

Markscheme

May 2026

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. - 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.		
3–4	The response is too general, lacks detail, is not focused on the question and is largely unstructured. - 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.		
5–6	The response partially addresses the question, but with a narrow argument, an unsubstantiated conclusion, and limited evaluation. - 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.		

7–8	The response addresses the whole question, the analysis is evaluated and the conclusion is relevant but lacks balance. • 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. • 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. • 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. • 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. • 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. • 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) (i) State the continent projected to have the greatest number of countries with high water scarcity in 2050. [1]
Asia
- (ii) Identify the water scarcity level for the countries marked with **X**. [1]
Low-medium

- (b) Outline **one** possible **human** cause of the high or extreme projected water scarcity in the countries shown on the map. [2]

Award [1] for the cause and [1] for explanation / development.

For example, high demand [1] leads to over-abstraction of potential water sources [1].

Other causes include:

- Industrialization / agriculture
- Pollution / contamination by waste water
- Outdated infrastructure
- War and conflict
- Refugees and in-migration
- Climate change – human induced
- Urban growth
- Lack of international cooperation on shared water sources
- Cost

NB. Do not accept the same cause or way for parts (b) and (c).

- (c) Explain **two** ways in which local communities can improve access to safe water. [3+3]

Award [1] for each way and a further [2] for development / explanation / exemplification.

For example, improving sanitation [1] by building pipes/sewers/water filters [1] in order to separate sewage and drinking water [1].

Other ways include:

- Small / local desalinization plants
- Water conservation / Recycling waste water
- Education
- Water purification / Water treatment plants
- Small-scale / localized dams and reservoirs / wells
- Protecting wetlands
- Rainfall harvesting / Harvesting fog / Solar stills
- Improving irrigation efficiency
- Local community action groups ensuring equitable access to clean safe water for all

NB. Do not accept large multipurpose dams (e.g. GERD), as they are not relevant to improving access to safe water by local communities.

2. (a) Examine the role of different stakeholders in influencing the environmental impacts of agricultural activities on water quality. [10]

Marks should be allocated according to the markbands.

Agricultural activities have had significant negative environmental impacts on water quality in rivers, lakes and aquifers. Chemical pollution derives from fertilizers, pesticides and animal waste; irrigation practices may result in depletion of groundwater and salinization. In addition, run-off and soil erosion may result in increased sedimentation. These impacts are often the result of intensification of agriculture. Changes to agricultural activities may be encouraged to reduce environmental impacts. Stakeholders concerned with the management of environmental impacts include farmers, TNCs, water companies, consumers and environmental groups.

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

- Agricultural activities may have severe negative environmental impacts on water quality. Chemical pollution results from fertilizers, pesticides and animal faecal waste entering rivers, lakes and groundwater.
- Impacts include eutrophication, algal blooms and death of many freshwater species.
- Increases in irrigation may cause severe environmental damage through salinization and lowering of water tables.
- Farmers may be the principal stakeholders, but intensification of farming is encouraged by governments and TNCs to increase output and increase food supplies.
- Environmentalists, consumers and water companies seek to change farming practices, to improve water quality.

Good answers may be **well-structured** (AO4) and may additionally offer a **critical evaluation** (AO3) of the statement in a way that examines the role and power of different stakeholders in influencing the environmental impacts of agriculture in different places. They might examine how different agricultural systems have varying impact; or how changes may lead to an improvement in water quality over time.

For **5–6 marks** expect weakly-evidenced outlining of at least one environmental impact of agricultural activities on water quality.

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

- either an evidenced explanation of the environmental impacts of agricultural activities on water quality and the role of different stakeholders.
- or a discursive conclusion (or ongoing evaluation), possibly examining how the impacts on water quality may change over time and in different places.

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

2. (b) Examine how the risk of river flooding in different places is affected by changes to land use and river channels.

[10]

Marks should be allocated according to the markbands.

Land use within drainage basins has an important influence on the pathways and flows of rainwater inputs to river outputs, hence the magnitude and frequency of river floods. Urbanization and deforestation have a significant effect, increasing magnitude and frequency of river flood risk. In addition, channel modification, such as straightening, designed to reduce flooding in some places, may increase the risk in others.

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

- Changes of land use within drainage basins, such as urbanization and deforestation, cause an increase in the magnitude and frequency of river floods.
- Land use changes affect the pathways, stores and flows of rainwater inputs, resulting in higher flood discharges and shorter lag times.
- Removal of vegetation and increase in impermeable surfaces reduces interception and storage and increases overland flow to rivers.
- Channel modifications, such as straightening, changes to hydraulic radius, artificial levees and concreting of channels, are designed to accommodate increases in discharge and reduce the risk of river flooding. However, this increases the risk of river flooding in downstream places.
- The risk of river flooding may be reduced by measures such as afforestation, increasing vegetation in urban areas, and reconfiguring river channels to a more natural state, such as reintroducing meanders and wetland storage areas.

Good answers may be **well-structured** (AO4) and may additionally offer a **critical evaluation** (AO3) of how changes in land use and river channels may affect the processes operating within drainage basins to increase/decrease the risk of river flooding in different places. They might also examine the power of different stakeholders in effecting changes and possibly reducing risk of river flooding over time.

For **5–6 marks** expect weakly-evidenced outlining of at least one way in which changes to land use and /or river channels may affect the risk of river flooding.

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

- either an evidenced explanation of how changes in land use and river channels may affect the risk of river flooding.
- or a discursive conclusion (or ongoing evaluation) grounded in geographical concepts and/or perspectives.

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

Option B – Oceans and coastal margins

3. (a) (i) State the percentage of deaths caused by storm surges. [1]
50 (%)
- (ii) State the percentage of deaths **not** caused by water hazards. [1]
11 (%)

- (b) Outline **one** impact of a hurricane on the physical environment of a coastal area. [2]

Award [1] for an impact and [1] for explanation / development.

For example, hurricanes can cause significant coastal erosion [1] due to high wave energy / storm surges [1].

Other physical impacts include:

- Loss of wetlands
- Damage to coral reefs
- Destruction of mangroves
- Loss of biodiversity
- Coastal flooding and debris deposited / saltwater intrusion.
- Destruction of sand dunes
- Landslides

NB. Do not credit impacts on the human (built) environment

- (c) (i) Explain **one** benefit of aquaculture. [3]

Award [1] for the benefit and up to [2] for development / explanation / exemplification.

For example, aquaculture can create employment [1] creating better lives for farmers and their families [1] as well as local and regional economic development.[1]

Other benefits include:

- Good source of food / protein
- Sustainable catches desired by seafood companies
- Reduce global hunger
- Smaller carbon footprint and requires fewer resources than traditional farming
- Helps with coastal defences / habitat restoration

- (ii) Explain **one** problem caused by aquaculture. [3]

Award [1] for the problem and up to [2] for development / explanation / exemplification.

For example, farmed fish may escape from the pens [1] and breed with the local wild fish [1] diluting the stocks able to be fished [1].

Other problems include

- Spread of sea lice and disease
- Mangrove removal – nurseries
- Contamination of waters caused by leaked chemicals / steroids
- The number of wild fish needed to provide the fish pellets for the farmed fish

4. (a) Examine the importance of wave action and subaerial processes in the formation of coastal landforms of erosion.

[10]

Marks should be allocated according to the markbands.

Coastal landforms of erosion include cliffs, stacks and wave-cut platforms. They are the result of interactions between various factors including wave action, lithology and subaerial process such as weathering and mass movement. The importance of these factors varies between different places, giving rise to distinctive coastal landscapes.

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

- Wave processes include erosion by hydraulic action and abrasion, and the power of wave erosion is strongly influenced by the strength of wind. Destructive waves are responsible for cliff erosion, and their strength is related to wind strength, duration and fetch.
- Subaerial processes include weathering and mass movement. Chemical and physical weathering act on the face of cliffs, weakening and causing collapse. The importance of weathering and subaerial processes will vary with the lithology of the cliff face.
- The importance of wave action and subaerial processes in coastal landforms of erosion will depend on factors such as the power and strength of wind and waves, and the lithology of the cliffs which will influence the type and rate of weathering and mass movement
- Wave erosion undercuts the cliff face, causing instability and collapse by mass movements such as slumping. Over time, the cliffs will retreat, forming a wave-cut platform at the base of the cliff.
- Cliffs formed of “softer/weaker” lithologies, such as clay and sand, will be rapidly undercut by waves, and mass movements such as slumping will cause rapid cliff retreat. More resistant and “massive” rock types, such as granite, will be eroded more slowly by wave action, and they will be less affected by mass movement, meaning that cliff retreat will be relatively slow.

Good answers may be **well-structured** (AO4) and may additionally offer a **critical evaluation** (AO3) which examines the importance, and inter-relationships between, wave action and sub-aerial processes, and the relative power of these processes in shaping coastal erosional landscapes. Other factors, such as the role of lithology and sea level changes may also be considered. These factors will vary between different places and over time.

For **5–6 marks**, expect some weakly-evidenced outlining of at least one way that wave action and / or subaerial processes may influence the formation of at least one coastal erosional landform.

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

- either an evidenced explanation of the importance of wave action and subaerial processes in the formation of coastal landforms of erosion.
- 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 the challenges for different stakeholders involved in the management of coastal flooding **or** erosion. [10]

Marks should be allocated according to the markbands.

Coastal margins may be affected by erosion and flooding. Erosion of cliffs may cause significant impact on human activity, such as loss of settlements, infrastructure and agricultural land. Coastal flooding not only causes damage but may also cause injury and loss of life. Managing coastal flooding and erosion may involve the use of hard or soft engineering techniques, as well as managed retreat. Challenges for stakeholders, such as local residents, businesses and national governments, may include the physical geography of the coastline, the type of land use, financial costs, impacts on tourism and environmental consequences.

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

- Decision-makers and stakeholders involved in the management of coastal flooding or erosion are likely to include residents, local and national governments, conservationists and local business including tourism.
- Management may involve the application of hard-engineering schemes using sea walls, groynes, gabions, revetments, flood barriers and breakwaters. Alternatively, soft engineering strategies include beach nourishment and managed retreat.
- Physical challenges include the lithology, climate and weather patterns, wave processes, rates of erosion, sediment supply, and environmental sensitivity.
- Human and economic challenges include the value of the land use, available budgets and technology, power of the stakeholders, and the efficiency of the decision-making processes.
- Management may be short or long term, sustainable or not, and subject to the impacts of climate change such as rising sea levels and the increased incidence and intensity of coastal storms.
- Management in one area may influence sediment supply further along the coast, necessitating cooperation / coordination amongst stakeholders throughout the sediment cell.'

Good answers may be **well-structured** (AO4) and may offer a **critical examination** (AO3) of the challenges for stakeholders, and why they may vary according to place. There might be recognition that the challenges may change over time. Management is likely to involve compromise between the various economic, human and physical challenges, and the power of decision-makers / stakeholders.

For **5–6 marks**, expect some weakly-evidenced outlining of **at least one** challenge involved in the management of coastal flooding or erosion.

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

- either an evidenced explanation of challenges for stakeholders in the management of coastal flooding **or** erosion.
- 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) (i) State the number of countries that include some part of the Atacama Desert. [1]

4

- (ii) Estimate the distance, in kilometres (km), of the Atacama Desert from north to south. [1]

Accept between 1300 and 1700. (km)

- (b) Outline **one** climatic characteristic of a hot desert that makes it an extreme environment. [2]

Award [1] for a climatic characteristic and [1] for development / explanation / quantification

For example, very high daytime temperatures / very hot [1] cause human discomfort [1].

For example, absence of rainfall / extreme aridity [1] causes problems for agriculture / water supply [1].

Other possibilities include:

- Sporadic heavy rainfall – flash floods
- Very cold nights

- (c) Explain **two** possible conflicts over mineral extraction in cold extreme environments. [3+3]

These should relate directly to mineral extraction and not to global climate change causing melting of the ice.

Award [1] for a conflict related to mineral extraction and up to [2] for further development / explanation / exemplification.

For example: There may be conflict between environmentalists and the mining companies [1] as there might be a loss of the unique ecosystems due to drilling and infrastructure construction [1] as tundra species are fragile / highly vulnerable to change [1].

For example: Indigenous groups may object to any change to their land through mineral extraction / oil and gas exploration / potential source of conflict [1] as their traditional hunting / culture will be interrupted [1], e.g. reindeer migratory routes in Siberia [1].

Other possibilities include:

- Loss of indigenous cultures due to increasingly lucrative jobs in the mining industries.
- Resource nationalism creates conflicting claims between competing countries.
- Protected wildlife areas *versus* further oil drilling.
- Presence of many military bases and loss of sea passage for tankers may lead to future unrest in area.
- Potential oil leakage due to fracture of pipeline.

6. (a) Examine ways in which the causes of desertification may be managed. [10]

Marks should be allocated according to the markbands.

Desertification is a major problem in many arid and semi-arid environments. It is important to understand and manage the causes of desertification, as the rate and extent is accelerating over time. The causes are a complex interaction between physical and human factors at a variety of scales from local to global. Physical causes include global climate change, increasing drought conditions and soil erosion; but these are often partly, or wholly, caused by human activities and population pressure. Management of the causes is a complex issue, involving the power of a variety of different stakeholders in different places.

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

- Desertification is caused by the interaction between a variety of physical and human factors.
- Management is a complex issue, involving many stakeholders in different places and at different scales.
- Physical causes include increased frequency and duration of droughts, causing depleted water supplies from rivers, lakes and aquifers, intensified by global climate change.
- Human causes of desertification include population pressure, farming practices such as over-grazing, overcultivation, depletion of vegetation cover and accelerated soil erosion; conflict and warfare make management more challenging.
- Management approaches include stone lines, tree planting, bunds / reservoirs for water storage, changing farming practices, global agreement on reducing CO₂ emissions.
- Management involves stakeholders at a variety of scales, from local to international, including local people, governments, international organisations and environmental groups. Integrated and co-ordinated agreement between stakeholders is very difficult.

Good answers may be **well-structured** (AO4) and may additionally offer a **critical evaluation** (AO3) of the complex causes of desertification and its management in different places and time scales. The power of different stakeholders in managing desertification could also be considered.

For **5–6 marks** expect weakly-evidenced outlining of **at least one** cause and/or management approach to desertification.

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

- either an evidenced explanation of the causes and management of desertification.
- or a discursive conclusion (or ongoing evaluation) grounded in geographical concepts and/or perspectives.

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

6. (b) Examine the challenges to local **and** global stakeholders from tourism in extreme environments.

[10]

Marks should be allocated according to the markbands.

There is a significant growth in tourism to both long-established destinations and, in recent years, to more distant, remote and inaccessible regions. Tourism in both cold environments, such as high mountains and high latitudes, and hot desert regions poses challenges to the local communities and global stakeholders. These stakeholders have varying power to mitigate these challenges for a more sustainable future.

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

- The growth of tourism has affected a variety of extreme environments, including hot deserts, high mountains and cold high latitude regions. The challenges to different stakeholders will vary over time and space.
- Local stakeholders face environmental, economic, social and cultural challenges. These include landscape changes, pollution of water and air and damage to ocean ecosystems.
- Economic challenges include exploitation, employment opportunities and land ownership. Cultural challenges might include “zooification” and damage to sites of religious, historic and archaeological importance.
- Global stakeholders include TNC tour and package holiday operators, who may face challenges to reduce the impacts of tourism on local environments and communities, whilst operating profitably.
- Local and global environmental groups attempt to minimize the impacts of tourism.
- Local and global political stakeholders face challenges to enact laws and regulations, promote ideas of sustainable tourism and ecotourism. They may also establish national parks and protected areas.

Good answers may be **well-structured** (AO4) and may additionally offer a **critical evaluation** (AO3) of the statement in a way that examines the challenges and power of local and global stakeholders in different places, and possibilities of mitigating adverse challenges. Another approach might be to examine the extent to which the challenges might be successfully managed, or to compare the scales of the challenges.

For **5–6 marks** expect weakly-evidenced outlining of at least one challenge caused by tourism in an extreme environment.

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

- either an evidenced explanation of the challenges to local and global stakeholders in one or more extreme environments.
- or a discursive conclusion (or ongoing evaluation) grounded in geographical concepts and/or perspectives.

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

Option D – Geophysical hazards

7. (a) (i) State the direction from the Keanakākoʻi Crater (**A** on the map) to the Kīlauea Iki Crater (**B** on the map). **[1]**

NE/NNE

- (ii) State the four-figure grid reference of the Keanakākoʻi Crater (**A** on the map). **[1]**

Accept 6246 or 62E46N Do **not** accept 62E,46N, 62,46 62/46 or 62-46

- (b) Outline **one** way in which a volcanic hazard might impact human well-being. **[2]**

*Award **[1]** for a valid way that well-being might be impacted and **[1]** for development / explanation / exemplification.*

For example, people's homes / farmland destroyed **[1]** causing communities to have to rebuild / financial losses / land becomes uninhabitable **[1]**

For example, health problems **[1]** caused by inhaling volcanic ash **[1]**

Other possibilities include:

- Fear of living with hazard
- Leaving belongings when evacuating
- People may be killed or injured
- Accept positive impacts e.g. volcanic tourism bringing money to the local economy

NB. Identification of a volcanic hazard is not needed.

- (c) Explain **one** way in which communities may adapt to hazard risk through:

- (i) government planning; **[3]**

*Award **[1]** for a valid way and up to **[2]** for development / explanation / exemplification*

For example, governments may impose restrictions through land use zoning **[1]**, limiting development permitted in high-risk areas **[1]** protecting homes / businesses from damage to minimise losses **[1]**.

Other possibilities include:

- Building codes
- Education policy
- Evacuation routes
- Investing in prediction technology
- Pre-event management strategies e.g. sea walls, diversion channels

(ii) personal resilience.

[3]

Award [1] for a valid way and up to [2] for development / explanation / exemplification.

For example, families may take out insurance [1], which will cover the cost of rebuilding homes in the event of a hazard [1], providing reassurance to continue living in a risk area [1].

Other possibilities include:

- Earthquake preparedness kit
- Awareness of what to do in the event of a hazard
- Adoption of technology, e.g. warning apps

8. (a) Examine the relationship between the characteristics of earthquakes and associated hazards.

[10]

Marks should be allocated according to the markbands.

Earthquakes exhibit varying characteristics including magnitude, depth of focus and wave types, and these depend on a range of tectonic factors. These characteristics will affect the associated hazards produced, which include both human and physical, primary and secondary. The physical location of the earthquake and the nature of the place affected will be vital to understanding the associated hazards produced from an earthquake.

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

- Characteristics of earthquakes include magnitude, epicentre, depth of focus, nature of movement, wave types, frequency and aftershocks.
- The location of earthquakes is an important influence on its characteristics and the range and severity of hazards produced. The physical aspects of the location include the plate boundary, land or ocean-based, geology, proximity of fault lines, etc. Human aspects of the location include proximity to human settlement, type of land use, density of buildings, and level of development.
- Physical hazards associated with earthquakes include ground tremors (shaking) tsunamis, liquefaction, mass movements and aftershocks, and these can be classified as primary or secondary.
- Human hazards associated with earthquakes include fires, building and infrastructure collapse, floods, disease, famine, etc. and can be short- or long-term.
- The relationship between earthquakes and associated hazards depends on the particular earthquake characteristics, and a range of human and physical factors associated with the place.

Good answers may be well-structured (AO4) and may additionally offer a critical evaluation (AO3) examining the relationship between earthquakes and the hazards produced. Answers may recognise that both earthquake and the hazard produced depend on the characteristics of the place, and that the relationship between earthquakes and hazards may be complex and change over time.

For **5–6 marks**, expect a weakly-evidenced outlining of at least one characteristic of an earthquake and its associated hazard(s).

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

- either an evidenced explanation of the relationship between earthquake characteristics and the associated hazards.
- or a discursive conclusion (or ongoing evaluation) grounded in geographical concepts and/or perspectives.

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

8. (b) To what extent are physical factors responsible for the impacts of mass movement events? [10]

Marks should be allocated according to the markbands.

Mass movements events (landslides, mudflows, rock-falls and avalanches, etc) will have different impacts according to physical factors like speed of flow, nature and volume of material, duration, and gradient. Impacts will range across economic, social, as well as the physical environmental damage caused. Human factors also influence the impact and might include removal of vegetation, population density, slope destabilization, overdevelopment and the management of the hazard risk.

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

- The impacts will depend on the physical factors such as the nature and volume of material, speed of flow, duration, gradient, water content, time of day, degree of isolation; and should vary according to each mass movement event.
- Mass movement events can have significant social impacts causing homelessness, loss of access to services, injury and death. Economic impacts might include damage to infrastructure and the costs of rebuilding; whilst the physical impacts could include effects on topography, water courses, soil erosion, and deforestation.
- The impacts may also be considered in terms of long- and short-term.
- Tectonic activity and climatic factors, such as heavy rainfall, snowfall, and frost action, may be relevant in triggering mass movement and causing impacts.
- Human factors affecting the impact of mass movements might include the level of development, population increases and urbanization, removal of vegetation cover, deforestation and increases in slope steepness due to construction.
- Human management of the potential hazard risk before, during and after may affect the scale and type of impact. This might include slope stabilization and effective management strategies, especially in more economically developed places.
- Impacts of mass movements may be subject to future changes in development, technology and climate change.

Good answers may be **well-structured** (AO4) and may additionally offer a **critical evaluation** (AO3) of the question. They may reach an evidenced judgment regarding the influence of physical and other factors affecting the impact of mass movement events. Answers may recognize that the power of hazard events varies according to a complex relationship between physical and other factors, and that the impacts may vary according to place and over time.

For **5–6 marks**, expect some weakly-evidenced outlining of one or more physical factors affecting the impact of mass movement.

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

- either an evidenced explanation of the extent to which physical factors affect the impact of mass movement events.
- or a discursive conclusion (or ongoing evaluation) grounded in geographical concepts and/or perspectives, maybe considering the impact of other factors.

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

Option E – Leisure, tourism and sport

9. (a) (i) State the country with the greatest number of festivals considered to be among the top 12. [1]

USA

- (ii) State the name of the festival located furthest north. [1]

Edinburgh Fringe Festival (must include Edinburgh and Fringe)

- (b) Outline **one** physical factor affecting the choice of a festival site. [2]

Award [1] for the factor and [1] for development / explanation.

For example, flat land [1] needed for erecting the stages / marquees / tents [1].

Other factors include:

- Size of the site
- Geology / soil type / drainage
- Location / latitude / climate
- Water supply
- Landscape / scenery

- (c) Explain how unsustainable tourism growth in an **urban** hotspot may result in:

- (i) **one** environmental consequence; [3]

Award [1] for a consequence and [2] for development / explanation / exemplification.

For example, pollution of water [1] due to generation of waste [1]; for example canals in Venice, which may exceed ecological carrying capacity [1].

Other possibilities include:

- Noise pollution
- Habitat destruction in urban parks / green areas
- Changes in visual quality
- Demand for resources, e.g. energy

- (ii) **one** social consequence. [3]

Award [1] for a consequence and [2] for development / explanation / exemplification.

For example: the rise in popularity of Air BnBs (or other tourist accommodations) [1] means that local house prices rise [1] and local people are forced out of the urban area [1].

Other possibilities include;

- Overcrowding / congestion
- Health decline
- Seasonal employment only
- Loss of traditional culture
- Accept any positive consequence e.g. **Short** term more and varied employment opportunities

NB. Do not credit the repeat of the same consequence in both parts, e.g. pollution.

NB. Do not credit the use of a rural area.

10. (a) Examine the extent to which the involvement of transnational corporations (TNCs) in expanding international tourism benefits different stakeholders. [10]

Marks should be allocated according to the markbands.

There has been a rapid growth in international tourism in recent years, regarding both the number of tourists and the range and number of tourist destinations. TNCs have played a significant role in expanding tourism, including investment in infrastructure, airport development, hotels and the promotion of cheap package holidays to new destinations. Many different stakeholders have benefitted from this expansion, but there have also been significant social, economic and environmental costs.

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

- TNCs play a dominant role in the expansion of international tourism, through transportation, accommodation, package holidays, tour groups and advertising.
- They also play an important role in the expansion of international tourism, to different countries and regions, away from the traditional mass tourism areas.
- TNCs are actively promoting niche tourism to new and exotic destinations.
- A variety of different stakeholders has benefitted from this expansion, but there have also been significant costs.
- Stakeholders, in addition to the TNCs, include local people and businesses, indigenous communities, environmental groups and national governments.
- Local people might benefit from increased employment opportunities and training, raising living standards; but this may be low-paid, low-skill and seasonal.
- TNCs may establish tourist resorts in low-income countries, but these often bring little benefit to the local economy and people. There is often little interaction between tourists and local people.
- TNCs may run tour groups to areas of scenic, historic or architectural importance, often benefitting local guides and transport. However, tourist pressures may exceed carrying capacity, affecting the local natural and cultural environment.
- Although local governments may benefit from development opportunities relating to the expansion of tourism, most of the profits leak back to the TNCs who retain control of the tourist development and activities.

Good answers may be **well-structured** (AO4) and may additionally offer a **critical evaluation** (AO3) of the power of stakeholders to benefit from the expansion of international tourism to different places and scales. Another approach might be to consider the possibilities for change to reduce the costs for stakeholders.

For **5–6 marks** expect weakly-evidenced outlining of how the involvement of a TNC may bring at least one benefit in the expansion of international tourism.

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

- either an evidenced explanation of the extent to which the involvement of TNCs in expanding international tourism benefits different stakeholders.
- or a discursive conclusion (or ongoing evaluation) grounded in geographical concepts and perspectives.

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

10. (b) Examine the importance of cultural **and** political influences on participation in international sport by different groups. [10]

Marks should be allocated according to the markbands.

Changing cultural and political attitudes and influences are important in increasing participation in international sport by groups. Cultural attitudes are influenced by increasing access and exposure to the media. Political factors include international agreements and the establishment and growth of the Paralympics.

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

- The growing importance of inclusion within international sporting events, for example people with different religious values, gender roles and disabilities.
- Cultural attitudes are influenced by greater exposure and awareness, through the media and education, of people with different values, religion, gender and disability.
- The role of high-profile people and celebrities in the establishment of the Paralympic Games, supported by national and international sporting bodies such as the IOC and IPC.
- Political factors include the provision of funding, support and training facilities for disabled people, women and disadvantaged communities, e.g. local initiatives to provide facilities and opportunities.
- Some governments and religious groups may change rules, for example allowing females to participate in sport. Sanctions may restrict participation of individuals or countries.
- Many attitudes are slow to change and discrimination on the basis of sex, religion or disability remains a significant barrier to further participation.
- Other influences might include level of economic development, or physical geography factors such as altitude or climate.

Good answers may be **well-structured** (AO4) and may additionally offer a **critical evaluation** (AO3) of the relative power and perspectives of stakeholders to enable greater participation in international sport by groups and individuals. Also, how these may vary between different places and change over time.

For **5–6 marks** expect weakly-evidenced outlining of at least one cultural and/or political factor influencing participation in international sport.

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

- either an evidenced explanation of the importance of cultural and political influences on participation in international sport
- or a discursive conclusion (or ongoing evaluation) grounded in geographical concepts and perspectives.

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

Option F – Food and health

11. (a) (i) Identify the factor that makes the largest contribution to carbon dioxide (CO₂) equivalent emissions in methods **A** and **B**. [1]

Growing medium

- (ii) Estimate the total annual carbon dioxide (CO₂) equivalent emissions, in kilograms (kg), produced by method **C**. [1]

Accept 2700-2900

- (b) Outline **one** way in which vertical farming can reduce the need for large quantities of water. [2]

Award [1] for the way and [1] for explanation / development.

For example, water will drip down [1] and is available for plants growing on different levels [1].

Other possibilities may include:

- Recycling of water
- Controlled indoor environment, so less evaporation / infiltration
- Less land needed so less water needed for irrigation

- (c) Explain **two** reasons why there may be disparities in health between men and women. [3+3]

Award [1] for a valid reason and up to [2] for development / explanation / exemplification.

For example, men are more likely to smoke than women [1], which can lead to high blood pressure [1], leading to higher risk / rates of chronic heart disease in men [1].

For example, men's nutrition may be prioritized when food is scarce [1], such as in poorer societies where men may take on more labour-intensive work [1] and are therefore less susceptible to malnutrition [1].

Other possibilities may include:

- Gender-specific marketing of diet products such as protein shakes
- Pregnancy-related health complications
- Gender inequality may pose barriers for women to access / be educated on healthcare
- In some cultures, men are slower to seek medical advice
- Some jobs with high health risks (e.g. mining) are male dominated

12. (a) To what extent can governance affect the severity of famine? [10]

Marks should be allocated according to the markbands.

Famines often occur as a consequence of both natural environmental factors, such as prolonged drought resulting in crop failure, and human factors affecting low food security such as conflict and warfare. Severe famines mainly occur in low-income countries; poverty, low food production, weak infrastructure, corruption, poor governance and civil unrest are some contributory factors. The severity and duration of drought may be alleviated by factors such as media awareness and international aid, and governance.

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

- Governance refers to the political system in a country which provides a framework for decision making and managing organisations.
- Good governance may encourage investment and prioritization of agriculture irrigation, and fertilizers to improve food production, distribution and security. Also, governance may encourage effective stockpiling of basic foodstuffs. These actions might reduce severity of famine.
- Good governance may improve living standards and health of communities, making them more resilient to food shortages.
- However, poor governance, corruption and civil unrest occur in many famine-prone regions. This leads to a breakdown in food production and distribution, exacerbating the severity of famine.
- The power of good governance is often uneven, and poorer regions and populations are often the most vulnerable.
- Additional measures to reduce the severity of famine may be necessary. These include international food and medical aid, which may be only short-term solutions.
- The effectiveness of aid also relies on good, stable governance in the famine-stricken areas.
- Other factors contributing to famine include crop failure, drought, flooding, conflict and population growth.

Good answers may be **well-structured** (AO4) and may additionally offer a **critical evaluation** (AO3) of the importance and power of governance in affecting the severity of famine, in different places and time scales. Consideration could also be given to the importance of other factors.

For **5–6 marks**, expect weakly-evidenced outlining of at least one way in which governance affects the severity of famine

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

- either an evidenced explanation of the extent to which governance may affect the severity of famine.
- or a discursive conclusion (or ongoing evaluation) grounded in geographical concepts and/or perspectives, maybe considering the importance of other factors.

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

12. (b) Examine the importance of different geographic factors affecting the rate of diffusion of agricultural innovation. [10]

Marks should be allocated according to the markbands.

The diffusion and adoption of agricultural innovation is uneven both spatially and over time and is affected by a range of physical, economic, political and social factors. Innovation includes the adoption of new technologies, irrigation, new crops and seeds and different farming systems. Not all new innovations are appropriate or suitable in different agricultural regions.

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

- The diffusion of agricultural innovation is uneven over place and time. The rate of diffusion and adoption is influenced by a variety of physical, economic, political and social factors.
- Economic factors affecting rate of diffusion include relative wealth and economic development, the availability of capital and loans, and the possible involvement of TNCs in agricultural production.
- Commercial agricultural systems, including agribusiness, are possibly more likely to adopt innovation than more traditional subsistence farming. The latter are more likely to be risk-minimizers, concerned with domestic food production.
- Land availability and patterns of land ownership are also important.
- Social and political factors include levels of education and training, awareness of innovation, and government support to farmers. Political unrest will negatively affect innovation.
- Access to technology and the internet opens new channels of communication for diffusion.
- Physical factors might also be important in the rate of innovation: for example, climate (e.g. drought), relief, distance and soil quality. The potential of innovation to cause environmental damage may be a barrier to diffusion.

Good answers may be **well-structured** (AO4) and may additionally offer a **critical evaluation** (AO3) of the question in a way that examines the importance of geographic factors and processes leading to varying rates of adoption in different places. The relative power of different stakeholders might also be examined. Another approach might be to examine why innovation has affected some places more than others.

For **5–6 marks**, expect weakly-evidenced outlining of at least one geographic factor affecting the diffusion of agricultural innovation.

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

- either an evidenced explanation of the importance of a variety of different geographic factors affecting the rate of diffusion.
- or a discursive conclusion (or ongoing evaluation) grounded in geographical concepts and/or perspectives.

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

Option G – Urban environments

13. (a) (i) Identify the city with the greatest percentage of people who walk or cycle. **[1]**
Utrecht (Accept “A”)
- (ii) State the percentage of people in Sydney who use public transport. **[1]**
30 (%)
- (b) Outline **one** environmental problem caused by the increase of vehicles in cities. **[2]**
Award [1] for an environmental problem, and [1] for development / explanation.
For example, air / noise pollution **[1]** due to congestion and /or traffic idling **[1]**.
Other problems include:
- Loss of biodiversity/natural habitats due to building more infrastructure
 - Global warming / acid rain
- (c) Explain **two** different reasons for the location of large retail centres outside of towns. **[3+3]**
Award [1] for each reason, and up to [2] for development / explanation/ exemplification in each case.
For example, large areas of available / cheap land in the outskirts [1] allows more space for parking [1] attracting more customers / making it more accessible for more people [1]
Other reasons:
- New and modern shops found in these retail centres (as shops in CBD were old and needing modernization)
 - Improvements in road and motorway networks – less congestion
 - Availability of public transport
 - Local government planning / funding / investment
 - Designed for greater accessibility, e.g. wheelchairs, mobility scooters, strollers.
 - Larger catchment area

NB. Allow push factors from city centres, but do not credit mirror answers.

14. (a). Examine how eco city design might contribute to the reduction of the urban ecological footprint.

[10]

Marks should be allocated according to the markbands.

Management of the ecological footprint is essential for the future sustainability of urban systems. The ecological footprint includes carbon emissions from the combustion of fossil fuels, water consumption for domestic and industrial purposes, waste disposal, and the land required for housing, industry, infrastructure and recreation. Eco city design may refer to purpose-built cities or retrofitted older settlements.

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

- Reducing the urban ecological footprint is important for future sustainability of urban systems. The ecological footprint measures the impact of urban areas on land, atmosphere, water and ecosystems.
- Eco city design includes reducing carbon emissions from the combustion of fossil fuels, loss of open space / wildlife habitat.
- The production of renewable energy, the introduction of electric vehicles, integrated public transport, cycle routes, and energy efficiency measures are also important. These will reduce climate risk from air pollution at local and global scales.
- Strategies aim to manage water consumption, reduce pressure on reservoirs, aquifers and rivers and reduce waste.
- Management of waste, both solid and liquid, through strategies to reduce and re-cycle materials.
- Reduction of the ecological impact through sensitive development of urban structures; maintenance of green spaces, and the restoration of environmentally damaged areas.
- Future possibilities involve education, co-operation and planning by local and national stakeholders and decision makers.

Good answers may be **well-structured** (AO4) and may additionally offer a **critical evaluation** (AO3) of the question that examines the possible contribution and limitations of eco city design principles, examining the power and perspectives of different stakeholders. Another approach might be to examine how far strategies can be delivered in different places, such as established cities and newly planned cities.

For **5–6 marks**, expect weakly-evidenced outlining of at least one way eco city design may reduce the urban ecological footprint.

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

- either an evidenced explanation of how eco city design might contribute to the reduction of the urban ecological footprint.
- or a discursive conclusion (or ongoing evaluation) grounded in geographical concepts and/or perspectives.

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

14. (b) Examine the costs **and** benefits of urban redevelopment to stakeholders in **one or more** neighbourhoods. [10]

Marks should be allocated according to the markbands.

Urban redevelopment includes the clearance of low-quality housing, brownfield redevelopment and gentrification. It involves changes in land use to restore run-down urban areas, improving quality of housing, encouraging economic growth, and improving infrastructure and services in affected neighbourhoods. An important aim is to improve quality of life, reduce poverty, increase opportunity and reduce urban stress in affected neighbourhoods. The costs and benefits of urban redevelopment will vary between the local neighbourhood populations and other stakeholders.

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

- Urban redevelopment involves land use changes in run-down urban areas and the clearance of low-quality housing.
- These are often areas of poor housing, high unemployment and lack of economic activity, poor infrastructure and poverty. They may also suffer from high levels of pollution, poor health and high levels of stress.
- The aim of urban redevelopment is to improve quality of housing, encourage economic growth, improve quality of life and reduce urban stress.
- Redevelopment of low-quality housing may involve the removal and re-development of informal settlements, affecting local populations in different ways.
- Run-down inner city areas may be improved by new housing developments, replacing de-industrialised areas with areas of different economic opportunity, improving transport and infrastructure, but raising costs and displacing local residents.
- The costs/benefits will vary between local populations and stakeholders (local communities, city planners, environmental groups, developers, local governments, businesses) depending on their differing perspectives and power concerning changes in land use and economic activity.

Good answers may be **well-structured** (AO4) and may additionally offer a **critical evaluation** (AO3) of the statement that examines the costs and benefits of schemes in different places, and the differing perspectives and power of stakeholders (e.g. residents, developers, local governments) and populations of affected neighbourhoods. Another approach might be to examine how the balance between costs and benefits may change over time.

For **5–6 marks**, expect weakly-evidenced outlining of at least one benefit and/or cost of urban redevelopment in one neighbourhood.

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

- either an evidenced explanation of the costs and benefits to stakeholders of urban redevelopment in one or more neighbourhoods.
- or a discursive conclusion (or ongoing evaluation) grounded in geographical concepts and/or perspectives.

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