

Markscheme

November 2025

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	<p>The response is too brief, lists unconnected information, is not focused on the question and lacks structure.</p> <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	<p>The response is too general, lacks detail, is not focused on the question and is largely unstructured.</p> <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). 		
5–6	<p>The response partially addresses the question, but with a narrow argument, an unsubstantiated conclusion, and limited evaluation.</p> <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). 		

<p>7–8</p>	<p>The response addresses the whole question, the analysis is evaluated and the conclusion is relevant but lacks balance.</p> <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.
<p>9–10</p>	<p>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.</p> <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.

Option A — Freshwater

1. (a) (i) State the main land cover in the box, **A**, in the south east of the map. [1]
Native forest
- (ii) State the height difference, in metres, between the spot heights in grid squares 2982 and 3383. [1]
40 (metres)
- (b) Outline the main features of **one** landform, formed by river processes, shown on the map. [2]
Award [1] for a basic outline of a valid landform and [1] for development of its main features or the process relating to its formation
For example, a meander is a winding / sinuous section of the river [1] with steep river cliffs and shallow slip-off slopes / where the stream spreads its energy over the width of the channel / where the force of the water (erosion) erodes the lateral bank [1]
Other possible landforms are
- Floodplains
 - Ox bow lakes
 - Old meander scrolls
 - River terraces
 - River cliffs
 - Levees
- (c) Explain **two** challenges arising from the use of internationally shared water resources. [3 + 3]
These can be rivers, wetlands, lakes and aquifers
Award [1] for the challenge and up to [2] for development, explanation or a developed example that clearly shows the reason for the challenges
For example, ensuring equal allocation of the water between countries [1] has led to tension between the USA and Mexico [1], as very little of the Colorado river reaches Mexico [1].
Other challenges include
- Political conflict may arise between neighbouring countries.
 - Competing demands for the resource
 - Difficulty of forming treaties / agreements.
 - Cross-border pollution

2. (a) Examine the extent to which human activities increase the frequency **and** magnitude of river flooding. [10]

Marks should be allocated according to the markbands.

Human activity may increase the frequency and magnitude of river flooding, causing significant economic and social impacts to vulnerable populations. Physical factors, such as rainfall amounts and intensities, vegetation, relief and geological characteristics of drainage basins are important factors in flood risk. Human activities include urbanization, deforestation, channel modification, as well as indirect actions such as climate change. Natural events such as volcanic eruptions or seasonal glacier melt may also lead to changes in river flooding.

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

- River flooding is a natural phenomenon, but the magnitude and frequency of floods has been increasing in recent years, largely due to human activities.
- Human activities that have increased the risk of flooding include urbanization, deforestation, agricultural land use, drainage of wetlands and channel modification.
- These have resulted in an increase in the volume and speed of surface run-off, and a decrease in lag-time from rainfall events. This has often resulted from a decrease in surface storage and an increase in impermeability within drainage basins
- Channel modification, including straightening, and loss of wetlands have also resulted in increasing flood risk.
- Human actions resulting in climate change have increased the frequency and magnitude of rainfall events, increasing flood risk.

Human activity may also decrease river flooding through actions such as afforestation, restoring river meanders, and building flood storage reservoirs.

Good answers may be **well structured** (AO4) and **evaluate** (AO3) the relative importance of human processes as mechanisms for increasing the frequency and magnitude of flooding and examine how the relative importance of human factors might vary between places, and over changing time periods. They might also examine how human activity might reduce flooding in the future. Physical processes may also be examined.

For 5-6 marks, expect some weakly-evidenced outlining of how at least one human activity might increase the frequency **and** /or magnitude of river flooding

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

- Either an evidenced examination of the extent to which human activities contribute to increased flood frequency and magnitude.
- Or a discursive conclusion (or on-going evaluation) regarding the relative importance of activities in different places, possibly also recognizing that human actions/management might decrease river flooding.

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

2. (b) Examine the extent to which the benefits exceed the costs of integrated drainage basin management (IDBM) plans.

[10]

Marks should be allocated according to the markbands.

Increasing demands on water supplies, resulting mainly from population growth and economic activity, has made the management of often limited water resources increasingly important. The drainage basin is the logical geographical unit for the management of water resources, and an integrated approach will ensure co-operation between different user groups and stakeholders, including planners, politicians, and environmentalists. Integrated management plans may bring significant economic, political and environmental benefits, but also costs and possible conflicts between stakeholders.

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

- Increasing pressures and demands on water resources from different user groups has made the management of water resources increasingly important.
- An integrated management plan would take account of the demands of different user groups and relevant stakeholders.
- The plan would monitor the supply and demand for water in different areas and times, ensuring the needs of different stakeholders and reducing possible conflicts.
- The plan should ensure the use of water resources for a sustainable and long-term future, also taking due account of environmental issues.
- The costs of such plans include possible political conflicts when the drainage basins cross international frontiers.
- There will also be a financial cost in implementing and maintaining the plan, which may result in conflict between stakeholders.

Climate change and its effects on rainfall patterns also adds pressure to water resources, making management even more essential.

Good answers may be **well structured** (AO4) and may additionally offer a **critical evaluation** (AO3) of the statement in a way that reaches evidenced judgment and shows understanding of the benefits and costs of IDBM plans. The concerns, possible conflicting interests and power of different stakeholders should be examined, together with the varying possibilities regarding the extent to which management of water resources may lead to a sustainable future. They may also consider the importance of scale, and that management may be more challenging in larger basins which cross international boundaries.

For 5-6 marks, expect some weakly-evidenced outlining of one or more benefit(s) and/or cost(s) of an IDBM plan

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

- Either an evidenced examination of the relative importance of the benefits and costs of an IDBM plan
- Or a discursive conclusion possibly regarding the growing need for such plans and the difficulty and costs in their implementation

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

Option B — Oceans and coastal margins

3. (a) (i) State the change in ocean pH between 1900 and 2000. **[1]**
0.1 or -0.1 (allow 8.2 to 8.1)
- (ii) Estimate the year in which atmospheric carbon dioxide (CO₂) concentration is projected to reach 20 millimoles per cubic metre (mmol/m³). **[1]**
2075 (accept 2070-2080)

- (b) Outline **one** way in which oceans can be a source of carbon dioxide (CO₂). **[2]**
Award **[1]** for the factor and **[1]** for development / explanation

For example, warmer ocean waters become a source of carbon dioxide because they can hold less CO₂ **[1]** so surface waters release CO₂ into the atmosphere **[1]**

Other factors include

- Ocean organisms decay releasing stored CO₂ to the ocean
- Carbon dioxide is released during underwater volcanic activity when sediments are destroyed by subduction
- Upwelling brings CO₂ from the deep ocean to the surface

- (c) Explain **two** reasons for international conflict over the control of transit choke points. **[3+3]**
Award **[1]** for each reason and up to **[2]** for development / explanation / exemplification.

Control over key transit choke points offers significant military advantages **[1]**, allowing states to monitor and restrict movement of rival naval forces **[1]**. This can increase tensions turning choke points into potential flashpoints for conflict **[1]**.

Transit choke points can be vulnerable to piracy and terrorist attacks **[1]** due to their concentrated traffic **[1]**. For example, Houthi attacks on commercial ships in the Bab el-Mandeb Strait (Red Sea) led to conflict with international military forces and increased international naval presence **[1]**.

- Canals are controlled gateways, giving the managing state significant leverage over ocean transportation.
- Climate change, sea level rise and changing weather patterns can impact the navigability of choke points and canals.

4. (a) Examine ways in which different coastal processes contribute to the formation of spits. **[10]**
Marks should be allocated according to the markbands.

Spits can be found on indented coastlines or river mouths where deposition from longshore drift takes place in lower energy environments. Spits shelter bays from waves and currents promoting further deposition and the development of sheltered environments like mud flats and salt marshes.

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

- Spits are dynamic coastal features shaped by the interplay of coastal morphology, waves, wind, currents, and sediment transport.
- Key processes responsible for their formation:
 - The action of wind and waves are interrelated. Waves and the process of longshore drift sorts & transports material. Refraction causes spits to become curved.
 - Winds are responsible for wave characteristics (strength, type and direction of longshore drift) and secondary winds or waves approaching from a different direction, along with refraction, help to form a hooked shape at the end of the spit.
- Other landforms may also be mentioned, including:
 - Dunes: these form on spits where there is a large supply sand on a beach and onshore winds.
 - Mud flats and salt marshes: spits shelter bays from waves and currents promoting further deposition and the development of sheltered environments like mud flats and salt marshes.
- Other factors as well as coastal processes may be considered, such as:
 - Shape of coastline: indented coastlines and river mouths allow spits to form.
 - Sediment supply from erosion: changes in wave characteristics and sediment supply can influence deposition rates and the morphology of spits. Human activities such as the construction of groynes or dredging may also impact sediment transport and deposition patterns.

Good answers may evaluate the relative importance of different coastal processes in the formation of spits in different places. Time scales may also be examined, where changes in sediment supply or erosion processes (e.g. seasonal changes in wave characteristics) can influence deposition rates and affect the morphology of spits. Interactions between people and coastal environments may also be considered.

For 5–6 marks, expect some weakly-evidenced outlining how one or more coastal processes contributes to the formation of spits.

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

- Either an evidenced examination of the ways that different coastal processes contribute to the formation of spits.
- or a discursive conclusion (or ongoing evaluation) regarding their relative importance.

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

4. (b) Evaluate the viability of alternatives to overfishing. [10]

Marks should be allocated according to the markbands.

Overfishing is the extraction of fish at unsustainable rates, threatening fish stocks, marine ecosystems, employment and food security. It is driven by increasing demand for seafood, with alternatives including aquaculture, conservation areas and quotas. The viability of these alternatives depends on their effectiveness, as well as practicality, long-term sustainability, social acceptability, impacts on the environment and economic feasibility.

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

- Overfishing is driven by consumer demand, linked to population growth and dietary shifts.
- Practices associated with overfishing include unsustainable fishing methods (e.g. bottom trawling), management practices such as subsidies and illegal unreported and unregulated fishing.
- Alternatives to overfishing includes aquaculture, stock enhancement, international agreements and regulations (e.g. gear restrictions), conservation areas (marine protected areas), quotas and use of technology (satellite monitoring, precise fishing).
- The viability of alternatives to overfishing depends on a combination of technological, regulatory, and social approaches.
- The viability of aquaculture is questionable due to various environmental and economic challenges that have to be overcome to be sustainable.
- Regulatory and catch limits rely on the implementation of national and international policies which are often difficult to enforce due to lack of resources, political will, and the spatial element.
- Technological advances make it easier to monitor illegal fishing. However, recognition of overfishing needs to be followed by enforcement.
- Social approaches for sustainability and decreased demand are countered by the dietary needs of a growing and wealthier population.

Good answers may be **well-structured** (AO4) and may additionally offer a **critical evaluation** (AO3) which evaluates the viability of alternatives at different geographic scales, and the roles/power of different stakeholders in different places. Different perspectives on the effectiveness of different alternatives may be explored.

For 5-6 marks, expect some weakly-evidenced outlining **one or more** alternatives to overfishing.

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

- Either an evidenced evaluation of the viability of alternatives to overfishing.
- 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) Identify the area with the largest number of people living in inland settlements on permafrost. **[1]**
Sakha
- (ii) Estimate the percentage of people in Alaska living in settlements that are **not** on permafrost. **[1]**
75% (accept 73-77%)
- (b) Outline **one** way in which settlements are affected by the melting of permafrost in this area. **[2]**
Award [1] for the effect on settlements, and [1] for development / explanation.
For example, buildings subside / collapse **[1]** as a result of the active layer thawing **[1]**.
Other ways may include:
- Economic prosperity due to discovery of oil and gas
 - Extension of farming further north
 - Accessibility of settlements
 - Water / waste water does not freeze / keeps on flowing
- (c) Explain **two** reasons for the occurrence of flash floods in hot, arid areas. **[3 + 3]**
Award [1] for each reason and up to [2] for development / explanation.
For example, heavy rainfall / intensity **[1]** exceeds infiltration capacity **[1]** leading to sudden surface run off / overland flow **[1]**
For example, sparse or unvegetated desert surfaces **[1]** less interception **[1]** results in little infiltration leading to flooding **[1]**
Other reasons include
- Water may be concentrated in wadis / canyons / channels
 - Summer convection rainfall / spring snow melt in mountains / monsoons
 - Presence of desert surfaces (crusts, rocky, impermeable) preventing infiltration

6. (a) Examine the relative importance of physical challenges **and** human challenges for resource extraction (minerals, oil, gas) in hot, arid environments. [10]

Marks should be allocated according to the markbands.

Large deposits of valuable mineral resources occur in arid environments, including iron, copper, uranium, oil and gas. These are often mined by large TNCs for export to industrialized countries. There are significant physical and human challenges to the extraction and exploitation of these resources. These include adverse physical conditions such as extreme heat and drought, remoteness, accessibility. Human challenges include lack of infrastructure, dependency on TNCs and leakage of profits, land rights and ownership, and possible health issues related to mining. However, many challenges can be overcome or minimised to ensure that the mining operations are more sustainable in future.

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

- Valuable mineral deposits, such as iron, copper, uranium, oil and gas occur in arid environments.
- There are significant physical and human challenges to the extraction of the minerals.
- Physical challenges include remoteness and isolation; extreme climate conditions, drought and water availability.
- Pollution on land and in waterways from mine waste may cause considerable environmental issues.
- Economic challenges include lack of infrastructure, the need for external labour, and dependence on TNCs. Minerals will probably be exported, and profits and revenues go overseas, with limited revenue for the host country.
- Other social and political issues concern land rights, and the impact of mining on local / indigenous people.
- Local and national stakeholders may be concerned about who benefits from mining developments.
- Challenges may be reduced or overcome by actions such as political and economic agreements between affected stakeholders, the use of technology to overcome physical challenges. Suitable development plans may be used to ensure environmental and social sustainability.

Good answers may be **well structured** (AO4) and may additionally offer a **critical evaluation** (AO3) of the human and physical challenges, how these may be overcome, and the varying power of different stakeholders, from local to national and international to ensure a more sustainable development for the future. They may examine possibilities for conflict resolution and ways of promoting/safeguarding the interests of local people and the environment.

For 5–6 marks, expect weakly-evidenced outlining of at least one human or physical challenge for mineral extraction in an arid extreme environment.

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

- Either an evidenced examination of the relative importance of physical and human challenges in an arid extreme environment.
- Or a discursive conclusion (or ongoing evaluation) grounded in geographical concepts and/or perspectives, possibly examining strategies for overcoming challenges.

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

6. (b) Examine the importance of glacial processes in creating unique landscapes in glaciated upland areas.

[10]

Marks should be allocated according to the markbands.

Glacial processes include erosion, transportation and deposition which together form unique and distinctive landscapes in glaciated upland areas, including those formerly affected by glaciation during past ice ages. Erosional landscapes include cirques/corries, aretes, pyramidal peaks and glacial troughs and lakes. Glacial deposition forms various types of moraine and erratics. Other processes operating in glacial regions include weathering and fluvial processes from glacial meltwaters.

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

- Landscapes formed by glacial erosion include cirques/corries, arêtes, pyramidal peaks/horns and glacial troughs. They are mainly formed by the processes of plucking and abrasion. Freeze-thaw weathering processes are also important.
- Eroded material is transported within and on top of the ice. When deposited these sediments may form various types of moraine: lateral, medial and terminal. When the ice melts, terminal moraines mark the position of the former ice front, or snout.
- Erratics are also carried by the glaciers, and when deposited give important evidence of the former extent of ice cover.
- Glacial processes do not operate alone and are accompanied by other processes which contribute to the unique landscapes of glaciated uplands. These include frost action, forming scree slopes, and fluvial processes from glacial meltwaters forming outwash plains beyond the glacial front.
- Glacial landscapes are unique, formed by distinctive processes associated with glacial ice.
- These unique landscape features also occur in areas not currently affected by glaciation and are testimony to the effects of glacial processes during past ice ages.

Good answers may be **well-structured** (AO4) and may additionally offer a **critical evaluation** (AO3), which examines the role of glacial processes of erosion, transportation, and deposition in creating unique landscapes in upland areas. They may also consider the importance of other, related processes. They might also discuss how these processes have operated in other areas during previous time periods, affected by climate change.

For 5-6 marks, expect a weakly-evidenced outlining of how glacial processes create one or more glacial landforms.

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

- Either an evidenced examination of the importance of glacial processes in the formation of unique landscapes.
- Or a discursive conclusion (or ongoing evaluation) of the relative importance of glacial and other processes in the formation of unique landscapes.

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

Option D — Geophysical hazards

7. (a) (i) State the number of supervolcanoes located in the Northern Hemisphere. [1]
2

(ii) State the amount of ejected material, in cubic kilometres (km³) from the smallest supervolcano. [1]
1000

(b) Outline **one** reason for the distribution of active volcanoes. [2]

Award [1] for the reason and [1] for development / explanation

For example, active volcanoes are found along destructive plate boundaries/margins [1] where subduction is occurring [1].

Other reasons include

- Hotspots
- Intra plate – rift valleys
- Constructive plate margins

(c) Explain **two** ways in which people’s vulnerability to volcanic hazards may be reduced. [3+3]

Award [1] a suitable way/method, and up to [2] for development / explanation

For example: land-use planning / zoning [1] by drawing maps of areas likely to be affected by lava and ash flows / hazard maps [1] and then restricting development and human access [1].

Other possible ways include:

- Insurance
- Aid
- Evacuation routes
- Building design
- Warning systems / sirens
- Monitoring of volcanoes
- Lava diversions
- Awareness / preparedness / education

8. (a) Examine how the risk to communities from **one or more** geophysical hazards is influenced by different human factors. **[10]**

Marks should be allocated according to the markbands

The risk to communities from geophysical hazards is influenced by the interaction between a variety of economic, social and political factors. These include relative levels of wealth, poverty and economic development, population characteristics, education, and political factors such as governance and political stability. Vulnerability varies spatially, between different places from local to international, and time scales.

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

- The risk from geophysical hazards results from the interaction between various human factors: economic, social and political characteristics of vulnerable communities
- Economic factors include levels of wealth, development, resilience of buildings, infrastructure, communications and technology.
- Social factors include education and literacy, perception and attitudes to risk.
- Population characteristics are important, including gender, age structure, population distribution and density.
- Political factors relate to governance, planning and political stability.
- These human factors will affect the response to hazards, including planning, pre-event and post-event strategies, and their effectiveness.

Good answers may be **well-structured** (AO4) and may additionally offer a **critical evaluation** (AO3) which show understanding of the inter-relationships between, and relative importance of, human factors influencing risk to communities in different places. Another approach might be to examine the power of different stakeholders, and how the relative importance of the factors may vary over time and at different scales.

For 5-6 marks, expect some weakly-evidenced outline of how the hazard risk to communities is influenced by one or more human factors

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

- Either an evidenced examination of different human factors affecting risk from geophysical hazards.
- Or a discursive conclusion (or ongoing evaluation) examining how these factors are inter-related with each other.

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

8. (b) Examine reasons why earthquake hazard events may have contrasting impacts on human well-being. [10]

Marks should be allocated according to the markbands

Human well-being is a broad term which includes mortality rates, health, access to food, water and shelter, education, and quality of life. Earthquake hazard events vary in magnitude, frequency and location, and their impact on human well-being will be affected by geophysical and human factors. The latter include economic, social and political factors. Similar earthquake events may affect human well-being in contrasting ways between different places.

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

- Human well-being includes mortality rates, physical and mental health, access to water, food supplies and shelter, and quality of life. It varies between places and is affected by a variety of geographic factors (economic, political and social).
- Earthquake hazard events have negative impacts on quality of life, the severity of which will vary with different geographic factors.
- The type and magnitude of earthquake hazard event (including tsunami, mass movement, ground shaking) will result in different impacts.
- Similar earthquake events in different places may have contrasting impacts on human well-being.
- Severe impacts on well-being may be long-term or short-term, depending partly on post-event management responses.
- Human well-being will be affected by the actions of different stakeholders (local, national, and international) in response to the hazard event.

Good answers may be **well-structured** (AO4) and may additionally offer a **critical evaluation** (AO3) of the statement in a way that shows understanding of the contrasting impacts on human well-being in different places and scales; the influence of different characteristics of the hazards. They may also examine how the impacts vary over different time scales (long and short-term).

For 5–6 marks, expect weakly-evidenced outlining of one or more reasons for the impacts of earthquake hazard events on human well-being.

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

- Either an evidenced examination of the reasons for contrasting impacts on human well-being of earthquake hazard events.
- Or a discursive conclusion (or on-going evaluation) grounded in geographical concepts and/or perspectives, perhaps considering severity of impacts at different time scales.

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

Option E — Leisure, tourism and sport

9. (a) (i) State the sport with the most equal participation percentage between males and females. **[1]**
Gym fitness.
- (ii) State the sport with the median participation percentage for males. **[1]**
Jogging
- (b) Outline **one** reason why a person’s lifecycle stage may affect their participation in sport. **[2]**
Award [1] for a valid reason and [1] for further development / explanation.
For example: retired people **[1]** who may have the time/ wealth to enjoy sports **[1]**
Other possibilities include:
- Sports encouraged at school – large number of younger participants
 - Working parents
 - Young professionals
- (c) Explain how using tourism as a national development strategy can bring:
- (i) **one** economic **benefit** to a country; **[3]**
Award [1] for an economic benefit and up to [2] for development / explanation / developed exemplification
For example, jobs will be created **[1]** leading to increased incomes **[1]** and a rise in living standards **[1]**
Other economic benefits include:
- Investment in infrastructure e.g. airports, roads, hotels, resorts
 - Foreign currency earned
 - Growth in GNP
- (ii) **one** economic **cost** to a country. **[3]**
Award [1] for an economic cost and up to [2] for development / explanation / developed exemplification.
For example, leakage of profits **[1]** as many hotels / resorts are owned by foreign TNC’s **[1]** so little money goes back into the community / no multiplier effect within the country **[1]**
Other costs include:
- Employment may be low-skilled, poorly paid and seasonal
 - Tourist niches / enclaves may develop
 - Decline of rural sector due to out migration

10. (a) Examine the extent to which the benefits exceed the costs for a country hosting an international sporting event. [10]

Marks should be allocated according to the markbands

Major international sporting events include the Olympics and Football World Cup, which are held every few years in a different country. These events attract a large global audience. Hosting such events may have considerable political, economic, social, and cultural benefits to the host country. There are also significant costs, in both short- and long-term time scales. The benefits and costs may be unevenly distributed within a country and affect different groups of people in varying ways.

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

- The hosting of major international sporting events bring varying costs and benefits to a country: political, economic, social and cultural.
- Considerable international prestige is a major political benefit, raising a country's reputation and profile. However, costs may include human rights violations and exploitation.
- Economic benefits include the construction/renovation of sporting venues, development of infrastructure, job creation, and development of tourism. However, creating new venues may be expensive and long-term use may be in doubt. Job creation may be short-term, reliant on migrant labour subject to human rights abuse
- Economic development may not be evenly distributed.
- Social / cultural benefits include a sporting legacy, improving sports participation and greater inclusion by race, gender and ability. Such benefits rely on long-term support and funding by government bodies.
- Environmental long-term benefits may include a focus on sustainable policies with regard to water, air and wildlife. Costs include habitat loss, pollution and water wastage.
- A significant economic cost may be a long-term legacy of debt to both local and national populations.

Good answers may be **well structured** (AO4) and may additionally offer a **critical evaluation** (AO3) of the statement in a way that considers political, economic, social and cultural benefits and costs from different perspectives, at varying time and spatial scales. Another approach might be to examine the power of different stakeholders, local to international, and why some places have benefitted more than others.

For 5–6 marks, expect some weakly-evidenced outlining of at least one relevant benefit **or** cost for a country hosting an international sporting event.

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

- Either an evidenced examination of different benefits and costs for a country hosting an international sporting event.
- Or a discursive conclusion (or ongoing evaluation) of the relative importance of benefits and costs.

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

10. (b) Examine the effectiveness of management strategies used to increase site resilience in rural tourist hotspots. **[10]**

Marks should be allocated according to the markbands

The growth of unsustainable tourism in rural tourist hotspots, where carrying capacity is exceeded, necessitates management strategies to increase site resilience. The rapid growth of mass tourism is encouraged by cheap travel, package holidays, increased wealth and leisure time, advertising, and media. As a result, rural areas experience many negative economic, social, and environmental consequences, as the carrying capacity is exceeded. The quality of life of local residents is decreased and there may be serious environmental impacts on water, vegetation, wildlife and landscapes. Management strategies are required to reduce these negative impacts, increase site resilience and contribute to a more sustainable future.

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

- The rapid growth of tourism and the development of tourist hotspots in rural areas has resulted in many economic, social, and environmental problems.
- The carrying capacity in rural hotspots is exceeded, with negative consequences for the local economy, population and environment.
- Management strategies should aim to address the problems and increase site resilience to ensure a more sustainable future.
- Strategies might seek to reduce visitor numbers, control access by vehicles, reduce the number of holiday/second homes and ensure participation of local people.
- The establishment of national parks and reserves might help protect rural environments and landscapes.
- Encouraging principles of eco-tourism, including recycling and waste disposal.
- The interests of different stakeholders, local to international, should be considered in management plans.
- Also the cultural and economic interests of local people should be taken into account.

Good answers may be **well structured** (AO4) and may additionally offer a **critical evaluation** (AO3) of the effectiveness of management strategies to increase site resilience, examining the power and perception of different stakeholders, and possible conflicts. They should evaluate the effectiveness of management strategies for a sustainable future.

For 5–6 marks, expect some weakly-evidenced outlining of at least one management strategy for increasing site resilience in rural tourist hotspots.

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

- Either an evidenced examination of the effectiveness of management strategies to increase site resilience in rural tourist hotspots
- Or a discursive conclusion (or ongoing evaluation) grounded in geographical concepts and/or perspectives, regarding their effectiveness.

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

NB Maximum [5] if hotspot is urban

Option F — Food and health

11. (a) (i) State the total amount of bananas produced, in millions of tonnes, in Asia in 2010. [1]
60 (million)
- (ii) Estimate the total increase in worldwide banana production, in millions of tonnes, between 1961 and 2020. [1]
100 (accept 98-102)
- (b) Outline **one** way in which the use of genetically modified organisms (GMOs) could increase food production. [2]

Award [1] for a basic outline point about increasing productivity/yield and [1] for further development.

For example: Scientists use GM technology to shorten the time needed for plants to be ready for harvest [1], which means there is a higher yield per year [1].

Other possibilities include:

- Growing season/time of germination
- Frost, drought or pest resistance
- Size and number of fruits/nuts/seeds *etc.*

- (c) Explain **one** barrier to the diffusion of:

- (i) a named vector-borne disease; [3]

Award [1] for a barrier and up to [2] for explanation / development / exemplification

For example, draining stagnant water in villages [1] as inadequate drainage is the ideal breeding place for mosquitoes [1] as the mosquito which transmits malaria lays its eggs in still water [1].

Other barriers include:

- Insecticide treated mosquito bed nets
- Medication
- New vaccination developments / anti-malarial drugs
- Spraying around house
- Health checks
- Education / community action
- Physical barriers like mountains, temperature / distance / remoteness

Vector-borne diseases include malaria, dengue fever, Lyme disease, Zika and West Nile fever.

NB. Maximum [2] if no named disease

- (ii) a named water-borne disease. [3]

Award [1] for a barrier and up to [2] for explanation / development / exemplification

For example, safe sanitation [1] as cholera can be caught by drinking water contaminated with the faeces of an infected person [1] for example, Haiti has endemic cholera as an estimated 90% of Haitians do not have access to proper toilets [1]

Other barriers include:

- Hygiene e.g. washing hands

- Eating well-cooked and hot food
- Peeling vegetables and fruit

Water-borne diseases include cholera, typhoid, giardia, dysentery, E coli, Hepatitis A.

Effective vaccinations exist for typhoid and Hepatitis A only

NB. Maximum [2] if no named disease

12. (a) Examine the roles of international organizations **and** governments in combating food insecurity.

[10]

Marks should be allocated according to the markbands

Food security refers to the availability and access to sufficient food for a healthy and active life. Food insecurity is widespread, occurring at different spatial and time scales: (local to global, long- or short-term) and caused by a variety of geographic factors (physical, economic, social and political). International organizations (including the UN and various NGOs) and national governments play vital roles in combating food insecurity through actions such as aid and emergency relief, and longer-term solutions such as agricultural innovations, education and infrastructure to increase productivity. Governments may also play an important role in ensuring food availability and affordability to vulnerable communities.

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

- Food insecurity refers to a lack of access to a sufficient amount of nutritious food for a healthy life.
- Food insecurity occurs at various spatial and time scales, but is often associated with physical stress, poverty, low agricultural production, poor communications and infrastructure, and international trade and agreements.
- International organizations, such as the FAO and the World Food Programme, play a vital role in providing education in agricultural innovation, access to water supply and irrigation, and trade agreements.
- They may also give essential aid to people affected by war or natural hazards.
- Governments may also enable increases in food production, and improve availability through trade and aid.
- Governments may help by giving financial assistance and educations to vulnerable communities (for example, free school meals)
- Governments may also introduce strategies to minimize food waste.

Good answers may be **well-structured** (AO4) and may additionally offer a **considered examination** (AO3) of the statement in a way that shows understanding of the power of international organizations, governments, and other stakeholders, in tackling food insecurity in different places, and spatial and time scales.

For 5-6 marks, expect a weakly-evidenced outline of how at least one international organization or government might combat food insecurity.

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

- Either an evidenced examination of the roles of international organizations and governments in combating food insecurity
- Or a discursive conclusion (or ongoing evaluation), grounded in geographical concepts and perspectives.

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

12. (b) Evaluate strategies of prevention **and** treatment in the management of **one or more** diseases.

[10]

Marks should be allocated according to the markbands

The management of disease involves limiting its spread and treating its effects. The strategies of prevention and treatment will be influenced partly by the nature of the disease, and a variety of economic, political and social factors. The nature of the disease, whether chronic or communicable, is relevant, as some diseases cannot be prevented, although risks can be minimised. Geographic issues such as poverty, access to basic needs, education, health infrastructure and political priorities are important in the prevention of communicable diseases. International bodies, such as the WHO and NGOs also help in the prevention of disease in different countries and regions.

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

- Prevention strategies seek to minimize the diffusion, occurrence and severity of disease.
- The effectiveness of treatment strategies may vary, according to affordability and access to healthcare professionals.
- Infectious diseases (such as measles or TB) may be more easily prevented than chronic diseases (such as cancer). However, the risk from the latter may be minimized through education, lifestyle changes and regular screening.
- Many infectious diseases may be prevented by reducing poverty levels and improving access to clean water, food security and shelter.
- Access to treatment and cost will vary between diseases. Infectious diseases can be treated, often relatively cheaply, with antibiotics, but these are ineffective with viruses, such as 'flu and COVID which are treated with palliative care, sometimes in hospital. Diseases such as many cancers and heart disease may require expensive surgical treatment in hospital or lengthy chemo-therapy treatment.
- Government policies and priorities are important, for example, in the development of health infrastructure and training healthcare workers, policies of disease screening and immunization programmes.
- Disease prevention may require isolation and quarantine, with associated long-term economic and mental impacts.
- International Organizations and NGOs provide important help in preventing disease in many parts of the world, including areas affected by natural hazards and war.

Good answers may be **well-structured** (AO4) and may additionally offer a **critical evaluation** (AO3) of the statement in a way that examines the possibilities and effectiveness of prevention and treatment strategies for the management of disease. The effectiveness of strategies will vary between different places and time and spatial scales, and will be influenced by the power of stakeholders.

For 5-6 marks, expect a weakly-evidenced outline of a prevention **and /or** treatment strategy for one or more diseases

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

- Either an evidenced evaluation of the strategies of prevention and treatment in the management of one or more diseases.
- Or a discursive conclusion (or ongoing evaluation), grounded in geographical concepts and perspectives, possibly comparing the merits of prevention and treatment.

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

Option G — Urban environments

13. (a) (i) Identify which country has the largest number of informal housing areas. **[1]**
Nigeria (do not accept Pakistan which is population total)
- (ii) State the mode of the estimated population. **[1]**
500 000
- (b) Outline **one** economic reason for the growth of informal housing areas. **[2]**
Award **[1]** for the reason and **[1]** for development / explanation
For example, job opportunities encourage rural-urban migration **[1]**, and there is insufficient housing available so people build their own **[1]**
For example, formal housing is limited / expensive **[1]**, so poorer people cannot afford it and informal housing grows **[1]**.
Other reasons include:
 - Economic stagnation in rural areas.
 - High unemployment / poverty
- (c) Explain **two** challenges facing urban areas when making improvements to infrastructure. **[3 + 3]**
Award **[1]** for a valid challenge and up to **[2]** for development / explanation
Infrastructure includes power, transport, telecommunications, sanitation, water, waste disposal.
For example, disruption to existing road system as repairs / upgrades are done **[1]** causing traffic congestion / pollution **[1]** potentially causing stress to commuters / dispute with the government agencies **[1]**
For example, the cost of providing access to power / water / waste management **[1]** increases local rates / diverts funds from elsewhere **[1]** which may lead to social dispute **[1]**
Other challenges include
 - Site restrictions
 - Community unwillingness for change / environment pressure groups
 - Planning restrictions / loss of countryside
 - Urban sprawl
 - Disputes over land ownership

NB. Do not accept urban renewal / gentrification as development to a valid challenge.

14. (a) Evaluate the effectiveness of resilient city design strategies in managing risks caused by climate change. **[10]**

Marks should be allocated according to the markbands

Resilient city design strategies are used to reduce the risks posed by the consequences of climate change. Global warming may result in increased flooding from rainstorms and hurricanes, coastal flooding caused by sea-level changes, and increases in heat waves and stress from high temperatures. On a local scale, atmospheric pollution and increasing strength of urban heat islands cause health and environmental issues. Resilient design seeks to minimize the risks and enable a more sustainable future for urban dwellers. Resilient city design strategies could include attempts to adapt to the challenge of climate change, e.g. flood barriers, or to mitigate the causes of climate change, e.g. reducing carbon dioxide through tree planting. The success of strategies in different areas will vary with political, economic, demographic and social characteristics of urban areas. Some cities will be more able to afford and implement design strategies than others.

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

- Climate change caused by global warming brings increased risk of flooding to urban areas, resulting from the increased frequency and intensity of rainstorms and hurricanes. Global changes in sea level also bring the increased risk of coastal flooding.
- Rising temperatures may increase the heat island effect and bring heat stress to urban populations.
- Increases in atmospheric pollution from burning fossil fuels adversely affect the health of communities and the environment of urban areas.
- Resilient city design strategies have been introduced in many cities, at various scales, to manage the risks to attempt to achieve a sustainable future.
- Flood control and reduction strategies include both hard and soft engineering, such as improving drainage systems and changing land use to reduce and absorb overland flow.
- An important strategy is the creating of green areas, which not only act as “lungs” to reduce pollution, but also reduce and absorb rainfall run-off.
- Sea defences may be strengthened to reduce coastal flooding, but planning strategies such as land-use zoning may also reduce the flood risk in riverine and coastal areas.
- Design strategies may also include reduction of the heat island effect and reducing pollution levels through traffic management schemes.
- Significant barriers to such design strategies include – financial cost and political will, especially in rapidly growing urban areas in low income countries, the problems caused by large infrastructure changes, and the perception of local populations. The scale of such strategies is a major issue, and perhaps local, focused planning strategies are more effective.

Good answers may be **well-structured (AO4)** and may additionally offer a **critical evaluation (AO3)** of the statement in a way that examines the effectiveness of resilient city design to reduce the risks from climate change, the power and perspectives of different stakeholders, together with how the effectiveness of strategies varies with scale, in places of different economic development.

For 5–6 marks, expect weakly-evidenced outlining of at least one resilient city design strategy to manage risks from climate change.

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

- Either an evidenced evaluation of the effectiveness of different resilient city design strategies in managing risks from climate change

- Or a discursive conclusion (or ongoing evaluation), grounded in geographical concepts and perspectives

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

14. (b) Examine the extent to which physical factors **and** economic factors affect the pattern of residential areas in cities. **[10]**

Marks should be allocated according to the markbands

The pattern of residential areas in cities is influenced by a variety of geographic factors, physical, economic, social and political, which vary in importance between different places. Physical factors include elevation, local climate, drainage and relief, and are to some extent linked to land values. The latter are also related to patterns of economic activity, distance from central areas and transportation. Decision-making regarding planning also has a major influence on residential areas, as does segregation based on the ethnicity of residents.

The importance of these factors will also vary between long-established and newly-built urban areas, and is affected by the varying power of different stakeholders.

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

- Patterns of residential areas are influenced by a variety of geographic factors.
- Physical factors are linked to economic factors, e.g. land values / house prices.
- Wealthy residential areas are attracted by high elevation, green open space such as woodland and clean air.
- Land values are also influenced by economic factors including transport networks and distance from central areas.
- Political decision-making, including urban planning and regeneration, and possible social and ethnic segregation also influence patterns of residential areas
- The relative importance of factors influencing residential patterns varies between places: for example, newly-planned cities and old-established urban areas, and regions with differing economic and political systems. The residential patterns also change over time.

Good answers may be **well-structured (AO4)** and may additionally offer a **critical evaluation (AO3)** of the statement in a way that examines the relative importance of physical and economic factors, the role and interaction between different stakeholders, and the influence of scale (e.g. megacities and small cities) and change over time. Another consideration is that the factors will vary between different places, and areas of contrasting economic development.

For 5–6 marks, expect weakly-evidenced outlining of at least one economic **and/or** physical factor affecting the pattern of residential areas in cities

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

- Either an evidenced examination of the extent to which physical and economic factors may affect the pattern of residential areas in cities
- Or a discursive conclusion (or ongoing evaluation), grounded in geographical concepts and perspectives, perhaps recognizing the influence of other factors

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