

Markscheme

May 2018

Geography

Higher level and standard level

Paper 2

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Paper 2 markbands

These markbands are to be used for paper 2 at both standard level and higher level.

	AO1	AO2	AO3	AO4	Paper 2
Level descriptor	Knowledge/ understanding	Application/ analysis	Synthesis/ evaluation	Skills	Marks 0–10
A	No relevant knowledge; no examples or case studies	No evidence of application; the question has been completely misinterpreted or omitted	No evaluation	None appropriate	0
B	Little knowledge and/or understanding, which is largely superficial or of marginal relevance; no or irrelevant examples and case studies	Very little application; important aspects of the question are ignored	No evaluation	Very low level; little attempt at organization of material; no relevant terminology	1–2
C	Some relevant knowledge and understanding, but with some omissions; examples and case studies are included, but limited in detail	Little attempt at application; answer partially addresses question	No evaluation	Few or no maps or diagrams, little evidence of skills or organization of material; poor terminology	3–4
D	Relevant knowledge and understanding, but with some omissions; examples and case studies are included, occasionally generalized	Some attempt at application; competent answer although not fully developed, and tends to be descriptive	No evaluation or unsubstantiated evaluation	Basic maps or diagrams, but evidence of some skills; some indication of structure and organization of material; acceptable terminology	5–6
E	Generally accurate knowledge and understanding, but with some minor omissions; examples and case studies are well chosen, occasionally generalized	Appropriate application; developed answer that covers most aspects of the question	Beginning to show some attempt at evaluation of the issue, which may be unbalanced	Acceptable maps and diagrams; appropriate structure and organization of material; generally appropriate terminology	7–8
F	Accurate, specific, well-detailed knowledge and understanding; examples and case studies are well chosen and developed	Detailed application; well-developed answer that covers most or all aspects of the question	Good and well-balanced attempt at evaluation	Appropriate and sound maps and diagrams; well structured and organized responses; terminology sound	9–10

Option A — Freshwater – issues and conflicts

1. (a) Outline **two** ways in which sediment is transported by a river. **[2+2]**

In each case, award [1] for correctly identifying the term and [1] for including some specific detail of the process, eg may quantify the particle size (accept “large” or “small”), or use specialist vocabulary.

For example:

- Saltation [1] is jumping/bouncing of small particles along the river bed [1].
- Traction [1] is heavier material dragged or rolled along the bed [1].

Other possibilities include:

- solution
- suspension
- floatation.

- (b) Using **one named** example of an international conflict related to freshwater, briefly explain:

- (i) **one** cause of the conflict; **[2]**

Award [1] for identifying a named conflict and [1] for some specific explanation of the cause.

For example: Sudan and Egypt had a conflict over the Nile river, as both are in need of limited water supplies [1] to satisfy the demands of their growing populations [1].

Other possible causes might be:

- two countries both in need of limited water supplies
- population/economic pressures
- environmental/climate change
- water security/boundary dispute
- hydropower schemes along transboundary rivers
- industrial pressures.

(ii) **two** consequences of the conflict.

[2+2]

Award [1] for each consequence identified and [1] for some further explanation or development.

Possible consequences could include:

- treaties/international agreement [1] and gives further detail (which may include quotas and water allowances) [1]
- escalation of international conflict [1] and gives a detail, eg political repercussions [1]
- one country builds a dam to maximize its supply [1] and gives a detail, eg date of construction, or ecological/economic harm downstream, or navigation issues [1]
- a substitution strategy, eg desalinization [1] and gives a detail [1].

For example: Sudan and Egypt's conflict resulted in the Nile treaty [1], which set limits for water use by each country [1]. As a consequence of now having access to less water, the Egyptians have tried to use desalinization to meet their water needs [1]. This uses a process called reverse osmosis to remove salt and produce freshwater [1].

Two separate consequences are needed; do not credit multiple problems associated with dam construction.

- (c) Examine how human activity influenced the severity of **one named** river flood event.

[10]

Human factors that can increase flood severity include: deforestation and changing agricultural practices in the drainage basin, removal of wetlands, urbanization/increasing concrete surfaces/drainage ditches and changes to the channel flow.

Human factors that can sometimes decrease severity include straightening, widening, building levees, *etc.*

Physical factors may be highly relevant for some case studies.

Good answers may examine how human activity can increase and/or decrease the risk of floods in complex ways (levees may reduce or increase flood risk).

Another approach may be to examine how human activities along one stretch of river have impacts for other places on the river. Rapid emergency responses might also reduce the severity of the flood.

At band D, expect a description of the ways in which human activity has caused the named flood event.

At band E, expect either a more detailed explanation of a greater range of human activities or a structured examination of how human activity has influenced flood severity.

At band F, expect both.

Marks should be allocated according to the markbands.

2. (a) (i) State the **four** elements of the hydrological cycle labelled A–D. [2]

Award [2] for all four correct answers, [1] for two or three correct answers.

A = evaporation

B = precipitation (accept rainfall)

C = infiltration (accept percolation)

D = groundwater flow (accept baseflow).

- (ii) State **two** possible methods of artificially recharging the aquifer. [1+1]

Award [1] for any of the following points, up to a maximum of [2]:

- the creation of recharge basin lakes
- controlled flooding/irrigation
- water pumped down the bore hole
- drainage diversion
- other valid methods.

- (b) Explain **three** possible ways people may modify a river channel to increase the flow of water. [2+2+2]

In each case, award [1] for correct identification of a method and [1] for a valid explanation of how it increases the flow of water (may make applied use of concepts such as wetted perimeter, hydraulic radius, channel efficiency).

For example, straightening/shortening a river channel [1] increases the gradient and therefore the velocity [1].

Other possibilities include:

- concreting the channel/decreasing the roughness
- widening/deepening/levees
- dredging.

- (c) To what extent has the management of **one** major wetland area been successful?

[10]

Responses should clearly identify one major wetland. If more than one wetland is referred to, credit only the first.

Major wetlands include, for example, the Kissimmee, the Everglades, Norfolk Broads.

Responses should clearly outline the management with respect to why it was needed and its aims. There are numerous reasons why wetlands are managed: biodiversity issues, restoration of wetlands, ecotourism, natural flood defenses. Management can then be evaluated in terms of how successful it has been (or not).

Good answers may discuss the extent to which different stakeholders have different perspectives on whether the strategy has been successful. Another approach might be to evaluate the extent to which all aims and objectives have been met (there may be spatial and temporal dimensions to this).

At band D, responses should describe the management of a major named wetland, and may assert partial success/failure.

At band E, there should be either greater explanation of the strengths and weaknesses of the management, or a critical evaluation of the extent of success.

At band F, expect both.

Marks should be allocated according to the markbands.

Option B — Oceans and their coastal margins

3. (a) (i) Estimate the percentage of days when the wind blows from the north. [1]
15 % (accept 13–17 %).
- (ii) Identify the direction of the most frequent wind. [1]
ESE (accept SE).
- (iii) State the direction towards which longshore drift is most likely to occur at X on the diagram. [1]
West/north west/west northwest.
- (iv) State **one** landform likely to be produced by longshore drift at X. [1]
Spit.
- (b) Explain **three physical** factors that affect the development of coral reefs. [2+2+2]

Award [1] for each factor explaining the development (growth or decline) of coral and [1] for its development and/or exemplification.

For example:

- Presence of polyps/zooxanthellae (soft animals) [1] which produce calcium carbonate to form the reefs [1].
- Sunlight for photosynthesis [1]; coral growth favoured in tropical oceans where sunlight is more intense [1].

Other factors include:

- clear, shallow water
- optimal sea temperatures of 23–29°C
- acidity of water
- salinity of water
- where water is less saline
- natural hazards can destroy reef
- natural predators
- climate change.

- (c) “Coastal hazard management always creates more problems than it solves.”
Discuss this statement, with reference to **one or more** areas of coastline.

[10]

The question can be answered using any coastal hazard, including tsunamis, storm surges, coastal erosion and cliff failure. Answers should include a discussion of the conflicts involved with coastal hazard management. These may include access, decline of amenity value, cost, disruption of ecosystems, impact on fisheries, impact on transport or lack of management.

For example, sea walls may be built to reduce the threat of tsunamis and storm surges but may interfere with natural ecosystems and shipping routes. Erosion may be managed using hard and soft engineering, but this may affect the aesthetics of an area and reduce its recreational/tourist impact. A “do nothing”/managed retreat may anger local residents land owners.

In contrast, many people feel more secure as a result of attempts to manage coastal hazards, and do not see a conflict of interest.

Good candidates may discuss different coastal hazards and stakeholders and cover both sides of the argument. Another approach may be to examine the scale of the hazard, eg a 50-year event may be planned for, but the scheme will not protect against an event of higher magnitude. Others may consider the possible impacts of climate change.

At band D, expect a description of the hazard management of one or more areas of coastline.

At band E, expect either a detailed explanation of the hazard management of one or more areas of coastline or a discussion of the problems created and resolved by hazard management.

At band F, expect both.

Marks should be allocated according to the markbands.

4. (a) Briefly outline the role of oceans as:

(i) a source of carbon dioxide; [2]

Award [1] for each of the following, up to a maximum of [2]:

- oceans are a source of carbon dioxide, which can be transferred to the atmosphere
- carbon dioxide is released during submarine volcanic activity
- carbon dioxide can be brought up from the ocean depths
- respiration of marine organisms
- other valid points.

Do not allow fossil fuels as a source.

(ii) a store of carbon dioxide. [2]

Award [1] for each of the following, up to a maximum of [2]:

- the ocean is the major/largest store/sink of CO₂
- acts as a sink for some of the carbon dioxide that has passed through the food chain; stored in sediments
- credit other valid points about oceanic storage of carbon.

Do not allow fossil fuels as a store.

(b) (i) Explain what is meant by the term “oceanic conveyor belt”. [2]

Award [1] for each of the following, up to a maximum of [2]

- the oceanic conveyor belt (OCB), refers to part of the large-scale ocean circulation
- places/oceans/currents are linked by the OCB
- cause or a pattern of the OCB, eg density gradients or the process of wind driven surface currents.

- (ii) Suggest **two** reasons why the oceanic conveyor belt is important. **[2+2]**

Candidates may approach this question from the perspective of human importance and/or system importance.

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

Possibilities include:

- Moderation of climates [1], so the thermal growing season for agriculture is extended/tourist development [1].
- Important because it transfers global heat energy between latitudes [1]; if the circulation stopped it would cause significant climate change [1].
- The conveyor belt reduces temperature differences between oceans [1], therefore linking the oceans as a single global system [1].
- OCB brings nutrients to the surface [1], and this supports abundant marine life/fish [1].

- (c) Evaluate the success of **one named** conservation policy for sustainable fishing. **[10]**

Conservation policies, eg the EU's Common Fisheries Policy (CFP), may refer to the total allowable catch, the harvesting of juvenile fish, limiting the number of vessels, checking of landings, limited access to fishing grounds.

Sustainable fishing is the maximum number/weight/amount of fish that can be caught in any one year without depleting the stock/population. A sustainable fishing policy allows a depleted stock to recover its size.

Good answers may evaluate critically what is meant by "successful" and the temporal and spatial scales this brings into consideration. Another approach might be to evaluate whether sustainable fish yields can cater for rising demand and changes in the distribution of fish.

At band D, expect some description of an identified conservation policy in relation to sustainable fishing.

At band E, expect either greater explanation of how an identified conservation policy tries to achieve sustainable fishing or a critical evaluation of the success of the policy.

At band F, expect both.

Option C — Extreme environments

5. (a) (i) State the earliest date on which there is a 50 % probability of snow depth exceeding 1 metre. [1]

July 15th [1]

- (ii) Estimate the probability of snow depth exceeding 2 metres on 1 September. [1]

27 % (accept 26–28 %) [1]

- (iii) Briefly explain how the graph provides evidence that this ski field is located in the southern hemisphere. [2]

Award [1] for evidence from the graph showing heaviest snow cover is in August/September and [1] for explaining that this must be winter in the southern hemisphere.

- (b) Explain **two environmental** impacts of tourism in **one named** extreme environment. [3+3]

In each case, award [1] for each identified environmental impact linked to a tourist activity, and [2] for further development and explanation of how the physical environment is affected.

Possibilities include erosion, mass movement, land degradation, vulnerability to hazards, water usage, waste disposal, disruption to biodiversity. Positive changes are possible, eg irrigation, restoration.

For example: Erosion of land surface in high altitude areas by creating ski-field infrastructure (pistes, chair lifts, restaurants) [1]. This destroys the vegetation which helps stabilize the slopes [1], which can then contribute to soil erosion/avalanches/unsightly bare ground [1].

Award up to a maximum of [3] for a generic account of tourism impacts with no reference to the specifics of a named extreme environment (either type or named region, eg Alps).

- (c) Compare the importance of water and wind in the development of landform features in hot, arid areas.

[10]

In hot, arid areas, water action includes erosion and deposition by exotic, endoreic and ephemeral rivers. Flash floods can produce sheetwash. Features formed by river action include canyons, wadis, alluvial fans and bajadas. The role of water in weathering processes should also be credited.

Wind action includes abrasion and deflation and landforms include dunes (barchans, seif, star, etc), deflation hollows, yardangs and zeugens.

N.B.: Responses do not need to consider more than a few of these landforms for the award of full marks.

Good answers might recognize that water and wind are equally important in forming features in hot, arid areas or may attempt to give credence to one over the other. Alternatively, a temporal element may be introduced with recognition of past pluvial periods or seasonal flash floods or a recognition that some landforms may be formed by a combination of both processes.

At band D, expect some description of the development of both water- and wind-formed features.

At band E, expect either a greater explanation of water- and wind-formed features in hot, arid areas or an attempt to compare the processes/features.

At band F, expect both.

Marks should be allocated according to the markbands.

6. (a) (i) Briefly outline **two human** factors that are possible causes of desertification in a hot, arid environment. [2]

Award [1] for a description of the following, up to [2]:

- overgrazing
- over-cultivation
- deforestation
- overpopulation
- global warming
- mismanagement of water resources.

- (ii) Briefly outline **two physical** factors that influence the occurrence of flash floods in hot, arid environments. [2]

Award [1] for a description of the following, up to [2]:

- intensity of rainfall
- rain exceeding infiltration
- impermeable desert surface
- lack of vegetation
- other possible answers.

- (b) Explain **three** reasons why there are concentrations of people in some parts of hot, arid areas. [2+2+2]

Award [1] for each valid reason, and [1] for development/exemplification.

Possible reasons include:

- mineral deposits
- tourist attractions
- irrigation/oases
- accessible aquifers
- military installation.

Accept other valid reasons.

For example: In Niger, the presence of uranium [1] has led to the development of the town of Arlit / associated settlement and infrastructure [1].

For example: Retirement resorts eg Palm Springs, have been built [1] which attract elderly/retired people who enjoy the hot, dry desert climate [1].

- (c) Examine the severity of the different challenges for resource development in periglacial areas.

[10]

Resource development in periglacial areas is affected by the presence of permafrost. The challenges of coping with the constant thawing and melting require a range of measures in place in order to pursue resource development. Activities and techniques must be constantly monitored and modified in order to maintain infrastructure (transport, pipelines, bridges, airfields), buildings and settlement requirements. Other challenges might include relief, climate, accessibility/remoteness.

There are economic and social challenges for the successful extraction of minerals, for scientific research and for ensuring the long-term viability of the nomadic lifestyles of indigenous people who rely on resources found in these areas.

Good answers might examine explicitly the relative severity of a range of challenges. Another approach might be to examine different periglacial areas and the contexts and challenges they present, *eg* greater/more severe challenges in areas of discontinuous permafrost / areas with more active layer activity or climate change associated issues. They may also examine the extent to which some challenges may be overcome if the opportunities merit investment.

At band D, expect description of some challenges for resource development in permafrost areas.

At band E, expect either explanation of a range of challenges for resource development in periglacial areas, or a structured examination of the severity of these different challenges (may examine the degree to which they can be overcome).

At band F, expect both.

Marks should be allocated according to the markbands.

Option D — Hazards and disasters – risk assessment and response

7. (a) (i) State the height in metres of the highest point north of the Oued Tensift river. [1]

884 (metres) [1]

- (ii) State the four-figure grid reference for this point. [1]

2012 [1]

If an incorrect height is identified, but the GR is correct for that height, award [1].

- (iii) Briefly describe the distribution of fruit farming areas shown on the map. [2]

Award [1] for any of the following points, up to a maximum of [2]:

- mainly located in the west [1]
- mainly close to Marrakech [1]
- south of the Oued Tensift river [1]
- located on lowland areas [1]
- mainly below 500 metres [1].

- (b) (i) Explain **two** possible human impacts that could occur as a result of a long-term drought in the area shown on the map. [2+2]

Award [1] for each possible human impact, and [1] for explanation.

Relevant human impacts will reflect that the term “drought” implies a lack of water, not high temperatures.

Possibilities in this area include:

- irrigation systems are under strain [1] due to drying up of seasonal rivers/ decreased river flow [1]
- decline in yield of food/income [1] leads to out-migration from affected areas [1] to Marrakech
- possible famine leading to increased death rates.

- (ii) Suggest **one** short-term strategy that the local community could use to help overcome the problem of drought in the area shown on the map. [2]

Award [1] for the strategy and a further [1] for development.

Possible strategies include:

- reducing water consumption by people in Marrakech, lowering the demand for water
- adopting “dry farming” techniques, ensuring that crops are more resilient to the impact of drought.

Do not credit long term infrastructure projects, eg reservoir construction.

- (c) Examine the reasons why people continue to live in areas affected by frequent earthquake or volcanic activity.

[10]

Allow answers that consider both earthquake and volcanic activity.

Possible reasons might include:

- lack of knowledge/awareness of previous tectonic activity
- benefits of continuing to reside in the area outweigh possible impacts, for example fertile soils/tourism in volcanic areas
- lack of economic options: poverty/inertia/fatalism
- good preparation for possible impacts of hazard event, such as earthquake-resilient buildings
- planning and early-warning systems give sense of security
- insurance against damage caused by tectonic activity.

Good answers may examine in a structured way how reasons may vary according to the type of geographical area (level of development; proximity to areas of tectonic activity); the frequency and magnitude of past events, and the decisions made by individuals and communities.

For band D, expect some description of some reasons why people continue to live in areas prone to volcanic or earthquake activity.

For band E, expect either a more detailed explanation of why people choose to remain in a particular area prone to earthquakes/volcanoes, or a structured examination of different kinds of hazards (eg at different levels of economic/social development).

For band F, expect both.

Marks should be allocated according to the markbands.

8. (a) Outline **two** factors that can influence the vulnerability of a community to the impacts of a tectonic hazard event. [2+2]

Award [1] for each factor and [1] for further development relating to vulnerability of a community to a tectonic hazard event.

For example, a high degree of poverty [1] means that people cannot afford to build earthquake-resistant housing that does not collapse [1].

Other possible factors include:

- lack of insurance
- elderly population
- a level of corruption
- time of day
- preparedness
- geographical location.

- (b) Briefly explain the occurrence of **either** volcanoes **or** earthquakes at:

- (i) constructive plate margins; [3]

Award up to [3] for any of the following points:

Volcanoes

- are formed when two plates diverge as magma wells up to fill the gap [1]
- example of constructive plate margin, such as mid-Atlantic Ridge [1]
- usually begins as submarine volcano, but may later become island [1].

Earthquakes

- are formed when two plates diverge as a result of friction and movement [1]
- the plate movement is explained, *eg* convection currents [1]
- example of plate margin, such as mid-Atlantic Ridge [1].

Credit other valid points and/or the use of suitable annotated diagrams.

- (ii) destructive plate margins. [3]

Award up to [3] for any of the following points:

Volcanoes

- explanation of two plates converging [1]
- one plate sinks / is subducted [1]
- are formed due to melting, producing magma [1]
- differences in plate density causing subduction, causing magma to rise [1]
- additional detail, eg explosive eruptions around the margins of the Pacific plate [1].

Earthquakes

- explanation of two plates converging, eg convection currents [1]
- subduction of denser oceanic plate [1]
- are formed due to friction between the plates [1]
- further detail, eg deep-focus [1]
- additional locational detail, eg around the margins of the Pacific plate [1].

Credit other valid points and/or the use of suitable annotated diagrams.

- (c) Examine the effectiveness of short- and long-term responses to **one** recent disaster caused by a hurricane (tropical cyclone/typhoon). [10]

Responses considered should be both short-term and long-term.

Short-term responses might include search and rescue, providing essential medical care, emergency food and water supplies, combating the threat of disease, establishing essential communications and alerting outside relief agencies.

Long-term responses continue for several months or years after the disaster, and might include rebuilding destroyed housing and infrastructure, re-establishing the local economy, undertaking protective measures and educating the local community in case of a future disaster, land-use zoning, establishing early-warning systems, planning evacuation routes.

Good responses will examine a range of different types of response to a recent named hurricane disaster, and consider their effectiveness in different timescales.

At band D, expect a descriptive account of different types of response to a hurricane disaster.

At band E, expect either a more detailed account of a range of short- and long-term responses, or some explicit examination of their relative effectiveness.

At band F, expect both.

Marks should be allocated according to the markbands.

Option E — Leisure, Sport and Tourism

9. (a) (i) Define the term *tourism*. [2]

Tourism involves travel away from home for at least one night [1] for the purpose of leisure [1].

- (ii) State **two** possible reasons why not all international arrivals can be classified as tourists. [1+1]

Award [1] for any of the following, up to [2]:

- transit / short-term passengers, not staying at least one night
- refugees / asylum seekers
- business people
- long-term voluntary migrants (joining family/work reasons)
- research scientists
- returning residents.

- (b) Explain **two** strategies designed to manage the environmental damage caused by tourism in **one named** large town or city. [3+3]

Award [1] for each strategy/problem/solution, and [2] for development of how it reduces/manages environmental damage.

Possible strategies include:

- reduced vehicle emissions
- reduced noise pollution
- waste management
- control of effluent disposal into the sea.

For example: Limiting the number of tourists is one way to reduce litter problems in Venice [1]. This has been done by limiting the number of hotel beds available [1] and restricting the number/capacity of visiting cruise ships [1].

Award a maximum of [3] if there is no named town or city, or if the example is inappropriate, eg a rural location.

- (c) Discuss the view that the economic benefits of tourism in **one** country you have studied outweigh its negative social and environmental impacts.

[10]

Answers should consider a variety of economic benefits and social/environmental impacts of tourism in a specific country.

Economic benefits might include improved employment opportunities, growth of local industry, improvements in infrastructure, increased GDP and incomes, increased standards of living.

Negative social and environmental impacts might include increases in crime rates, increasing social inequality, increases in pollution and land degradation, excessive use of groundwater supplies.

Good answers may provide a structured discussion of the different kinds of economic benefits and social/environmental costs of tourism in a particular country, and some evaluation of their relative importance.

Award a maximum of band C if the answer refers to a city (*eg* Venice) rather than a country.

At band D, expect some description of the economic benefits and social/environmental costs in a particular country.

At band E, expect either a more detailed explanation of the benefits and costs of tourism or some discussion of their relative overall importance in a particular country.

At band F, expect both.

Marks should be allocated according to the markbands.

10. (a) With reference to the photograph, identify:

(i) one primary tourist attraction; [1]

Award [1] for any of the following:

- distinctive architecture/exotic buildings
- temples.

Accept other valid responses.

(ii) one secondary tourist attraction. [1]

Shops selling gifts/souvenirs/food stalls [1].

Accept other valid responses.

(b) Using photographic evidence, suggest why the perceptual carrying capacity of this site might have been reached. [2]

Award [1] for photographic evidence that perceptual carrying capacity has been reached, and [1] for further development.

For example: There is such a large number of visitors shown [1] that some may be experiencing stress due to excessive congestion and noise [1].

(c) For **one named** international sporting event, explain how **one physical factor and two human** factors influenced the choice of venue(s). [2+2+2]

Award [1] for the identification of a suitable factor that might influence the choice of venue, and a further [1] for development.

For example: Sochi Winter Olympics in Russia, which has a very cold climate [1], was chosen because of its normally abundant snowfall needed for winter sports [1].

Other possibilities might include:

- relief
- coastal location
- attractive landscape
- good international transport links, such as airports, increasing accessibility
- good accommodation for athletes and supporters
- good local transport and infrastructure
- pre-existing venues, reducing construction costs
- government support and public opinion.

Award a maximum of [5] if no international sporting event is named.

- (d) Examine the extent to which the aims of sustainable tourism might be achieved in **two** different environments.

[10]

The aims of sustainable tourism, involve the protection and conservation of primary tourist resources and support the livelihoods and cultures of local peoples.

Possible strategies to achieve the aims might include:

- protection of the natural environment, *eg* by establishing National Parks
- managing the exploitation of local resources, such as water, fuelwood
- protection of ecosystems and respecting local wildlife
- education of tourists in the need for environmental protection and respecting the way of life of local communities
- managing visitor numbers
- involvement of local people in tourist activities, so that they benefit economically and socially
- reducing economic leakage
- supporting the culture and way of life of local people, without exploitation
- reducing the environmental impact of tourist accommodation.

“Environments” could be interpreted in various ways; for example, different rural areas, urban areas, and ecosystems.

Good answers may provide a structured examination of the environmental, economic and social aims of sustainable tourism and the extent to which these aims have been met in different areas. Another approach might be to provide a structured examination of different approaches to managing tourism in a sustainable manner in different areas.

For band D, expect some description of the management of sustainable tourism in one or two different areas.

For band E, expect either a more detailed examination of the effectiveness of sustainable tourism management in two different areas, or an examination of the extent to which the aims of sustainable tourism can be achieved in different areas.

For band F, expect both.

Marks should be allocated according to the markbands.

Option F — The geography of food and health

11. (a) (i) Referring to areas on the map, describe the spread of the Zika virus between 1947 and 2010. [3]

Award [1] for each of the following, up to a maximum of [3]:

- starts in East/Central Africa, 1947
- spreads to Southeast Asia 1969
- spreads to West Africa 1975
- spreads to Pacific Islands 2007
- spreads to Thailand/Laos/Cambodia/Southeast Asia 2010.

Dates and countries/regions should be identified, if not, award marks as follows:

- 3 correct regions and no dates = 2
- 2 regions and 2 dates = 2
- 2 regions and 1 date = 1
- 2 regions and 0 dates = 1

- (ii) State what type of diffusion accounts for the spread of the Zika virus from French Polynesia to Brazil. [1]

Relocation.

- (b) Explain **three** health improvements that have led to an increase in life expectancy in many low-income countries in recent years. [2+2+2]

Award [1] for each valid improvement, and [1] for further development.

For example: Improved access to safe water [1] resulting in a reduction in water-borne diseases, such as cholera and diarrhea [1].

Other possible improvements include:

- incidence of vector-borne diseases, such as malaria, has been reduced by strategies such as bed nets, spraying, clearing of stagnant water
- reduction in sexually transmitted diseases, such as HIV, due to better education, use of condoms
- the rollout of anti-retroviral therapies (ARTs) has increased the life expectancy of people with HIV
- improvements in medical care, numbers of doctors/health professionals; vaccinations
- improvements in food supply, reduced incidences of death from malnutrition.

- (c) Examine the strengths and limitations of the energy efficiency ratio as an indicator of sustainable agriculture.

[10]

Energy efficiency ratio is a measure of the amount of energy input into a farming system compared with the energy outputs. A ratio of greater than 1 is considered efficient, as outputs will be greater than inputs. Inputs into the system include labour, machinery, pesticides, fertilizers, irrigation and fuel, while outputs refer to the quantity/yield of food that is produced.

Energy efficiency ratios differ for many farming systems around the world. Capital-intensive systems, such as irrigated rice farming, are likely to have high inputs and high yields, and might be considered as efficient. Subsistence farming systems, with high inputs of labour, might also be regarded as efficient if the outputs are high.

Farming systems differ in their EERs and their relative sustainability. EER might be a good indicator of the efficiency of a farming system, but it neglects the wider environmental and social impacts of farming. Agricultural systems that have a high EER might produce plentiful food supplies, but they are not necessarily sustainable. The farming system might have an adverse impact on the land or water – for example, irrigation might lead to salinization and depletion of groundwater; pesticides might result in eutrophication, and soil quality might be degraded.

Good answers may examine the extent to which EERs are a useful indicator of sustainability in its fullest sense (social, economic and environmental). Another approach might be to examine differing perspectives on the usefulness of the EER relative to other agricultural indicators.

For band D, expect some description of strengths and limitations of EERs.

At band E, expect either a more detailed explanation of the strengths and limitations of EERs, or a structured examination of the value of EERs in relation to sustainable agriculture.

At band F, expect both.

Marks should be allocated according to the markbands.

12. (a) (i) Briefly outline what is meant by the term “food security”. [2]

Food security involves four basic concepts. Award [1] for the description of each of the following concepts, up to a maximum of [2]:

- access to food
- sufficient amount
- safety
- nutritional quality/diet.

- (ii) Outline **one** way in which the health of a population can be affected by chronic hunger. [2]

Award [1] for the problem identified and [1] for further development.

Possibilities include:

- long-term under-nutrition [1] resulting in stunting/body weight loss [1]
- increased vulnerability to disease [1] due to weaker immune system [1]
- high maternal/infant mortality [1] due to lack of nutritious food [1].

- (b) Explain **three** geographic impacts at a national scale of **one named** water-borne or sexually transmitted disease. [2+2+2]

Award [1] for recognition of a geographic impact and [1] for further development.

For example, HIV has impacted upon Swaziland’s GDP due to lost working hours / lower productivity [1]. The HIV prevalence rate in Swaziland is around 30% [1].

Impacts might include:

- high death rates/infant mortality rates
- cost of health care
- decrease in tourism
- cost of prevention policies.

Response should apply to one or more countries. If no example at a national scale is given, award a maximum of [5].

- (c) To what extent were physical factors responsible for **one** recent famine? **[10]**

A famine may be defined as a widespread shortage of food in a region that leads to malnutrition and hunger and results in increased mortality rates. Famine may be caused by a variety of physical and human factors.

Physical factors might include:

- severe drought, caused by climatic factors
- soil exhaustion, caused by poor farming practices
- crop pests and diseases
- natural hazards, such as major earthquake
- climate change/global warming.

Human factors might include:

- civil war/conflict/refugees
- government policies/corruption
- poor infrastructure
- widespread poverty / high food prices
- rapid population growth/population pressure
- failure of response by outside agencies.

Reference should be made to a recent famine, preferably no earlier than the 1990s. Responses that do not focus on a specific recent famine are unlikely to progress beyond band D.

Good answers might provide a structured evaluation of the causes of a recent famine, and arrive at a considered view of the extent to which physical or human factors might matter most. Another approach might be to show how the factors are interrelated and interact with each other.

For band D, expect some description of physical and/or human factors that have caused a recent famine.

At band E, expect either a more detailed explanation of a range of physical and human factors (do not expect balance), or a structured evaluation of the extent to which particular factors (or the interrelationships between them) were responsible.

At band F, expect both.

Marks should be allocated according to the markbands.

Option G— Urban environments

13. (a) (i) Describe what line A represents. [1]
- It shows equality in the distribution of wealth by households/a line of perfect equality [1].
- (ii) Estimate what percentage of the city’s total wealth belongs to the wealthiest 10 % of households. [1]
- 32 % (Allow 30–33 %) [1]
- (iii) Referring to the graph, outline the evidence that many households in this city suffer from poverty. [2]
- Award [1] for valid evidence, and [1] for further development, including development of numerical evidence.*
- For example: The 25 % of households that are least wealthy share less than 1% of the wealth [1]. This means that many households will be living on very few dollars a day equivalent and struggling to survive [1].
- (b) Explain why people’s choice of residential location within a city might be influenced by their:
- (i) ethnicity; [3]
- Award [1] for a description of how residential areas vary in terms of ethnicity and a further [2] for development/exemplification of the reason(s).*
- For example, in many cities, such as London, there are clusters of ethnic groups, such as South Koreans in New Malden [1]. Many Koreans choose to live there as there are Korean restaurants/supermarkets [1] as there is sufficient demand to support such specialist facilities [1].
- Ethnic groups may also be segregated for negative reasons, eg poverty or due to discrimination.
- (ii) family status (stage in lifecycle). [3]
- Award [1] for a description of how residential areas vary in terms of family status and a further [2] for development/exemplification of the reason(s).*
- Family status refers to whether a person is single, married, married with children, and describes how their housing needs vary depending on the size of the family.
- For example: In some countries, single people may live in more central areas [1] in rented accommodation close to work/entertainment/education [1] whereas married couples may move towards the quieter suburbs [1].

- (c) Evaluate the success of **one** strategy designed to sustainably manage pollution in **one named** urban area.

[10]

Answers should refer to one named strategy, which can relate to one more types of urban pollution (atmospheric, noise, waste, water pollution, visual *etc*). The strategy may have multiple strands, *eg* integrated transport management, promotion of public transport, renewable forms of energy. The pollution management strategy could be part of a holistic approach to achieve sustainable development (circular systems)/reduce pollution, *eg* Beijing and the 2008 Olympic games.

Good candidates might evaluate success from different perspectives, *eg* businesses may resent costs of tackling pollution. Another approach might be to evaluate environmental and social benefits in relation to economic costs (making use of a sustainability framework). Another approach might be to evaluate the durability of any success (this depends on sustained political will, the ability to afford it/police it/perceived benefits).

At band D, expect a description of a pollution strategy in a named urban area.

At band E, expect either more detail or explanation of a pollution strategy in a named urban area, or an attempt to evaluate its success.

At band F, expect both.

Marks should be allocated according to the markbands.

14. (a) (i) Describe **two** differences between a circular city system and a linear city system. [1+1]

Award [1] for each valid difference.

Possibilities include:

- circular is (more) sustainable, linear is less sustainable [1]
- circular city system has smaller inputs of fossil fuels, water and products than a linear system [1]
- circular city system has smaller outputs than a linear system [1]
- circular city system has more recycling, re-use and reduction in inputs than a linear system [1].

- (ii) Outline how **one** transport management strategy can contribute to a circular city system. [2]

Award [1] for a brief description of a transport management strategy and [1] for outlining its contribution to the city system dynamic, eg inputs/outputs.

For example: Increased public transport reduces the number of cars on the road [1] and therefore reduces energy inputs/atmospheric outputs [1] from the city.

- (b) Explain **two** reasons for the location of retail activities in the central business district (CBD) of **one** city you have studied. [3+3]

In each case, award [1] for a valid reason and a further [2] for the development of that reason.

For example: In Central, the CBD of Hong Kong, retailing is located where public transport links converge [1]. It is a zone of high accessibility for workers and consumers [1], enabling stores to exceed their threshold population [1].

Other reasons could include:

- land values
- prestige of location
- planning regulations
- city centre redevelopment schemes.

- (c) Examine the consequences of the movements of different socio-economic groups within a city.

[10]

There are many consequences of socio-economic groups moving into/out of different parts of a city. These include gentrification, suburbanization, re-urbanization, commuting and relocation of selected populations. Do not accept rural–urban migration, as this is not a movement within a city.

Gentrification refers to the movement of higher socio-economic groups into inner city areas. Impacts can be positive, *eg* increase in house price, improvement of housing by owners, the growth of services, but can also be negative, *eg* forcing local residents to leave an area, housing becoming unaffordable for local people, *etc.* Relocation of people may occur due to planning or for major events such as the Olympic Games. Generally, it is the poor who are moved further away from areas of economic activity.

Good answers may examine a structured range of positive and negative impacts (impacts could be for people, places, the environment, *etc.*). Another approach might be to examine different timescales for movement processes (commuting, temporary movement, *eg* students, permanent relocation). Another approach might be to compare the dominant type of movement seen in HICs, NICs and LICs.

At Band D, expect a description of one movement of socio-economic groups.

At Band E, expect either a more detailed explanation of one or more movements of socio-economic groups in different parts of a city or an examination of the impacts of such movements on different parts of a city.

At Band F expect both.

Marks should be allocated according to the markbands.