

Markscheme

November 2017

Geography

Higher level and standard level

Paper 2

32 pages

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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) Briefly outline **two** processes of river erosion. **[2+2]**

In each case, award [1] for identifying the process, and [1] for a brief outline.

- Hydraulic action [1] in which the force of water hitting the banks causes erosion [1].
- Abrasion / corrasion [1] – wearing away of river sides and bed by the river's load [1].
- Attrition [1] – material moved along the bed of a river collides with other material and breaks it up into smaller pieces [1].
- Corrosion / solution [1] – depends on chemical composition with certain rocks dissolving more [1].

- (b) (i) Explain how irrigation can lead to salinization. **[2]**

Salinization is the build-up of salts in soil to an excessive level. It can occur when there is over-irrigation [1] (*ie*, where more water is added than can be taken up by the plants). If the groundwater has a high salt content and the water table rises, the soil in fields may have salt levels that are too high for plant growth [1].

For example: As water passes over/through the soil, it dissolves various minerals and nutrients [1] / in some areas, naturally high levels of evaporation increase the salt content at the surface [1] / capillary action also brings water to the surface where evaporation leaves the salts [1].

- (ii) Explain **two** consequences of salinization for farmers. **[2+2]**

In each case, award [1] for valid consequence and [1] for further explanation/detail.

Possible consequences include:

- may be very costly for farmers [1] as yields of crops may decrease / as may have to add expensive artificial fertilizers [1]
- salinity may affect the structure of the soil [1], resulting in surface soil compaction [1]
- loss of vegetation cover [1] may expose the area to the effects of soil erosion [1].

For example: Crops tend to have low salt tolerance [1] so salinization reduces crop yield/makes it less productive [1].

- (c) Discuss the positive **and** negative **hydrological** impacts of dam and reservoir construction.

[10]

Responses could cover downstream positive impacts such as more regular discharge, reduced differences in seasonal flow (regime), fewer floods with longer delay and lower peaks. Upstream positive impacts could include lower gradient and change to local base level.

Negative downstream impacts are that lower discharge can cause severe environmental problems, *eg*, the Nile Delta erosion and red water famine at Aswan, the reduced discharge of the lower River Colorado. Negative impacts upstream could include increased evaporation and seepage.

There could also be reference to changes in sediment transport immediately downstream or upstream, with effects on fluvial landforms.

Some credit may be given for geographical knowledge of some issues about a recognizable dam/reservoir.

Good answers may discuss in detail the potential positive and negative hydrological impacts of dam construction before arriving at a final evidenced conclusion. An alternative approach would be to provide a structured discussion of the question from different perspectives, as these may differ on what constitutes positive or negative.

At band D, expect two hydrological impacts to be described and linked to dam construction.

At band E, expect either a more detailed explanation of greater range of hydrological impacts or a structured discussion of both positive and negative hydrological impacts.

At band F, expect both of these elements.

Marks should be allocated according to the markbands.

2. (a) (i) State the lag time for the storm event shown on the hydrograph. [1]
10–11 hours [1]
- (ii) State how many hours the discharge was over 40 cumecs. [1]
5 hours 30 minutes (5.5 hours) [1]
Accept answers in the range 5–6 hours [1].
- (iii) Outline why the rising limb on this hydrograph is steeper than the falling limb. [2]
The rising limb is steeper as it is responding to the precipitation falling in the drainage basin/rapid increase of rainwater reaching the river/rapid run-off [1], whereas the falling limb still has rain reaching the river slowly/by throughflow / groundwater flow [1].
- (b) Explain the formation of **two** landforms on a river floodplain. [3+3]

Possibilities include, but are not limited to:

- floodplain
- meanders
- ox-bow lakes
- deltas
- levees
- terraces
- alluvial fans.

Award [1] for each landform identified and [2] for further description/explanation of their formation.

For example: Braiding [1] is a river channel with a number of interconnecting channels separating the islands or eyots [1]. They form when sediment-rich rivers are forced to deposit their load as discharge is reduced [1].

- (c) Discuss the environmental consequences of eutrophication and the pollution of aquifers.

[10]

Groundwater pollution and eutrophication may be caused by farming, fertilizer and waste run-off. Eutrophication occurs in a surface water store, causing algal blooms and reduced levels of oxygen in the water, whereas aquifer pollution results in the declining quality and quantity of water.

Other environmental consequences could include adverse impacts on habitats, flora and fauna, or creation of dead zones.

Good answers may compare environmental consequences on a variety of scales or from different perspectives (stakeholders). Another approach might be to compare the way eutrophication occurs at a more local scale than aquifer pollution, or the way eutrophication occurs on the surface whereas aquifer pollution occurs underground.

At band D, expect description of the two types of pollution and their environmental consequences.

At band E, expect either a more detailed explanation of the consequences or a structured discussion of the two types of pollution.

At band F, expect both of these elements.

Marks should be allocated according to the markbands.

Option B — Oceans and their coastal margins

3. (a) Identify and briefly describe **two** landforms in box X. **[2+2]**

Award [1] for each landform identified and [1] for valid description.

Possibilities include:

- transform fault
- rift valley.

For example: Mid ocean ridge **[1]** is the long linear submarine mountain range **[1]**.

- (b) Using examples, explain **two** positive economic impacts that El Niño events can bring. **[3+3]**

Award [1] for each valid economic impact, and a further [2] for development/exemplification of the impact.

Possibilities include, but are not limited to:

- reduced hurricane activity in the Atlantic so less damage to infrastructure
- Peruvian anchovies migrate south to Chilean waters increasing fishing opportunities
- in some parts of Southern Africa, low rainfall could reduce incidence of malaria, reducing healthcare costs.

For example: El Niño events may lead to an increase of rainfall in normally dry areas **[1]** in Peru **[1]**, leading to an increase in agricultural yields **[1]**.

- (c) “Geopolitical conflict is the inevitable outcome of human use of oceans.” Discuss this statement.

[10]

Conflict between nations may arise on account of territorial disputes (exclusive economic zones, EEZs) or access to biotic and abiotic resources. Some ocean resources are found in EEZs whereas some are part of the global commons. In the open ocean, there is no EEZ and so countries are free to utilise resources as best they can, potentially leading to multiple claims.

Ocean resources include oil, gas, gold, manganese, biotic resources and territory (EEZ) and control over shipping routes/transport routes. Some resources have been discovered and exploited; others are still potential resources, such as oil in the Arctic.

However, an alternative view is that ocean resources may be managed in ways avoiding conflict, *eg*, by the EU’s Common Fisheries Policy, Convention on the Conservation of Antarctic Marine Living Resources, Marine Stewardship Certification, *etc*.

Good answers may discuss whether the statement applies to all uses or just certain uses. Another approach might be to discuss the importance of the EEZ for sovereign states and the degree to which this may lead to conflict. Another approach might be to discuss the statement in relation to different timescales and the concept of sustainability (conflict may become more likely over time as finite resources become exhausted).

At band D, expect a description of human use of one or more ocean resources by different people/countries.

At band E, expect either a more detailed explanation of how oceans are used by different people/countries and the conflicts that exist or a structured examination of the statement.

At band F, expect both of these elements.

Marks should be allocated according to the markbands.

4. (a) (i) State **two** causes of a negative change in sea level. [2]

Sea level fall [1]

Uplift of land [1]

Accept other valid terminology.

- (ii) Briefly describe **one** landform associated with an advancing coast. [2]

Award [1] for a named landform and [1] for description.

Possibilities include:

- relict platform
- raised beaches
- sandbar
- spit
- saltmarsh
- tombolo.

For example: An abandoned cliff / stack [1] is a former marine cliff now above the high tide level [1].

- (b) Using examples, explain **two** effects of the oceanic conveyor belt on different places. [3+3]

Award [1] for each valid effect and a further [2] for development/exemplification.

The oceanic conveyor belt brings warm water [1] into high latitudes in the North Atlantic [1] causing temperatures, evaporation and rainfall to be higher in this region [1].

In other regions, such as Antarctica [1], the oceanic conveyor belt causes the uplift/mixing of colder water with surface water, leading to an increase in nutrients in the upper water [1], thereby supporting a rich marine life, and, potentially, fisheries [1].

- (c) “The loss of coral reefs has more serious effects than the loss of mangrove swamps.” Discuss this statement.

[10]

Consequences of the loss of coral reefs include: erosion of coastlines, loss of fish habitats and biodiversity (they shelter more than 25% of all known fish species), loss of economic productivity and livelihoods for people who depend on fishing and/or coral reef tourism/diving.

In addition to biodiversity loss, the removal of mangroves may reduce the amount of available food, fuel, building materials and medicine for local societies. Mangroves also act as natural filters, absorbing nutrients from farming and sewage disposal. The dense interlocking roads of mangroves help to stabilize shorelines and prevent erosion.

Good answers may provide a structured discussion of different types of effect/impact according to scale (local/global issues), or human and physical effects. Another approach might be to discuss the onshore context of mangroves and the offshore context of reefs, thus reaching a judgement on the severity of loss for local people (relatively more are affected by mangrove loss). Another approach might be to discuss how coral reefs and mangroves both protect coastlines by absorbing some wave energy, especially during storms such as hurricanes (tropical cyclones).

At band D, expect a description of some effects/impacts of coral and mangrove loss (do not expect balance).

At band E, expect either a more detailed explanation of some severe effects of coral and mangrove loss (do not expect balance) or a structured discussion of the statement.

At band F, expect both of these elements.

Marks should be allocated according to the markbands.

Option C — Extreme environments

5. (a) (i) Identify **one** landform of glacial erosion in square 3415. **[1]**

Pyramidal peak, corrie/cirque, arête, tarn **[1]**

(ii) State the name of **one** U-shaped valley/trough shown on the map. **[1]**

Grisedale / Grisedale Beck / Glenridding / Thirlmere **[1]**

(iii) Estimate the length in kilometres of the walking track between the start of the walking track (footpath) at Highpark Wood (3116) to the summit of Helvellyn (3415). **[1]**

About 3 km (allow between 2.5 km and 3.5 km) **[1]** (units not needed for **[1]**)

(iv) State the height gained from the spot height in square 3315 to the triangulation pillar in square 3415. **[1]**

949 m – 859 m = 90 m

(v) Using map evidence, explain **one** reason, **other than** climate, why mining in this extreme environment is challenging. **[2]**

Possibilities include:

- height
- remoteness/inaccessibility
- low population of workers.

For example: Very steep slopes in 3514 **[1]** make vehicular access very expensive **[1]**.

Specific reference to the map is needed for the award of the second mark.

(b) Explain the formation of **one** feature **or** landform of glacial deposition. **[4]**

Possible features include:

- moraine (lateral/terminal)
- eskers/kames
- outwash plain
- erratics.

*Award **[1]** for naming a feature, up to **[2]** for description and up to **[2]** for explanation.*

For example: A drumlin **[1]** is a smooth, elongated mound/hill of glacial till **[1]** formed when a glacier deposits its load in a valley/lowland area **[1]** due to changes in gradient/velocity **[1]**.

- (c) Examine how the balance between challenges and opportunities affects economic activities in **one or more** extreme environments.

[10]

If the economic benefits outweigh the costs of living in an extreme environment, then economic activities are likely to take place. Examples may include mining in the Arctic/hot desert areas, agriculture in hot, arid areas, tourism in any extreme environment.

Opportunities may occur where there are accessible mineral deposits, rivers providing irrigation, easily accessible aquifers, areas that attract tourists, areas of manufacturing, TNC development, areas of retirement, scientific research, areas where income overcomes challenges. Accept other reasons.

Other areas may have resources that are currently undeveloped, *eg*, oil in Greenland.

Challenges include adverse climate, remoteness, limited accessibility, low populations, protected lands.

Accept environmental degradation and social impact on local people as long as it is tied closely to economic activities.

Good answers should progress beyond simply agreeing with or rejecting the statement and discuss the validity of the statement, *eg*, opportunities always outweigh challenges if there is an important resource, *etc*. Good students may appreciate that challenges and opportunities vary over time and place. Alternatively, there may be recognition of the stakeholders involved, *eg*, indigenous peoples compared to large TNCs, and there may be possible conflict between them.

At band D, expect some description of the opportunities and challenges of named economic activities in recognizable extreme environments.

At band E, expect either more detailed explanation of opportunities and challenges or a structured examination of the statement.

At band F, expect both of these elements.

Marks should be allocated according to the markbands.

6. (a) (i) Estimate the volume of ice lost between 1850 and 1950. [1]

Accept answers in the range 21–22 metres water equivalent [1].

- (ii) State the year when the glacier began a continuous decline lasting to 2010. [1]

1970 [1] (*accept 1969–1971*).

- (iii) Suggest why a short-term increase in glacial ice (positive balance) begins around 1950. [2]

Award [1] for stating that the accumulation of ice was greater than the melting of ice.

Award the second mark for one of the following:

Decrease in temperature leads to less melting [1] / Increase in snowfall leads to greater accumulation of ice [1] / other valid suggestion.

- (b) Distinguish between aridity and infertility in hot, arid areas.

[6]

Soil aridity is the deficiency of moisture in the soil. Soil is considered arid if the rate of evapotranspiration in the soil is higher than the amount of water absorbed by the soil.

Accept climatic aridity as an alternative to soil aridity.

Infertility is a lack of necessary requirements for healthy plant growth (minerals, nutrients). It does not mean soils are unsuitable for plant growth, but the only plants that can grow are those that either need few nutrients or obtain them from fertilizers.

For example:

Aridity:

Is the lack of moisture/water in the soil [1] where evapotranspiration is greater than water provided [1], which limits the plants able to grow [1].

or

Aridity is a deficiency of moisture / an area with less than 250 mm/year [1], resulting from a permanent absence of rainfall / when evaporation exceeds rainfall [1], which limits plants' ability to grow resulting in scant vegetation [1].

Answers may refer to an aridity index.

Soil infertility:

Is the lack of nutrients in an arid soil [1] but some plants can grow due to special adaptations to the conditions [1] or by the provision of fertilizers [1].

Award up to [5] for description/explanation of aridity and infertility with a maximum of [4] if only one term is considered.

Reserve [1] for the idea that the two can be linked or an attempt to distinguish, for example, not all soils in arid environments lack the necessary nutrients to be productive but the lack of available water limits plant growth and agricultural potential.

(c) Examine the causes **and** consequences of the melting of permafrost.

[10]

Possible causes include:

- annual seasonal melting and refreezing of the active layer
- potential impact of global climate change in extreme environments and possible feedback mechanisms
- melting resulting from resource development, settlement and communications.

Possible consequences include:

- implications for settlement and communications and mineral extraction, for example, subsidence, increased frost heave
- long-term implications of climate change for indigenous populations, for example, disruption of traditional seasonal migration routes
- possible costs/benefits for tourism depending on context, for example, possible safety issues for ski infrastructure.

Good answers may examine different timescales or different stakeholders affected by permafrost melting. Another approach might be to provide a structured examination of different consequences (positive/negative), a recognition of feedback mechanisms and also the interaction of natural and human causes depending on the location.

At band D, expect some description of the causes and consequences of permafrost melting. Do not expect balance.

At band E, expect either more detailed explanation of the causes and consequences of permafrost melting or a structured examination of the statement including a recognition that there are multiple causes which are place/time dependent.

At band F, expect both of these elements.

Marks should be allocated according to the markbands.

Option D — Hazards and disasters – risk assessment and response

7. (a) With reference to the diagram, describe the changes in:

(i) number of deaths; [2]

For example, there has been some reduction in the number of lives lost over time/since 2000 [1], but some storms still resulted in large losses of life, for example 150 deaths in 2013 [1].

Award maximum [1] if no quantification.

(ii) economic losses. [2]

There has been a rapid increase in economic losses over time [1], for example 78 billion pesos in 2013 [1].

Award maximum [1] if no quantification.

(b) Suggest reasons for the changes you identified in (a) for:

(i) number of deaths; [3]

The early warning system has had some effect in reducing loss of lives, because people are warned of an impending storm and can be better prepared [1], but the warning may not reach the more vulnerable sectors of the population [1], early warning predictions may not always be accurate because the tropical storm tracks may change [1].

Accept other valid suggestions such as details of preparation, evacuation, education, etc.

(ii) economic losses. [3]

The sharp increase in economic losses may reflect an increase in the value of economic development/infrastructure/housing [1]. However, buildings may have been sufficiently modified to withstand the effects of storms [1]; and the local effects may be unequal, affecting vulnerable coastal communities in particular [1].

Accept other valid suggestions.

- (c) Examine the factors that affect the choice of adjustments before, and responses after, **tectonic** (earthquake/volcanic) hazard events.

[10]

Possible adjustments before the hazard event include: prediction and forecasting; warning systems; land-use planning/zoning; insurance. Possible responses include short-term (rescue) and long-term (rehabilitation and reconstruction). Factors affecting the choice include level of economic development, perception of the hazard by individuals and communities.

Good answers may show a good knowledge and understanding of a range of possible adjustments and responses after a tectonic hazard event. These should be short-term, mid-term and long-term responses, and might distinguish between rescue, rehabilitation and reconstruction responses. They may also examine the factors affecting the choice of adjustments to the hazard event, such as perception, politics and level of economic development. Another approach might be to examine the range of choices made by individuals, civil society, governments, and so on.

For band D, expect a description of some basic adjustments and responses with reference to tectonic hazard(s).

For band E, expect either a more detailed explanation of possible adjustments and responses to tectonic hazards, and the factors that affect choice, or some examination of the difficulties affecting the choice.

For band F, expect both of these elements.

Marks should be allocated according to the markbands.

8. (a) (i) Outline what is meant by the term “drought”. [2]

Drought: a period of lower than expected rainfall [1]

And some development such as:

- over an extended period of time (usually for a season or more) [1]
- may recognize different types of drought from various parts of the world [1].

- (ii) Briefly describe **one** physical cause of a **located** severe drought. [2]

Reasons for lower than expected rainfall include: anticyclonic conditions; El Niño/La Niña; jet stream movements; North Atlantic Oscillation.

For example: Drought in Australia (2000s) [1] was caused by an El Niño event / bringing high pressure/anticyclonic conditions [1].

Maximum [1] if not a located drought.

- (b) Suggest **two** reasons why individuals and communities may underestimate the probability of a severe drought occurring in the region in which they live. [3+3]

Possible reasons include:

- lack of perception/knowledge, because they recently moved into an area during a period of higher rainfall, or there had not been a drought within living memory
- unreliable or lack of historical climatic data, so unable to estimate the statistical probability of a drought event
- the probability of a drought might be underestimated, especially if there had been a long period of higher rainfall
- people have adapted their lifestyles to the possibility of low magnitude drought, but are unprepared for a severe drought of long duration
- people believe that they are well-prepared for a drought and that they will not be affected by a drought event
- climate change is changing the rainfall and evaporation patterns, making drought even more unpredictable and probability unknown.

Award [3] for each developed reason.

For example: People may have a lack of knowledge of previous droughts [1] because there has not been a major drought within living memory [1] so they are unaware of the return period/recurrence interval [1].

- (c) Discuss the reasons why some low-income countries may be more vulnerable than others to the effects of hazard events.

[10]

Hazard events discussed may be natural and/or human-induced hazards.

Demographic, social and economic factors affect a country's initial vulnerability and subsequent ability to deal with the consequences and after-effects of hazard events. Geographical position may also affect the vulnerability of some low-income countries:

- location on active plate margins (vulnerability to tectonic hazards)
- tropical coastal areas (exposure to frequent hurricanes)
- desert margins (frequency of drought).

Population characteristics, such as high densities and growth rates, mean that the numbers of people exposed to hazards is high and increasing rapidly. Socio-economic factors, such as poor/weak infrastructure, lack of medical facilities, lack of information and knowledge and low economic resources, will affect a country's vulnerability and ability to deal with hazard events.

Good answers may discuss how some low-income countries are especially vulnerable to multiple types of hazard event, and not just one type. Another approach might be to discuss different aspects of vulnerability (ability to make use of forecasting, planning and education; costs of improvements to buildings and infrastructure; post-event recovery).

If the response interprets "more vulnerable than others" as a high-income country, then award maximum band D.

At band D, expect a description of how one or more hazard events have affected vulnerable low-income countries.

At band E, expect either a more detailed explanation of a range of hazards/vulnerable countries or a structured discussion of the statement.

At band F, expect both of these elements.

Marks should be allocated according to the markbands.

Option E — Leisure, sport and tourism

9. (a) Using a located example, outline **two** ways in which sustainable tourism supports the culture of local people. **[2+2]**

Possibilities include:

- respecting/supporting cultures of local communities
- conserving cultural heritage
- reduces out-migration therefore retaining distinctive practices
- employment of local guides can lead to environmental preservation (nature can be part of cultural heritage).

Award [1] for each way and [1] for exemplification/location. If only one location is used, the second point must be developed in order for full marks to be awarded.

For example: Ecotourism in Uluru, Australia **[1]**, helps aboriginal customs survive due to educating visitors **[1]**.

- (b) Explain **two** impacts of tourism on the natural environment of rural areas. **[3+3]**

Some possible impacts include: natural resources, pollution, conservation and protection, for example:

- conservation and protection, including the establishment of National Parks and other protected areas
- provision and construction of tourist facilities may increase pressure on forests, wetlands, wildlife and other ecosystems; *eg* deforestation by wood fuel collection in Nepal
- tourism may cause various forms of local pollution, such as noise pollution from recreational vehicles (*eg* jet skis); transportation increases air pollution, especially in urban areas; littering, sewage and waste disposal.

Award [1] for the identification of an environmental impact, and [2] for further development and/or exemplification.

For example: There may be a depletion of local water resources due to increased demand from hotels and golf courses **[1]**, which may lead to a lowering of local water tables **[1]** with consequent changes to local habitats **[1]**.

- (c) Examine how the benefits of hosting **one or more** major international sporting events have been unevenly distributed. [10]

The benefits may be economic, social, short term, long term, *etc.* Benefits could be distributed between neighbourhoods, businesses, national government, *etc.* The focus should be a major event, such as Olympics, football World Cup, or Formula One (F1) race.

Benefits may include:

- raising the profile of a city, may lead to increased tourism and economic investment
- legacy of improved sporting venues, public transport and infrastructure
- creation of new jobs and reducing unemployment
- urban regeneration, including new housing and cleaning up polluted landscapes and the uneven spatial pattern of gentrification
- short-term boost to the local economy
- the value of the sporting legacy at different spatial scales.

Benefits are not shared equally between groups of people. Groups who have not shared benefits may be identified; however, do not credit an extended account of costs for marginalized groups as this is not asked for.

Good answers should examine both the short-term and long-term benefits of hosting major sporting events. They will examine a range of benefits on both local and national scales, with reference to suitable examples. They may go on to arrive at a reasoned judgement of who/where benefits most.

For band D, expect answers that describe the uneven distribution of some benefits of hosting an international sporting event.

For band E, expect either greater depth of explanation of a range of benefits and their uneven distribution, or some structured examination of the statement.

For band F, expect both of these elements.

Marks should be allocated according to the markbands.

10. (a) (i) Describe the general relationship shown by the diagram. [2]

There is a positive correlation/relationship between catchment area and settlement size / small settlements have facilities with small catchment areas/larger settlements have facilities with large catchment areas [1].

Award [1] for some quantification.

- (ii) Suggest **one** reason why settlement A does not fit the general relationship. [2]

Award [1] for understanding that it has a larger catchment area than facilities in other settlements with small population and [1] for further development of the reason or a valid example of a high catchment facility, for example, ski centre; mountain bike course trail.

- (b) Suggest **three** possible reasons why the sphere of influence of supporters of a sports team could change over time. [2+2+2]

Possible reasons include:

- changes in transport, meaning that it is easier/harder for supporters to travel longer distances to watch their teams
- improvements in communications technology, meaning that supporters from around the world can watch their teams on television or through the internet
- more/less money and capital investment raises/weakens the international profile of major teams, so supporters come from many different countries/change allegiance
- increased wealth and affluence means that supporters can afford to travel further to watch their teams.

Award [1] for each reason, and a further [1] for development and/or exemplification.

For example: Due to improvements in technology such as television and internet [1], Manchester United's sphere of influence has grown to include people all around the world [1].

- (c) Examine the contribution that ecotourism can make to a country's tourist industry. **[10]**

The question can be answered using one country only or multiple examples.

Ecotourism can be defined as responsible travel to remote, fragile and often protected areas that strive to be low impact and of small scale. Such activities might include bird watching, studying local ecosystems, walking and cycling. Ecotourism occurs in many countries at different levels of development.

Unique species and landscapes can be a major selling point for a country of local place's tourist industry. Affluent tourists may travel long distances to see certain species in their natural habitats. Sustainable ecotourism provides local people with much-needed employment in some development contexts; in time, some may develop their own tourist-orientated businesses, helping to develop the tourist industry further.

However, careful management is required to avoid exceeding carrying capacity and risking the sustainability of ecotourism ventures. Strategies might include: restricting visitor numbers, which places a limit on the contribution that can be made to a national industry. In contrast, mass tourism ventures may make a larger economic contribution.

Good answers may examine the varied contexts for ecotourism (the contribution made to the tourist industry in very isolated countries, or those lacking other types of tourism, eg mass tourism, may be greater than for some high-income countries with well-established mass tourism industries). Another approach might be to examine the concept of sustainability (recognizing that there are limits to the expansion of an industry that aims to be sustainable). Another approach might be to examine how the contribution may change over time (some ventures gain and later lose popularity in the Butler model).

For band D, expect some description of ecotourism/the tourist industry in one country.

For band E, expect either a more detailed explanation of ecotourism's contribution to the national tourist industry or a structured examination of the statement.

For band F, expect both of these elements.

Marks should be allocated according to the markbands.

Option F — The geography of food and health

11. (a) (i) State **two** diseases of poverty. **[1]**

Diseases of poverty include communicable/infectious diseases, such as malaria, ebola, tuberculosis and HIV/AIDS **[1]**.

Accept other possible answers.

- (ii) Describe the distribution of diseases of poverty. **[3]**

Diseases of poverty are primarily concentrated in low-income countries **[1]** often in tropical regions, but are also found in low-income groups in more affluent countries **[1]**.

Do not accept reasons for poverty unless they are specifically linked to developing the location/distribution/example.

*Award **[1]** for additional detail such as a located example.*

- (b) Explain **two** types of diffusion in relation to the spread of disease. **[3+3]**

The two types named in the syllabus are relocation and expansion diffusion.

Accept other valid types of diffusion, such as contagious and hierarchical.

*In each case, award **[1]** for identification of the type of diffusion, **[1]** for explaining the concept, and **[1]** for further development or exemplification.*

For example: Influenza is primarily spread by expansion diffusion **[1]**, which means it spreads outwards by contact with an infected individual **[1]** into a population that has not previously been exposed to the disease **[1]**.

- (c) To what extent have recent changes in agriculture increased the production and availability of food in low-income countries?

[10]

A distinction should be made between increases in food production and increases in food availability.

Recent changes in agricultural production have included increases in crop and animal yields due to scientific innovation, breeding and development of higher yielding varieties. There has also been an increase in areas under irrigation, and in the use of fertilizers and pesticides, which have increased crop yields. There has also been an increase in the area under cultivation.

The growth of agribusiness, improvements in transport and communications, the development of marketing, and improved storage facilities have also increased food availability.

However, there has been unequal development and changes have not occurred in all regions. Wealthier, more fertile regions have increased agricultural yields, while more marginal, less fertile and poorer regions have not experienced large increases. Political factors, income levels, high food prices and poor infrastructure often limit increases in productivity and availability. In other areas, especially those farmed by agribusinesses, changes may focus on the production of non-food crops for export, decreasing local food availability.

Good answers may evaluate the extent to which there have been increases in both food production and availability. They might consider changes in agricultural systems in low-income countries that have resulted in increases in productivity. They could evaluate the extent to which changes in productivity have occurred in different regions, and that food availability may vary due to economic, political and demographic factors.

For band D, expect answers that describe some changes in food production and availability in some countries.

At band E, expect either a more detailed explanation of changes in agriculture, food production and availability in particular regions, or some structured evaluation of the extent to which the statement is true.

At band F, expect both of these elements.

Marks should be allocated according to the markbands.

12. (a) (i) Describe the changes in Sub-Saharan Africa between 1990 and 2015. [1]
Decreased from about 170–180 to about 70–80 deaths per thousand [1].
- (ii) Identify the region with the greatest **relative** change in mortality rate between 1990 and 2015. [1]
Eastern Asia [1].
- (iii) Outline why HALE is a better indicator of a nation’s health than child mortality. [2]
Health-adjusted life expectancy, based on life expectancy at birth but including an adjustment for time spent in poor health [1]; it refers to the whole population rather than just a subset of the population [1].

Or any other valid suggestion.

- (b) Explain how the application of **two named** barriers to limit the spread of disease has reduced child mortality rates. [3+3]

Possible barriers include:

- introduction of bed nets
- anti-retrovirals reducing mother–child transmission
- spraying of still water sources
- introduction of vaccination/immunization programmes.

Other valid factors should be credited.

NB. “physical” barriers are not valid as they are not “applied”.

Award [1] for each valid point and [2] for further development or explanation.

For example: Increased access to anti-retrovirals [1] in South Africa, which has a high incidence of HIV/AIDS [1], reduces mother to child transmission of disease, enabling more children to survive past the age of five [1].

- (c) Evaluate the relative importance of fair trade and food aid in overcoming food shortages in low-income countries.

[10]

The aim of fair trade is to help producers in low-income countries achieve better trading conditions, markets and higher prices for their produce and to promote sustainability. The focus is typically on agricultural produce that is typically exported to high-income countries, such as coffee, tea, bananas. It promotes sustainable development and seeks to improve the working conditions and rights of small-scale farmers. A higher income means more money available to purchase food and the ability to invest in food production, and thus overcome long-term food shortages.

Food aid is concerned with providing food to tackle problems of hunger in emergency situations, or to alleviate longer-term hunger and achieve food security. Although useful in overcoming emergency food shortages in times of disasters such as famine or earthquakes, or civil wars and refugees, it is questionable whether it offers a long-term solution to food security. Sustainable development is not necessarily food aid's long-term objective. Also food aid has been criticized for food dumping and maintaining low prices for farmers in low-income countries.

Good answers may evaluate the degree to which food shortages might be localized or widespread, short-term or long-term. Answers may evaluate whether fair trade is mainly focused on the export of food crops, or also seeks to promote sustainable development; higher farm incomes might result in increased investment in the production of food crops and thus alleviate local food shortages. Answers may evaluate whether food aid is essentially an emergency strategy designed to alleviate food shortages. The disadvantages of food aid in solving long-term shortages might be considered, and whether or not it is a sustainable strategy.

For band D, expect some description of the role of food aid and fair trade in overcoming food shortages.

For band E, expect either a more in-depth explanation of the usefulness of food aid and fair trade, or some structured evaluation of how successful they have been in overcoming food shortages.

For band F, expect both of these elements.

Marks should be allocated according to the markbands.

Option G — Urban environments

13. (a) (i) Describe the changing poverty gap between Abidjan and smaller cities over time. [2]

The gap got wider and then narrowed [1] / increased and decreased [1]

Award [1] for quantification of the gap, eg was widest in 2005 / 1995 around 11 %; 2005 around 35 %.

Do not award credit for simple listing of the poverty rates.

- (ii) Suggest **one** reason why the poverty rate in Abidjan is always lower than the poverty rate in the smaller cities. [2]

Award [1] for a reason, eg, infrastructure, industries, investment, and [1] for recognition that proportionately fewer people lack income.

For example: Abidjan is the largest city so may have more industries [1] so there are many more opportunities for employment [1].

- (b) Suggest **two** reasons for the occurrence of low-cost housing areas within cities. [3+3]

Reasons could include:

- migrants are often unemployed with little disposable income
- some areas suffer deprivation and are avoided by wealthy people
- authorities may build/provide social housing
- areas of older housing may be in poor condition and used as low-cost housing.

Award [1] for the identification of a valid factor that influences and [2] for further development/exemplification.

For example: In Rio de Janeiro [1], there is a large influx of migrants from smaller cities and rural areas [1] and it is impossible to provide adequate housing for all the population [1].

- (c) Evaluate the success of **one or more** strategies to control rapid city growth resulting from in-migration.

[10]

Rapid urban growth is a phenomenon that is present in many parts of the world, notably NICs and low-income countries. The advantages of city growth for migration include the supply of qualified workers, attractions for investors and the resulting multiplier effect. Rapid population growth may lead to scarcity of housing, employment and access to facilities.

Governments may try to limit in-migration through a variety of strategies, including quotas/work permits, the creation of new capital cities/new cities/new towns/expanded towns/greenbelts and rural development schemes. Successful strategies tend to be in cities (such as Mexico City) in which government investment or financial incentives have encouraged people to move to other areas in the country.

Others have had less success, *eg* despite Egypt's new town programme, the growth of Cairo has not been reduced, and despite China's hukou system, rapid city growth has continued. Nevertheless, in many countries, rates of urbanization are tailing off.

Good answers may recognize that in-migration is both a cause and an effect of rapid city growth, and may be seen in a positive light. It may also be seen in a negative way, and so controls are needed. Good candidates may recognize that controls can operate at a variety of scales, *eg* urban (limit cities to a certain size, then have new towns/cities projects), rural (keep people working in the countryside), international (control the number of overseas migrants) and national (redevelop urban areas in other parts of the country). Answers may also discuss attempts to balance/manage city growth.

NB. Do not accept responses that look at the effects of rapid city growth or those that look at strategies to deal with rapid city growth.

At band D, expect a description of one or more strategies to control growth from rapid in-migration.

At band E, expect either a more detailed explanation of strategies to control in-migration, or a structured evaluation of the success of strategies to control rapid city growth.

For band F, expect both of these elements.

Marks should be allocated according to the markbands.

14. (a) (i) Describe the pattern of temperatures shown south of the River Liffey. [3]

- decreases steadily southwards [1]
- some quantification, eg falls from 1.5 to –2.5 [1]
- the decline in temperatures is much more gradual towards the south of the city [1]
- or other clarification [1].

(ii) Estimate the temperature range north of the River Liffey. [1]

Accept either a value in the range 5.5 to 6.5 [1] (or < –1.5 to +4) [1].

Units (°C) not needed for award of mark.

(b) Using examples, explain **two** reasons for the growth of suburbs. [3+3]

Award [1] for each valid reason and a further [2] for further development/exemplification.

Possibilities include:

- development of new transport infrastructure / increase in private car ownerships
- availability of cheaper land near the edge of urban settlements
- increased demand for housing due to in-migration, allows areas further from the city to be developed for housing
- push factors from city due to crime rates *etc* and perceived better lifestyle.

For example: Development of new transport infrastructure [1] allows people to live further from their place of work and to commute daily [1], for example London, UK, doubled in size when the underground system was extended in the 1930s [1].

- (c) Examine recent land use changes in the central and/or inner areas of **one or more** cities.

[10]

Urban land use changes may include changes to the CBD, economic activity changes including central brownfield sites, and housing in inner-city areas. Also, responses may look at transport, retail and entertainment developments and infrastructure changes.

Good answers may examine connections between different land use changes, eg new housing supporting workers for revitalised CBD. Another approach might be to examine land use changes on different spatial or temporal scales, or to make a comparative examination of different places. Another approach might be to examine the causes and/or consequences of change, eg government, business or civil society.

At band D, expect a description of two appropriate land use changes in one or more named cities.

At band E, expect either a more detailed explanation of appropriate urban land use changes in one or more named cities or a structured examination of the topic.

At band F, expect both of these elements.

Marks should be allocated according to the markbands.
