceptible to wave action and coastal erosion.
- A clear explanation of the links between wave-cut platforms and the processes creating the landscape.

- Critical evaluation of whether weathering and/or erosion are responsible for the formation of wave-cut platforms in large or in part.
- Explanation of the link between weathering, erosion and the landforms within coastal environments.
- Critical evaluation of the importance of weathering and erosion:
  - eg some landforms such as arches and stacks are dominated by the influence of weathering, whereas others like wave-cut platforms are more influenced by marine erosion.
- Other factors could be discussed (such as wind, geology, climate, transportation) and their role in the formation of the chosen landform.
- An evaluation of whether weathering is important in forming wave-cut platforms. There may be some examples used to justify this.

Question	Part	Marking guidance	Total marks
08		**'Sea level change makes attempts to mitigate against coastal erosion more difficult.'** **Assess the extent to which you agree with this statement.** **Use <u>at least one</u> case study of a coastal landscape you have studied to support your answer.** AO1 – Knowledge and understanding the human intervention in coastal landscapes. Knowledge and understanding of climatic and sea level changes' potential impact on coasts. Knowledge and understanding of how coastal landscapes present risks for human occupation and human responses such as mitigation. AO2 – Application of knowledge and understanding to analyse the attempts to mitigate against coastal erosion and coastal flood risk. Application of knowledge and understanding to assess the influence of coastal intervention against erosion and relative to sea level change influenced by climatic change.	**20** **AO1=10** **AO2=10**

Level	Marks	Descriptor
4	16–20	AO2 – Detailed evaluative conclusion that is rational and firmly based on knowledge and understanding which is applied to the context of the question. AO2 – Detailed, coherent and relevant analysis and evaluation in the application of knowledge and understanding throughout. AO2 – Full evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts. AO1 – Detailed, highly relevant and appropriate knowledge and understanding of place(s) and environments used throughout. AO1 – Full and accurate knowledge and understanding of key concepts and processes throughout. AO1 – Detailed awareness of scale and temporal change which is well integrated where appropriate.
3	11–15	AO2 – Clear evaluative conclusion that is based on knowledge and understanding which is applied to the context of the question. AO2 – Generally clear, coherent and relevant analysis and evaluation in the application of knowledge and understanding. AO2 – Generally clear evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts. AO1 – Generally clear and relevant knowledge and understanding of place(s) and environments.

		AO1 – Generally clear and accurate knowledge and understanding of key concepts and processes. **AO1** – Generally clear awareness of scale and temporal change which is integrated where appropriate.
2	**6–10**	**AO2** – Some sense of an evaluative conclusion partially based upon knowledge and understanding which is applied to the context of the question. **AO2** – Some partially-relevant analysis and evaluation in the application of knowledge and understanding. **AO2** – Some evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts. **AO1** – Some relevant knowledge and understanding of place(s) and environments which is partially relevant. **AO1** – Some knowledge and understanding of key concepts, processes and interactions and change. **AO1** – Some awareness of scale and temporal change which is sometimes integrated where appropriate. There may be a few inaccuracies.
1	**1–5**	**AO2** – Very limited and/or unsupported evaluative conclusion that is loosely based upon knowledge and understanding which is applied to the context of the question. **AO2** – Very limited analysis and evaluation in the application of knowledge and understanding. This lacks clarity and coherence. **AO2** – Very limited and rarely logical evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts. **AO1** – Very limited relevant knowledge and understanding of place(s) and environments. **AO1** – Isolated knowledge and understanding of key concepts and processes. **AO1** – Very limited awareness of scale and temporal change which is rarely integrated where appropriate. There may be a number of inaccuracies.
0	**0**	No creditable content.

<u>Indicative Content</u>

This question requires candidates to review the impact of human intervention in coastal landscapes. They should consider their relative merit against erosion and evaluate whether this would alter with climatic change which has potential to impact on coasts. Candidates should review these using examples to justify their response.

AO1

- Knowledge of recent and predicted climatic change and potential impact on coasts.
- Knowledge of sea level change and major changes within the last 10 000 years.
- Knowledge and understanding of human interventions in coastal landscapes including:
  - traditional approaches to coastal flood and erosion risk
  - hard and soft engineering
  - sustainable approaches to coastal flood risk and coastal erosion management
  - shoreline and integrated coastal zone management.
- Current sea level rise is the result of melting freshwater ice and thermal expansion of water. Low lying coastal areas such as the Maldives and Kiribati are threatened with inundation.
- Coastal areas are under economic pressures.
- Populations of coastal areas are at risk of flooding and coastal erosion. Human intervention is used to reduce these risks and allow continued human occupation.
- Human intervention against coastal erosion and flood risk can present opportunities and challenges and will be influenced by climatic change:
  - India's Odisha coast has experienced increased rates of coastal erosion in the last decade. The community is susceptible to storm surges and coastal erosion. Increased human intervention in densely populated areas has a measured impact on rates of erosion of unprotected mangrove forests.
  - existing rock armour and sea walls in Puerto Rico have generally worked to reduce erosion and flood risk. Increased sea levels have meant that in the last five years the island has experienced unseen flooding and significant risks to tourist areas, putting strain and pressures on marginal land. The US government have created a shoreline management plan to review the height of the sea walls against rising sea levels.
- Knowledge of use and impacts of human intervention.
- Knowledge and understanding of the interaction of processes threatening areas subject to climatic change and sea level rise eg climatic warming increases sea levels; this reduces the impacts of some defences in coastal regions such as the height of a sea wall or the impact of strategies like mangrove restoration.

AO2

- A clear explanation of the influence that coastal erosion and flood risk have on the example coastal environments:
  - eg the Karnataka coastline in India experiences significant levels of coastal erosion. Rock armour and sea walls are used as a barrier between the vulnerable cliffs and the sea. The population are able to live in these regions due to the management.
- A clear explanation of the links between the coastal erosion, climatic change, sea level rise and responses of human intervention.
- Human interventions should be clearly linked to coastal erosion and flood risk and underlying issues creating the problems within the case study:
  - eg the Karnataka coastline is exposed to significant coastal erosion influenced and exacerbated by the climatic conditions during the monsoon season. Since 2010 the authorities increased spending on sea walls and rock armour to reduce flood and erosion risk, as well as reef protection. The coastline now has over 15% of the coast protected. 22% of the coastline continues to erode and Ullal has an erosion rate of up to 1.3 metres annually. This is increased by the nature of the

population and the natural processes. Cities such as Mangalore are suggested to be submerged with potential sea level rise despite human interventions.
- An evaluation of the attempts to mitigate against coastal erosion and flood risk and whether the climatic change and resultant sea level change will hinder their success in protecting these areas.
- A conclusion of the influence of sea level change in reducing the successfulness of the human interventions to reduce coastal flood and erosion risk.

Assessment Objective grid

	AO1	AO2	AO3	Total
Section A				
01.1	1			1
01.2	1			1
01.3	1			1
01.4	1			1
01.5	1			1
02			6	6
03	4	5		9
04	10	10		20
Section B				
05.1	1			1
05.2	1			1
05.3	1			1
05.4	1			1
05.5	1			1
06			6	6
07	4	5		9
08	10	10		20
Unit total	38	30	12	80