



Markscheme

May 2019

Geography

Higher level and standard level

Paper 1

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Paper 1 markbands

These markbands are to be used for paper 1 at both standard level and higher level.

Marks	Level descriptor		
	AO1: Knowledge and understanding of specified content AO2: Application and analysis of knowledge and understanding	AO3: Synthesis and evaluation	AO4: Selection, use and application of a variety of appropriate skills and techniques
0	The work does not reach a standard described by the descriptors below.		
1–2	The response is too brief, lists unconnected information, is not focused on the question and lacks structure.		
	<ul style="list-style-type: none"> • The response is very brief or descriptive, listing a series of unconnected comments or largely irrelevant information. The knowledge and understanding presented is very general with large gaps or errors in interpretation. Examples or case studies are not included or only listed. • There is no evidence of analysis. • Terminology is missing, not defined, irrelevant or used incorrectly. 	<ul style="list-style-type: none"> • No evidence of evaluation or conclusion is expected at this level. 	<ul style="list-style-type: none"> • Information presented is not grouped logically (in paragraphs or sections). • Maps, graphs or diagrams are not included, are irrelevant or difficult to decipher (only if appropriate to the question).
3–4	The response is too general, lacks detail, is not focused on the question and is largely unstructured.		
	<ul style="list-style-type: none"> • The response is very general. The knowledge and understanding presented outlines examples, statistics, and facts that are both relevant and irrelevant. Links to the question are listed. • The argument or analysis presented is not relevant to the question. • Basic terminology is defined and used but with errors in understanding or used inconsistently. 	<ul style="list-style-type: none"> • If appropriate to the question, the conclusion is irrelevant. • There is no evidence of critical evaluation of evidence (examples, statistics and case studies). 	<ul style="list-style-type: none"> • Most of the information is not grouped logically (in paragraphs or sections). • Maps, graphs or diagrams included lack detail, are incorrectly or only partially interpreted without explicit connections to the question (only if appropriate to the question).

Marks	Level descriptor		
	AO1: Knowledge and understanding of specified content AO2: Application and analysis of knowledge and understanding	AO3: Synthesis and evaluation	AO4: Selection, use and application of a variety of appropriate skills and techniques
5–6	The response partially addresses the question, but with a narrow argument, an unsubstantiated conclusion, and limited evaluation.		
	<ul style="list-style-type: none"> • The response describes relevant supporting evidence (information, examples, case studies et cetera), outlining appropriate link(s) to the question. • The argument or analysis partially addresses the question or elaborates one point repeatedly. • Relevant terminology is defined and used with only minor errors in understanding or is used inconsistently. 	<ul style="list-style-type: none"> • If appropriate to the question, the conclusions are general, not aligned with the evidence presented and/or based on an incorrect interpretation of the evidence. • Other perspectives on evidence (examples, statistics and case studies) and/or strengths and weaknesses of evidence are listed. 	<ul style="list-style-type: none"> • Logically related information is grouped together (in sections or paragraphs) but not consistently. • Maps, graphs or diagrams included do not follow conventions, and include relevant and irrelevant interpretations in the text (only if appropriate to the question).

7–8	The response addresses the whole question, the analysis is evaluated and the conclusion is relevant but lacks balance.		
	<ul style="list-style-type: none"> • The response describes relevant supporting evidence correctly (information, examples and case studies) that covers all the main points of the question, describing appropriate links to the question. • The argument or analysis is clear and relevant to the question but one-sided or unbalanced. • Complex terminology is defined and used correctly but not consistently. 	<ul style="list-style-type: none"> • If appropriate to the question, the conclusion is relevant to the question, aligned with the evidence but unbalanced. • Other perspectives on evidence (examples, statistics and case studies) and/or strengths and weaknesses of evidence are described. 	<ul style="list-style-type: none"> • Logically related information is grouped together (in sections) consistently. • Maps, graphs or diagrams included contribute to/support the argument or analysis (only if appropriate to the question).
9–10	The response is in-depth and question-specific (topic and command term); analysis and conclusion are justified through well-developed evaluation of evidence and perspectives.		
	<ul style="list-style-type: none"> • The response explains correct and relevant examples, statistics and details that are integrated in the response, explaining the appropriate link to the question. • The argument or analysis is balanced, presenting evidence that is discussed, explaining complexity, exceptions and comparisons. • Complex and relevant terminology is used correctly throughout the response. 	<ul style="list-style-type: none"> • If appropriate to the question, the conclusion is relevant to the question, balanced and aligned with the evidence. • Evaluation includes a systematic and detailed presentation of ideas, cause and effect relations, other perspectives; strengths and weaknesses of evidence are discussed; (if appropriate) includes justification of the argument and conclusion. 	<ul style="list-style-type: none"> • Response is logically structured with discussion (and if appropriate to the question, a conclusion) focusing on the argument or points made, making it easy to follow. • Maps, graphs or diagrams are annotated following conventions and their relevance is explained and support the argument or analysis (only if appropriate to the question).

Option A — Freshwater

1. (a) Estimate the highest discharge of the river during the 1950s. [1]

Award [1] for 6.3 (m³/s) (allow 6.2–6.4).

- (b) State the number of times that river discharge reached 4 m³/s (cubic metres per second) during the 1990s. [1]

Award [1] for 8 times.

- (c) Outline **two** possible land use changes that could account for the increase in river discharge over time shown in the diagram. [2+2]

In each case, award [1] for a valid land use change (eg, urbanization, deforestation) that might explain increased river discharge, and [1] for how this could account for the increase shown. For example:

- A change from rural to urban land use / urbanization [1] would result in an increase in impermeable surfaces and reduced infiltration, resulting in increased overland flow and thus river discharge [1].
- Change in vegetation cover by deforestation [1] would reduce interception and so increase surface run-off [1].

- (d) Explain how **different** channel modifications in a small drainage basin such as this can:

- (i) increase flood risk; [2]
- Award [1] for a valid modification and [1] for further development of how this might increase flood risk.*

For example: Straightening the river channel [1] allows faster removal of an increased amount of water away from the area, increasing flood risk downstream [1]

- (ii) assist with flood mitigation. [2]
- Award [1] for a valid modification and [1] for further development of how this might decrease flood risk.*

For example: Constructing man-made levees [1] increases channel capacity, allowing greater discharge without flooding [1].

As the question asks for "different modifications", do not accept the same modification twice.

Do not accept afforestation, changing agricultural practices or other land use changes.

2. (a) Examine the costs and benefits, for different stakeholders, of one recent integrated drainage basin management (IDBM) plan. [10]

Marks should be allocated according to the markbands.

Increasing demands on water, and reduction in quality, necessitate management of resources in a drainage basin. Integrated drainage basin management (IDBM) coordinates conservation, management and development of water, land and related resources for a river basin. Different stakeholders will receive different economic and social benefits from water resources without depletion.

Candidates may not focus on an actual IDBM plan, but use examples such as the Mississippi basin, Mekong river basin and Great Artesian Basin with reference to management. These examples should be accepted.

Possible **applied themes** (AO2) **demonstrating knowledge and understanding** (AO1) include:

- locational knowledge of a named basin
- description of the management strategies employed, recognizing that they are integrated in some way
- costs and benefits may be economic, political, environmental, social
- costs and benefits vary for different stakeholders
- costs and benefits may be both short and long term
- the importance of sustainability principles.

Good answers may be **well-structured** (AO4) and may additionally offer a **critical evaluation** (AO3) of the statement in a way that explicitly examines the balance of costs and benefits, and may show understanding that perspectives (eg, political, economic, social and environmental) differ on where the balance lies. Another approach might be to examine which stakeholders gain greater benefits, perhaps in relation to varying power over the decision-making process. Another approach might be to examine changing costs and benefits over different time scales.

For 5–6 marks, expect some outlining of a recent IDBM plan, and some of its costs and/or benefits. The response is partial, narrow or lacks supporting evidence.

For 7–8 marks, expect a well-structured account, which includes:

- either a well-evidenced explanation of a range of IDBM stakeholder costs and benefits (do not expect balance)
- or an ongoing evaluation (or discursive conclusion) grounded in geographical concepts and/or perspectives.

For 9–10 marks, expect both of these traits.

2. (b) Examine the relative importance of erosion and deposition in the formation of floodplains **and** meanders.

[10]

Marks should be allocated according to the markbands.

The focus of the response should be on both erosional and depositional processes and their role in the formation of these landforms. Floodplains and meanders involve both erosion and deposition. Over time the relative importance of these processes varies according to discharge, base level and other factors.

Possible **applied** themes (AO2) **demonstrating knowledge and understanding** (AO1):

- Floodplains are the result of deposition at times of high discharge when the flow exceeds bankfull discharge. This is dependent on erosion upstream and transportation downstream of bedload and suspended load.
- Rivers meander across floodplains eroding the valley sides over time. With changing conditions, rivers may erode into floodplains, creating river terraces.
- Both erosion and deposition are essential in different parts of the meander curve with erosion on the outside of the bend and deposition on the inside.
- Meanders are formed as a complex interplay of erosion and deposition as the river seeks to flow efficiently and minimize energy loss.

Good answers may be **well structured** (AO4) and may additionally offer a **critical evaluation** (AO3) which examines the statement in a way that shows understanding that the relative importance between erosion and deposition varies over different time scales (seasonal or short / long term). Another approach might be to examine spatial variations in the operation of erosion and deposition processes for each landform (eg, slip-off slope and river cliff) and the way these processes interact to create landforms. Another approach might be to examine interactions between the creation of floodplains and meanders.

For 5–6 marks, expect some outlining of the formation of floodplains and/or meanders. The response is partial, narrow or lacks supporting evidence.

For 7–8 marks, expect a well-structured account which includes:

- either a well-evidenced explanation of the formation of floodplains and meanders by erosion and deposition
- or an ongoing evaluation (or discursive conclusion) grounded in geographical concepts and/or perspectives.

For 9–10 marks, expect both of these traits.

Option B – Oceans and coastal margins

3. (a) Identify the least controlled activity in the coastal margin shown on the map. [1]

Diving

- (b) Estimate the distance, in kilometres, between the Preservation Zone and Cardwell. [1]

40 (km) (allow 36–44 inclusive)

- (c) Outline **one** possible physical reason **and one** possible human reason for the location of the Preservation Zone. [2+2]

In each case, award [1] for identifying a reason and [1] for further development.

For example:

Physical

There is unusually high biodiversity here [1] and this allows researchers to study many different species of coral, fish and other organisms [1].

Human

It is inside the marine national park zone [1] which protects it from disturbance and pollution in the general use zone [1].

Other possible reasons may include:

- highly damaged area which researchers are investigating
- long distance from shoreline disturbances eg, tourists.

- (d) Explain **two** sovereignty rights that the nation in the map possesses over the area of water shown. [2+2]

In each case, award [1] for a valid right and [1] for further development.

Valid rights include fishing, mining, oil/gas. (The resource must be specified or implied.)

For example: It has fishing rights [1] (all of which is within 200 nautical miles) and is within the EEZ [1].

4. (a) Examine why some hurricanes could have a greater impact than others on coastal margin landscapes.

[10]

Marks should be allocated according to the markbands.

Hurricanes are tropical cyclones in the NE Pacific and N Atlantic with sustained strong winds. High winds, heavy rainfall and a storm surge associated with low atmospheric pressure and wind direction combine to produce physical impacts on the coastline. Characteristics of the storm, such as strength and direction of wind, amount of rainfall, height of storm surge and speed of movement, will interreact with characteristics of the coastal landscape, such as relief, vegetation, surface cover and constructions, to produce differing impacts.

Candidates will have studied the impact of one hurricane in detail but should additionally have a broader understanding of the formation, distribution and physical impacts of hurricanes on coastal margins, including storm surges. They should also have studied the impact of waves on a variety of coastal landforms.

Possible **applied themes** (AO2) **demonstrating knowledge and understanding** (AO1):

- Hurricanes have varied characteristics relating to wind speed, speed of movement, amount of precipitation, height of storm surge.
- Heavy rain leads to flooding of low-lying rural and urban areas.
- Plantation crops can be destroyed.
- Strong winds damage coastal property and infrastructure.
- Storm surge floods coastal areas with salt water.
- Increased wave action can change beach profile, erode beaches, destroy bars and spits and wetlands.
- Impacts can be both short and long term.

Good answers may be **well structured** (AO4) and may additionally offer a **critical evaluation** (AO3) which examines the statement in a way that considers different types of place (context), or the relative impact of different physical processes. Another approach would be to examine the possibility that human preparation and prevention may mitigate the impact of similar storms.

For 5–6 marks, expect some outlining of the impact of one or more named hurricanes, or hurricanes in general, on coastal margin landscapes and/or people. The response is partial, narrow or lacks supporting evidence.

For 7–8 marks, expect a well-structured account that includes:

- either a well-evidenced explanation of the impact of hurricanes (or one named hurricane) on coastal margin landscapes
- or a discursive conclusion (or ongoing evaluation) grounded in geographical concepts and/or perspectives.

For 9–10 marks, expect both of these traits.

4. (b) Examine why conflicting land-use pressures on coastlines can be difficult to resolve. [10]

Marks should be allocated according to the markbands.

Land-use pressures on coastlines include commercial land uses (tourism, industry and housing) and conservation measures. The varying interests of different stakeholders may be difficult to reconcile; environmental and economic aims may not be easy to meet jointly. The power of different stakeholders will influence the outcome and determine the resolution of the conflict.

Possible **applied themes** (AO2) **demonstrating knowledge and understanding** (AO1):

- The variety of land uses in coastal areas, including residential, industrial, tourist-related, agricultural, etc. Do not credit ocean uses, eg fishing or marine management strategies such as the SMMA.
- Details of how they may conflict with each other, or conflict with wider conservation of the coastline.
- Decision making and planning structure will vary from place to place, which can influence outcomes and any resolution.

Good answers may be **well structured** (AO4) and may additionally offer a **critical evaluation** (AO3) which examines the statement in a way that considers different types of place (context), or the relative power of different stakeholders. Another approach might be to examine the possibility of resolution of the conflict or its continuation, or a partial resolution that is considered a good outcome for some of the stakeholders.

For 5–6 marks, expect some outlining of conflicting land-use pressures on one or more coastlines. The response is partial, narrow or lacks supporting evidence.

For 7–8 marks, expect a well-structured account that includes:

- either a well-evidenced explanation of the conflicting land-use pressures and their possible resolution(s)
- or a discursive conclusion (or ongoing evaluation) grounded in geographical concepts and/or perspectives.

For 9–10 marks, expect both of these traits.

Option C – Extreme environments

5. (a) Briefly describe the distribution of thawing permafrost in Greenland. [2]

Award [2] for two valid descriptions, such as latitude, compass directions, or distance. Do not accept longitude.

Possibilities include:

- Thawing permafrost is found along the coastline.
- Thawing permafrost is found in the southern half of the island.
- Thawing is found south of 70 degrees north (accept 70 to 60 degrees north)
- Thawing extends further inland on the west coast.

- (b) Outline **one** possible reason why some permafrost in area A has not thawed. [2]

Award [1] for stating a valid reason why permafrost has not thawed and [1] for further outlining of why this might be the case.

For example:

The climate here is unusually cold and ground remains frozen most of the year [1]. This is most likely because of high altitude [1].

Local soils or geology may be slow to warm in summer and stay frozen [1] perhaps because of their specific heat capacity [1].

- (c) Suggest **three** possible ways in which the melting of permafrost could affect local populations in areas such as those shown on the map. [2+2+2]

In each case, award [1] for a valid effect on local populations and [1] for further development/exemplification.

For example: Land subsidence [1] may cause buildings and/or infrastructure to collapse [1].

Other ways may include:

- Potentially easier drilling/mining of gas and oil [1] resulting in increased economic prosperity for some local populations in North America [1].
- Possible extension of farming further north [1] increasing food security for local populations [1].
- Habitat changes, animals migrate [1], affecting local populations who rely on animals as a source of food [1].

Accept any other reasonable impacts.

6. (a) Examine the importance of water in the development of hot, arid landscape features. [10]

Marks should be allocated according to the markbands.

Both wind and water are involved in the development of hot, arid landscapes. Their relative importance has been a subject of debate and water has often not been recognized sufficiently. Water is essential for most weathering processes that occur, and infrequent but intense rainfall events have an important erosive effect with subsequent transportation and deposition. Past climatic conditions are also an important consideration, as many landforms, such as wadis, might be explained in relation to periods of higher rainfall.

Possible **applied themes** (AO2) **demonstrating knowledge and understanding** (AO1):

- The role of water in both physical and chemical weathering and in erosion, transportation and deposition.
- The formation of landscape features, such as wadis, rock pedestals, mesas and buttes.
- Understanding that precipitation, although infrequent, is often intense and may have a significant impact on landforms.
- Understanding that the nature of the ground surface and lack of vegetation is conducive to erosion by water.
- Understanding of the importance of other processes of wind erosion, transportation and deposition.

Good answers may be **well structured** (AO4) and may additionally offer a **critical evaluation** (AO3) of the statement in a way that explicitly examines the relative importance of water and wind processes responsible for landscape development, perhaps in different or contrasting places. Another approach might be to examine the relative importance of different processes over varying time scales, such as past climates.

For 5–6 marks, expect some outlining of one or more landscape features whose development is linked with water. The response is partial, narrow or lacks supporting evidence.

For 7–8 marks, expect a logically structured account, which includes:

- either a well-evidenced explanation of why water is important for the development of two or more landscape features
- or an ongoing evaluation (or discursive conclusion) grounded in geographical concepts and/or perspectives.

For 9–10 marks, expect both of these traits.

6. (b) Examine the extent to which new technologies might contribute to sustainable development in **one or more** kinds of extreme environment.

[10]

Marks should be allocated according to the markbands.

Sustainable development has social, economic and environmental dimensions.

New technologies, including the use of solar power and desalinization, may aid the development of extreme environments. Technology can be used to mitigate the aspects of extreme environments that make development difficult. New and future technologies open the possibility of further development of these regions. However, some technologies demand large inputs of energy and resources and cannot be considered sustainable.

Possible **applied** themes (AO2) **demonstrating knowledge and understanding** (AO1):

- New technologies include the use of new building and construction materials, developments in IT and communications, the development of solar power and other alternative energy sources, desalinization, hydroponics, climate controlled greenhouses, recycling and waste management.
- These technologies can be used to overcome some of the challenges of extreme environments, such as extremes of climate, access to fresh water, limits to agriculture, inaccessibility and remoteness.
- These technologies may offer social, economic and/or environmental benefits and therefore be deemed sustainable (or not).

Good answers may be **well structured** (AO4) and may additionally offer a **critical evaluation** (AO3) which examines the limits of different technologies in relation to different possible scenarios, eg extreme climate change. Another approach might be to examine contrasting places and their varying prospects for sustainable development (economy, society, environment), perhaps at different scales or in varying geographic (arid versus cold) or economic (high income versus low income) contexts.

For 5–6 marks, expect some outlining of one or more new technologies in extreme environment(s). The response is partial, narrow or lacks supporting evidence.

For 7–8 marks, expect a well-structured account which includes:

- either a well-evidenced explanation of use of new technologies potentially contributing to sustainable development
- or an ongoing evaluation (or discursive conclusion) grounded in geographical concepts and/or perspectives.

For 9–10 marks, expect both of these traits.

Option D – Geophysical hazards

7. (a) Briefly outline **two** long-term impacts of infrastructure damage that could be included in Box A. [1+1]

*Award [1] for each valid **long-term** impact on society (defined as persisting beyond the initial event, eg power supply disruptions lasting for weeks, or loss of schools harming education for many years).*

Possibilities include:

- lack of schools/education for community children
- widespread mortality from long-term lack of hospitals / disease
- persistence of polluted water supplies
- homelessness due to destroyed buildings.

Award [1] for two impacts whose long term or community aspect cannot be inferred. For example “roads closed” and “no electricity” would together be worth [1] only.

- (b) Outline how **one** characteristic of a community’s population structure can affect its vulnerability to earthquakes. [2]

Award [1] for a valid characteristic and [1] for outlining the effect on vulnerability.

For example: An elderly population structure [1] could mean larger numbers of people would be likely to suffer serious injuries due to their limited mobility [1].

Other possibilities include:

- Large proportion of children – could heighten vulnerability if a school is destroyed.
- High dependency ratio means that the population has disproportionately large number of young and elderly who would be less able to respond appropriately.

- (c) Explain **three** strategies that could increase the personal resilience of community members to an earthquake event such as the one shown in the diagram. [2+ 2 +2]

Resilience describes the ability to recover/resume normal operations following a hazard event. This can be achieved in various ways, before, during and immediately after the event.

In each case, award [1] for a strategy and [1] for the explanation of how resilience is increased.

For example: Some individuals have fitted their houses with automatic shutdown switches [1], which reduces their vulnerability/increases their resilience to the secondary hazard of fires [1].

Personal resilience is achieved through:

- increased preparedness (for example personal emergency kits, adaptations to homes)
- use of insurance
- adoption of new technologies (for example smartphone apps related to advance warning)
- education in use of bamboo to strengthen building design.

8. (a) Examine how physical processes affect the level of volcanic hazard risk in different places.

[10]

Marks should be allocated according to the markbands.

Hazard risk is a function of the interaction between human and physical factors. Physical processes include both the primary hazards resulting from the characteristics of volcanic activity and the associated secondary hazards. The risk from volcanic activity varies between different places (which may be rural or urban, or at different scales, or with varying levels of wealth). Hotspots are relatively localized, and the risk will be over a small area, while activity on a plate margin presents risk over a much wider area.

Possible **applied themes** (AO2) **demonstrating knowledge and understanding** (AO1):

- The characteristics of volcanoes, including:
 - magnitude and frequency of eruption / active or dormant volcanoes
 - the type of eruption, eg destructive plate margins are associated with violent, explosive volcanic activity
 - the type of lava – explosive, andesitic or basaltic
 - secondary hazards: pyroclastic flows, lahars, landslides, tsunamis.
- The degree of risk is a function of the relationship between the nature of the volcanic hazard and human factors.
- The risk also varies between different rural and urban places.

Good answers may be **well structured** (AO4) and may additionally offer a **critical evaluation** (AO3) which examines the statement in a way that shows understanding of the relationship between multiple physical processes, including magnitude and type of volcanic activity, and associated secondary hazards. Another approach would be to examine risks to places at different locations and scales (“hotspots” as opposed to plate margins).

For 5–6 marks, expect some outlining of risk(s) resulting from volcanic activity. The response is partial, narrow or lacks supporting evidence.

For 7–8 marks, expect a well-structured account which includes:

- either a well-evidenced explanation of a range of volcanic processes and associated risks
- or an ongoing evaluation (or discursive conclusion) grounded in geographical concepts and/or perspectives.

For 9–10 marks, expect both of these traits.

8. (b) Examine why mass movement hazard risk in some places could change in the future. [10]

Marks should be allocated according to the markbands.

The risk from mass movement hazards is a product of economic factors, such as levels of development and technology; demographic and social factors, such as population density and education; and political factors. The question refers to “some places” – in other words, the risk might not increase in all places; in some it might decrease over time. Some places might be more at risk than others.

Possible **applied themes** (AO2) **demonstrating knowledge and understanding** (AO1):

The risk from mass movement hazards might increase because of:

- increased population pressure due to growth of population / urbanization in hazardous areas; eg shanty towns on mountain slopes
- increase in frequency and magnitude of hazard – “trigger actions” due to climate change, such as more storms, deforestation of hillslopes.

In other areas, the hazard risk might decrease due to:

- management practices and mitigation techniques, including slope stabilization, land-use zoning, personal resilience (preparedness, insurance)
- changes in hazard perception.

The nature of the risk may also depend on type of mass movement and local contexts (eg, will high magnitude events increase more than slow types of movement, such as solifluction and creep in thawing periglacial regions).

Good answers may be **well structured** (AO4) and may additionally offer a **critical evaluation** (AO3) which examines the varying degree of risk attached to different mass movement processes. Another approach might be to examine how future risks vary between places and may increase over different time scales.

For 5–6 marks, expect some outlining of mass movement hazard risks. The response is partial, narrow or lacks supporting evidence.

For 7–8 marks, expect a well-structured account which includes:

- either a well-evidenced explanation of the varying reasons for future changes in mass movement hazards risks in different places
- or a discursive conclusion (or ongoing evaluation) grounded in geographical concepts and/or perspectives.

For 9–10 marks, expect both of these traits.

Option E – Leisure, tourism and sport

9. (a) Referring to the photograph, describe the distribution of **two** touristic activities. [1+1]

Award [1] for each valid description. Accept facilities and/or activities.

For example:

- sports in the complex between two highways/main roads
- swimming pools/water parks scattered throughout the tourist centre
- playing golf / golf course west of the highway
- large marina along the eastern coast
- playing tennis on courts next to the highway.

- (b) Using photographic evidence, suggest **one physical** reason why this destination may have reached its environmental carrying capacity. [2]

Award [1] for a valid reason based on photographic evidence and [1] for a suggested link with environmental carrying capacity.

For example:

- Large areas of un-vegetated arid land are visible south of the settlement [1], suggesting that water supplies cannot be increased further [1].
- Tourist activities shown, such as the swimming pools, [1] may already be exhausting finite water supplies [1].

Maximum [1] if no clear reference is made to the photograph.

- (c) Explain **three** local **human** factors that could reduce the number of tourist arrivals at a destination such as the one shown in the photograph. [2+2+2]

In each case, award [1] for a valid local human factor, and [1] for an explanation of how this could reduce the number of tourist arrivals.

For example:

- Terrorist activity targeting tourists may mean fewer long-haul arrivals [1] because of widespread reporting on (social) media in tourist source countries [1].
- Increased arrivals could mean perceptual carrying capacity is reached [1] when the beaches and marina become too overcrowded for tourists to enjoy themselves [1].

Other possible factors include:

- increased prices at destination
- local withdrawal of supporting TNC
- conflict between relatively poor local people and the rich tourist enclave
- local exchange rates / world recession.

10. (a) Examine how international sporting events bring social and economic benefits to different places.

[10]

Marks should be allocated according to the markbands.

International sporting events include the Olympics, the FIFA World Cup and the Paralympic Games. These can have significant economic and social benefits to communities and countries around the world.

Possible **applied themes** (AO2) **demonstrating knowledge and understanding** (AO1):

Economic benefits might include:

- urban renewal, for example the development of brownfield sites
- development of infrastructure and transport to accommodate sporting events competitors and visitors
- job creation, which may be only temporary.

Social benefits might include:

- sporting legacy – increasing participation in sporting events
- inclusion via changing gender roles; increased female participation
- inclusion of disabled people through growing importance of paralympic sporting events
- community cohesion linked with national/local pride
- housing supply increases post-event, eg reuse of athletes' villages.

Good answers may be **well structured** (AO4) and may additionally offer a **critical evaluation** (AO3) of the statement in a way that examines the economic and social benefits from different perspectives or on varying time or spatial scales. Another approach might be to examine why some places have benefited more than others from hosting the same events and the varying power of different places to maximize benefits for themselves.

For 5–6 marks, expect some outlining of how a sporting event brings some social and/or economic benefits. The response is partial, narrow or lacks supporting evidence.

For 7–8 marks, expect a well-structured account, which includes:

- either a well-evidenced explanation of one or more sporting events and the social/economic benefits for different places
- or an ongoing evaluation (or discursive conclusion) grounded in geographical concepts and/or perspectives.

For 9–10 marks, expect both of these traits.

10. (b) Examine the physical and human reasons why some rural areas have become important for leisure activities.

[10]

Marks should be allocated according to the markbands.

The focus of the question mainly concerns primary tourist/recreational resources in rural areas. Secondary tourist/recreational resources, such as accommodation and entertainment, might also be discussed.

The question is relatively broad and a wide range of responses is possible. The term “leisure activities” might include tourism, recreation and sport. The scale of the rural areas is not specified; it might be a large national park or small village.

If an inappropriate example is used, award up to a maximum of [4].

Possible **applied themes** (AO2) **demonstrating knowledge and understanding** (AO1):

- The importance of physical reasons in rural areas, including outstanding landscapes, attractive climates and unique ecosystems (such as coral reefs, tropical rainforests).
- Human factors in rural areas might include important heritage sites, areas of distinctive cultures, and indigenous populations.
- Human factors might also include secondary resources, such as accommodation and entertainment.
- Some of these areas have been specially designated as national parks or UNESCO sites, which will further attract tourists.
- This may result in the creation of tourist “hotspots”.
- Activities in rural areas might include hiking, enjoying the wilderness, or visiting heritage sites.
- Reasons why some rural places become music/religious/other festival sites.

Good answers may be **well structured** (AO4) and may additionally offer a **critical evaluation** (AO3) in a way that examines the interactions between physical and human processes in different rural places. Another approach might be to examine who has power over rural areas (to allow or block touristic developments). Another approach might be to explicitly examine rural areas at varying scales.

For 5–6 marks, expect some outlining of physical and/or human reasons for leisure activities in rural areas. The response is partial, narrow or lacks supporting evidence.

For 7–8 marks, expect a well-structured account which includes:

- either a well-evidenced explanation of a range of physical and human reasons why rural areas are important for leisure activities
- or a discursive conclusion (or an ongoing evaluation) grounded in geographical concepts and/or perspectives.

For 9–10 marks, expect both of these traits.

Option F — Food and health

11. (a) Estimate the percentage increase in the total number of affluent people. [1]

Award [1] for answers in the range 140–150%.

- (b) State whether the number of affluent people in Africa is projected to increase, decrease or stay approximately the same. [1]

Award [1] for recognition of increase.

- (c) Outline **one** way in which rising affluence in Asia may affect food consumption in other regions shown in the diagram. [2]

Award [1] for a valid way in which rising affluence may affect food consumption in other regions and [1] for further development.

For example: Demand for food imports in Asia will increase hugely as affluence rises [1], which could result in food shortages in other regions [1].

Other possible impacts include:

- New technologies in Asia might help increase food supply / consumption (increased crop yields, etc).

- (d) Suggest **three** possible reasons why the health of populations in Asia might deteriorate as a result of the rising affluence shown in the diagram. [2+2+2]

In each case, award [1] for a valid reason, and [1] for an explanation of the link with the rising affluence shown.

For example: Rising affluence in Asia may lead to a greater incidence of obesity [1] because more people can afford to consume unhealthy, high-calorie fast food [1].

Other changes for Asia have included:

- diseases of affluence, eg increased type 2 diabetes linked with sugar; increased heart disease linked with diet; incidence of cancer if more people can afford cigarettes
- greater proportion of people living in urban areas with poor air quality as the country modernises; resulting in asthma/respiratory illness
- rising affluence is usually linked with industrialization in emerging economies, such as China and Bangladesh; which may result in industrial accidents and injuries
- diseases may spread more rapidly in urban centres / megacities in emerging economies than they did in isolated rural areas in the past when distance between villages acted as a barrier to transmission.

Do not accept drug use.

12. (a) Examine the view that food waste reduction is the best way to achieve future food security.

[10]

Marks should be allocated according to the markbands.

Food security means that all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs for an active and healthy life. In recent years, reducing food waste and food loss have become high on the agenda as a means of achieving food security. The reduction of wastage, be it post-harvest, in the distribution or processing stage of the food chain, or at the consumer level, will often contribute to general food security. However, if the aim is to improve access to food, in particular for the poor and over the short term, other solutions are needed.

Possible **applied themes** (AO2) **demonstrating knowledge and understanding** (AO1):

- Food is lost or wasted throughout various stages of the food supply chain: crops can become damaged, animals may die due to diseases, fish may be discarded. Food may be lost during the processing and transport stages, and consumers may waste food by throwing it away.
- In high-income countries food is mainly wasted by consumers. In low-income countries it is mainly lost during the production stages of the food chain.
- Other strategies to achieve food security may include:
 - provision of food aid and relief, in the short term
 - increasing food supply by improving farming technologies, such as genetically modified crops (GMOs), mechanization and irrigation
 - developing sustainable farming practices
 - improving infrastructure, and storage facilities for crops
 - international trade agreements to facilitate the trade in food crops
 - overcoming political instability.

Good answers may be **well structured** (AO4) and may additionally offer a **critical evaluation** (AO3) of the statement in a way that explicitly examines the view that waste reduction is the best possibility for future food security. Another approach might be to examine how interactions between food producers, consumers and other stakeholders will determine whether waste reduction can be achieved. The issues might also be examined at differing spatial scales (eg, local, national and international).

For 5–6 marks, expect some outlining of food waste reduction and/or food security issues. The response is partial, narrow or lacks supporting evidence.

For 7–8 marks, expect a well-structured account, which includes:

- either a well-evidenced explanation of how food security can be achieved by food waste reduction (also credit other strategies)
- or an ongoing evaluation (or discursive conclusion) grounded in geographical concepts and/or perspectives.

For 9–10 marks, expect both of these traits.

12. (b) Examine the relative importance of physical and human factors in the diffusion **over time** of **one** vector-borne disease.

[10]

Marks should be allocated according to the markbands.

Vector-borne diseases include malaria, dengue fever, Lyme disease, Zika, Ebola and West Nile virus. Vectors such as mosquitoes, ticks, fleas and tsetse flies can transmit infectious diseases between humans or from animals to humans. Mosquitoes are the best-known disease vector. The distribution of these diseases is influenced by a complex set of environmental, social and economic factors.

If an inappropriate disease is chosen (eg HIV/AIDS, cholera), award up to a maximum of [4].

Possible **applied themes** (AO2) **demonstrating knowledge and understanding** (AO1):

- Physical factors affecting the diffusion of the disease, eg climate, stagnant surface water, altitude.
- Human factors affecting the diffusion of the disease, eg poverty, housing, rural-urban, age and gender.
- Diffusion of the disease may be affected by factors such as:
 - increasing international travel due to tourism and trade
 - migration of populations.
- Physical and human barriers to the spread of disease may include:
 - health checks, border controls and quarantine
 - vaccinations; bed nets; spraying
- Over time, spread of disease might be modified by climate change, improvements in health infrastructure, understanding of the disease, technological developments such as vaccinations and increased affluence.
- Globalization of travel and trade have a significant impact on the spread of disease.

Good answers may be **well structured** (AO4) and may additionally offer a **critical evaluation** (AO3) of the statement in a way that examines the complex interactions between the various factors affecting both the incidence and diffusion of the disease. Another approach might be to examine how the spatial diffusion of the disease is changing due to globalization and climate change processes. Another approach might be to examine the time and spatial scale of the diffusion, and the changing relative importance of physical and human factors (eg for malaria, early spread may be due to physical factors, human factors then becoming relatively more important).

For **5–6 marks**, expect some outlining of human and/or physical factors in diffusion of disease. The response is partial, narrow or lacks supporting evidence.

For **7–8 marks**, expect a well-structured account which includes:

- either a well-evidenced explanation of physical and human factors affecting diffusion of a disease over time
- or an ongoing evaluation (or discursive conclusion) grounded in geographical concepts and/or perspectives (for example an evaluation of changing importance over time).

For **9–10 marks**, expect both of these traits.

Option G — Urban environments

13. (a) Using map evidence, state why traffic congestion may occur at De Bataaf (grid square 4722). [1]

A brief statement using map evidence is needed for [1]. A response that implies traffic congestion is acceptable.

Possibilities include:

- Major road which attracts heavy traffic.
- Parking areas which slow traffic flow.
- Sports facilities which attract visitors
- Golf and tennis facilities may attract people (implies traffic congestion).

- (b) State the direction from Vredespaleis (4720) to World Forum (4621). [1]

NW (only acceptable answer)

- (c) Outline **one** possible recent change in urban function in box A. [2]

Award [1] for a valid change for a post-industrial city and [1] for further development (outline).

For example: Urban industries have probably been replaced by services [1] such as waterfront restaurants around what are probably old docks [1].

Other possible ways/changes include:

- conversion of waterside warehouses into offices
- conversion of waterside warehouses into hotels or houses / gentrification
- old docks have been replaced by marina.

Award a maximum of [1] if no clear reference is made to box A.

- (d) Explain **one possible** physical factor **and two possible** human factors that can affect the pattern of residential development in a post-industrial city such as Den Haag.

[2+2+2]

In each case, award [1] for a valid factor linked to residential development and [1] for explanation of how it affects the residential pattern.

For example: Human factor – residential housing is absent from large areas of this city where there are parks [1]. This may be due to planning laws limiting development on green spaces [1].

Physical factor – attractive coastal scenery [1] can encourage residential development along the coastline, because of the attractive view [1].

Other possible factors include:

Physical

- restriction in flood risk areas (both rivers and coastline)
- other physical factors such as relief/flat land.

Human

- land values
- land use planning/purpose-built estates
- distance from old industrial areas

14. (a) Examine the contribution eco city design could make to the management of urban challenges in the future.

[10]

Marks should be allocated according to the markbands.

An eco city is a city built from the principles of living within environmental means. Eco cities may be new or retro-fitted older settlements. Credit design/architectural features and management strategies eg water harvesting, solar panels.

Urban challenges may already be present and candidates may not necessarily distinguish between present day and possible future challenges.

Possible **applied themes** (AO2) **demonstrating knowledge and understanding** (AO1):

- Challenges including: reducing the urban ecological footprint; stresses from increasing traffic congestion; housing shortages.
- Stresses due to escalating climatic risks at the local and global scale, such as air pollution, urban heat islands, and global warming.
- Urban resource shortages, including water.
- Future possibilities for the management of urban systems including: eco city design (and also resilient city design and smart city design).
- Specific strategies to manage the urban ecological footprint, including: the elimination of carbon waste (zero-carbon city), production of energy through renewable resources, resource conservation.
- Restoring environmentally damaged areas whilst still stimulating economic growth and tackling urban poverty.

Good answers may be **well structured** (AO4) and may additionally offer a **critical evaluation** (AO3) of the statement that examines possible limitations of eco city design and the contribution that can realistically be made (recognising high costs and existing infrastructures, and political commitment). Another approach might be to examine how far strategies can be delivered in different places, ie established cities and megacities, compared with newly planned cities.

For 5–6 marks, expect some outlining of eco city design and/or urban challenges. The response is partial, narrow or lacks supporting evidence.

For 7–8 marks, expect a well-structured account which includes:

- either a well-evidenced explanation of eco city design(s) and the management of (future) urban challenges
- or a discursive conclusion (or ongoing evaluation) grounded in geographical concepts and/or perspective.

For 9–10 marks, expect both of these traits.

14. (b) Examine ways in which deindustrialization has helped bring positive changes to some urban areas and communities.

[10]

Marks should be allocated according to the markbands.

There are positive economic, social and environmental consequences of deindustrialization for urban areas, although not all areas/places and community/people may benefit equally. These effects may be considered in different geographical contexts and on varying time scales.

Possible **applied themes** (AO2) **demonstrating knowledge and understanding** (AO1):

- The subsequent growth of tertiary and quaternary industries after the decline of manufacturing industry.
- Re-investment in deprived areas, especially by service industries; improvements in transport, housing and infrastructure.
- Redevelopment of brownfield sites.
- Decreasing unemployment, especially amongst unskilled and low-paid workers (provided new opportunities and training appear).
- In-migration into regenerated urban areas.
- Environmental improvements / restoration.
- Economic benefits for areas where industrial work has relocated.

Good answers may be **well structured** (AO4) and may additionally offer a **critical evaluation** (AO3) of the statement in a way that examines the different positive changes linked with economic, social and environmental aspects of the deindustrialization process. Another approach might be to examine varying benefits for different places affected by the process (possibly including urban areas where factories have relocated). Another approach might be to examine the time scale of the changes. Another approach might be to examine the power of different stakeholders to deliver positive change.

For 5–6 marks, expect some outlining of some positive changes linked with deindustrialization. The response is partial, narrow or lacks supporting evidence.

For 7–8 marks, expect a well-structured account which includes:

- either a well-evidenced explanation of positive changes for urban areas and their communities resulting from deindustrialization
- or a discursive conclusion (or ongoing evaluation) grounded in geographical concepts and/or perspectives.

For 9–10 marks, expect both of these traits.
