

Markscheme

May 2017








Geography

Higher level and standard level

Paper 2

This markscheme is the property of the International Baccalaureate and must **not** be reproduced or distributed to any other person without the authorization of the IB Assessment Centre.

The following are the annotations available to use when marking responses.

Annotation	Explanation
	Unclear
	Incorrect Point
	Good Response/Good Point
AQ	Answers the Question
CKS	Clear Knowledge Shown
NAQ	Not Answered Question
	Apply to blank pages
	On-page comment text box (for adding specific comments)
	Highlight (can be expanded)
CON	Contradiction
DEV	Development
DES	Descriptive
EG	Example
EVAL	Evaluation
BaEv	Basic evaluation
AdEv	Advanced evaluation
EXC	Excellent Point
GP	Good Point
	Wavy Underline Tool

NE	Not Enough
VL	Very Limited
WKAR	Weak Argument
GEN	Generalisation
BOD	Benefit Of Doubt

You **must** make sure you have looked at all pages. Please put the **SEEN** annotation on any blank page, to indicate that you have seen it.

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	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** environmental problems that may occur downstream from multi-purpose dams. **[2+2]**

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

For example: Reduced nutrient transport downstream [1], resulting in decreased agricultural/fisheries yields [1].

Problems could include:

- loss of biodiversity
- increased risk of salinization
- less water for agriculture
- clear water erosion
- decreased fish stocks
- flooding due to dam collapse

Accept other credible suggestions as long as they are downstream from the dam.

- (b) Define the concept of “maximum sustainable yield” of freshwater. **[2]**

The maximum level of extraction of water [1] that can be maintained indefinitely for a given area [1].

Alternative acceptable definitions include:

- the relationship/balance between inputs and outputs [1] so that water does not run out for the foreseeable future/on an annual basis [1]
- the largest amount of water that can be taken from a resource [1] without depleting the original source or potential for replenishment [1].

- (c) With reference to **one named** river basin, explain **two** strategies that have been adopted to meet competing demands for water.

[2+2]

In each case, award [1] for a valid strategy, and [1] for further development. Award a maximum of [3] if no example is given.

One approach is to manage the conflicting needs of different user groups, eg farmers, industries and domestic users. Another approach is to tackle the issue of too many domestic users competing for limited water.

For example: In the Colorado River basin: state administrations impose quotas [1] for different user groups, eg casinos/golf courses [1], restricting consumption in order to conserve water. At the local scale, homeowners in any city are competing for a limited amount of water and have to implement their own conservation measures, eg flushing the toilet less often [1]. This is encouraged by grants for low-flush toilets [1].

Other possibilities include:

- domestic pricing
- rationing
- water metering
- conservation measures, eg shorter showers, re-use of grey water, replacing grass with sand and succulents, more efficient irrigation systems – drip rather than sprinkler, desalinization projects
- storage of water: eg dams/reservoirs
- inter-basin water transfer.

- (d) “The negative consequences of river flooding always outweigh the benefits.”
Discuss this statement.

[10]

Answers would be expected to discuss the advantages and disadvantages of river flooding.

The benefits of flooding could include the formation of floodplains; areas of flat land; fertile alluvial soils suitable for agriculture; areas for human settlement; formation of wetland ecosystems; maintaining ecosystems; re-charging of groundwater. Opportunities may exist, for example, for aquaculture; some economies are closely connected to the flood cycles.

The negative consequences of floods may include loss of life, damage to infrastructure, housing and farmland. Economic and social losses may be substantial, especially in urban areas on floodplains.

It may also be argued that the information gained from a river flood helps guard against future inundations, and that frequent monitoring and management strategies may reduce the impact of flooding. Similarly, it may be argued that river flooding is largely beneficial and that many ancient civilizations depended on the regular flooding of rivers. However, because of climate change and other human factors, flood frequency and magnitude has increased.

Good answers would be expected to discuss in detail the potential advantages and disadvantages of flooding in a way that arrives at a final evaluation. An alternative approach would be to provide a structured discussion of the statement from different perspectives, as these may differ on what constitutes a benefit or cost.

At band D, expect a description of some consequences of river flooding.

At band E, expect either more detailed explanation of the advantages and disadvantages of river flooding or a structured discussion of the statement.

At band F, expect both of these elements.

Marks should be allocated according to the markbands.

2. (a) (i) State which country or world region has the highest undeveloped potential for HEP. [1]
Africa.
- (ii) Estimate the current HEP production in terawatt hours for Europe. [1]
Accept answers in the range 430 to 490 inclusive [1] terawatt hours (no requirement to state units).
- (iii) Suggest **two** ways in which Australasia can be viewed as an anomaly to the general pattern shown on the map. [1+1]
N.B. Potential could be interpreted as either the total height of the bar, or the “grey” undeveloped part of the bar.
Award [1] for each of the following:
- overall total is much less than anywhere else
 - proportion of total that is undeveloped is much lower than anywhere else.
- (b) Explain **three** factors that may produce a short time lag on a storm hydrograph. [2+2+2]

A short time lag is usually associated with overland flow linked with any of the following factors:

- the characteristics of the precipitation input (type and duration of precipitation, speed of snow melt, antecedent rainfall)
- the shape and size of the drainage basin (including tributaries / drainage network)
- characteristics of the drainage basin (land use, gradient, geology, vegetation, urbanization).

For example: Short lag time is caused by an unvegetated drainage basin [1] in which surface runoff is accelerated/interception does not occur [1]. Also linked with impermeable clay soil [1] and the lack of infiltration [1]. Also linked with drainage basins that are round [1] because all water reaches the measuring point at roughly the same time [1].

- (c) Compare the effectiveness of alternative stream management strategies, **other than** dams.

[10]

There are many alternative strategies that could be examined. For example, building of dykes/flood barriers or artificial levees, channel management (straightening, deepening, widening), flood relief channels/basins, river/wetland restoration.

Land uses strategies are acceptable if they are purposely designed to manage streams. Do not credit indirect/unplanned impacts of urbanization, deforestation, etc.

Good answers may focus on, and compare, the effectiveness of strategies (may look at different perspectives, user groups). Another approach might be to compare the effectiveness at different spatial/temporal scales.

At band D, expect a description of one or more stream management strategies.

At band E, expect either a more detailed explanation of two or more different strategies or a structured comparison of their effectiveness (costs, benefits and perspectives on these).

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) Describe **two** characteristics of oceanic crust. **[2+2]**

In each case, award [1] for a valid characteristic, and a further [1] for development/exemplification.

For example: Oceanic crust is dense [1], and is mainly basaltic [1].
It is relatively young [1], being nowhere older than 200 million years [1]. It increases with age away from a mid-ocean ridge [1] where new ocean crust is formed [1].
It is thinner than continental crust [1], 6–10 km thick as opposed to 35–70 km [1].

Description of oceanic landforms (for example, ridge, trench) [1]; development including details of oceanic crust [1].

- (b) (i) Briefly outline the oceanic circulation in the Pacific Ocean during an El Niño event. **[2]**

Surface water moves eastwards from west/Australia to east/South America [1] before sinking and returning at depth to the west [1].

Full credit may be awarded for a suitably annotated diagram.

- (ii) Explain the wind and pressure systems in an El Niño event. **[4]**

Award [1] for each valid point.

For example: High pressure is located in the western Pacific/Australia and low pressure over the eastern Pacific/South America [1].
This causes surface winds to blow from the western Pacific eastwards [1]. This pushes warm water towards South America, warming the air above and causing low pressure [1].
Winds at high altitude blow from east to west, and the subsiding air in the western Pacific leads to high pressure at ground level, eg Australia and Indonesia [1].

The connection between wind and pressure systems must be made explicit for full marks.

A suitably annotated diagram may be used as part of the explanation.

- (c) Examine the spatial and temporal consequences of overfishing.

[10]

The consequences of overfishing can include falling fish stocks, extinction of prized species, reduced harvests of fish, economic decline, unemployment, the creation of policies to reduce/combat over-fishing, the movement of trawlers into fisheries more distant from their country of origin, illegal fishing in other territories' waters.

Examples could include the decline of fishing in the Grand Banks of Canada, North Sea cod, blue-fin tuna in the Mediterranean, and, increasingly, off the coast of West Africa.

Good answers will explicitly address how the consequences are spatial and temporal, for instance they may examine how impacts can be local (eg falling fish yields) or global (increased prices for top species), short term (seasonal) or long term. They may also examine whether the consequences are negative (falling stocks and yields) or positive (eg a cause for the development of aquaculture or for greater management and conservation policies eg maximum sustainable yield/quotas) for different places / on different timescales.

At band D expect a descriptive account of at least two consequences of overfishing. (Do not expect both spatial and temporal consequences to be addressed explicitly at this level.)

At band E expect either a greater range/depth of consequences of overfishing or a structured examination of the spatial and temporal dimensions of overfishing.

At band F expect both of these elements.

Marks should be allocated according to the markbands.

4. (a) With reference to the map:
- (i) describe the location of the Great Barrier Reef; [1]
Off the east/north-east coast of Australia (must have Australia).
 - (ii) estimate the length in kilometres of the Great Barrier Reef; [1]
Accept answers in the range 2000 to 2300 inclusive [1]. Units not needed for award of mark.
 - (iii) suggest how **two** of the threats to the Great Barrier Reef shown on the map may damage coral. [2+2]
The threats shown on the map are:
 - mining
 - mega ports
 - shipping superhighways.*Award [1] for an explanation of how the activity may damage coral and a further [1] for a development/extension.*
For example: Increased shipping in the reef areas leads to more sediment being disturbed/more pollution [1] – this reduces the amount of light reaching the reef and so coral productivity decreases [1].
- (b) Explain **two** conflicts that may arise as a result of aquaculture. [2+2]
In each case, award [1] for an identification of the conflict and a further [1] for a development/extension of the conflict.
For example: There may be conflict between aquaculture operators and environmentalists [1] owing to the large volume of fish pellets needed to feed the farmed stock [1]; it takes 2–5 kg of fish pellets to produce 1 kg of farmed salmon [1].
Other possible conflicts may include:
 - local/national fishermen/the fish industry due to the introduction of exotic species, eg Atlantic salmon into the Pacific
 - environmental health agencies may be worried about the leaking of steroids/faeces/chemicals into surrounding waters, damaging local ecosystems/water sources.

- (c) “The disposal of waste in the oceans is causing serious harm to people and places.” Discuss this statement.

[10]

Waste disposal includes radioactive material, oil and chemical waste. Chemical waste includes SO₂ and NO_x (acidification), nitrates (eutrophication/dead zones), plastics (garbage patches), effluent from ships, oil pollution, heavy metals.

Disposal of waste may lead to reduced biological productivity. On the other hand, increased productivity in the short term is associated with nitrates, increased risk of diseases and fatality, reduced growth rates, reduced survival rates. Waste disposal may lead to death of people, falling incomes through reduced fish yields, increased cost of clean-up, unemployment, reduced tourist revenues.

However, the opposing view could be that not all waste causes serious harm to people and places, *eg* some waste may be disposed of far from populated areas or may be treated/of low toxicity and therefore not especially harmful to ecosystems. For companies involved in clean-up operations/repairs, there may be increased opportunities, rather than any harm.

Good answers may progress beyond a simple description of the problems associated with waste disposal. Good answers may discuss:

- the scale of pollution
- how the impacts vary from place to place and on different types of people
- whether pollution is serious (perspectives may differ)
- whether it is a global problem or a localized one
- whether pollution is a greater problem in different types of ocean (open ocean versus partly enclosed)
- whether management strategies are effective.

At band D, expect some description of waste disposal and the harm that it is causing to people and places.

At band E, expect either a more detailed explanation of waste disposal’s impact on people and places or a structured discussion of the statement that questions the idea of severity and harm.

At band F, expect both of these elements.

Marks should be allocated according to the markbands.

Option C — Extreme environments

5. (a) Outline **two** ways in which people have adapted their **outdoor** activities to extremes of weather in hot, arid environments. **[2+2]**

In each case, award [1] for the factor and [1] for further development/exemplification.

For example: People wear long, loose / light-coloured robes/clothes [1] as such garments allow air to circulate / reflect insolation [1] / provide protection from the sun during the day and are warm at night [1].

Turbans provide protection from the sun [1] and can be wrapped around the face in sand storms [1].

Nomadic herders stay in tents [1] that are easily dismantled and moved [1].

Daily routine [1] – work done in the cool of the morning [1].

Nomadic herders move their animals [1] in order to be close to sources of water during a dry season [1].

Long term-agricultural adaptations that reflect climatic conditions (such as irrigation) are not acceptable.

Accept other valid suggestions.

- (b) (i) Distinguish between the terms “accumulation” and “ablation” in the glacial environment. **[2]**

Award [1] for each statement. Two simple statements (no need for explicit distinction) acceptable for [2].

- Accumulation – increase of snow and ice on the glacier [1].
- Ablation – the melting of glacial ice [1].

- (ii) Explain **two** reasons why many glaciers are retreating. **[2+2]**

In each case, award [1] mark for the factor and [1] for further development.

Possible reasons include:

- global warming (either caused by humans or part of a natural cycle)
- changes in precipitation levels
- increased volcanic activity
- changes in ocean currents
- El Niño
- sunspot activity.

For example: Many glaciers retreat due to higher temperatures / global warming [1] caused by enhanced greenhouse effect [1].

- (c) “Global climate change will create more opportunities than challenges for indigenous populations.” Discuss this statement, with reference to **one or more** extreme environments.

[10]

There are many different indigenous populations that may be used. Examples include, but are not limited to, the San, Tuareg, Fulani, Inuit, Nenet, Saami.

The question is not limited to one area, so references may be made to more than one indigenous population and more than one extreme environment.

Indigenous peoples are among the first to face the direct consequences of climate change, owing to their dependence on, and close relationship with, the environment and its resources (for food, cultural identity). Climate change exacerbates the difficulties already faced by vulnerable indigenous communities, including political and economic marginalization, loss of land and resources, human rights violations, discrimination and unemployment.

However, global climate change in the Arctic may bring increased navigation during the winter, and a warmer climate has lengthened the growing season so potential yields may increase, more opportunities for sedentary agriculture / forestry / tourism / sea fishing / hunting.

Opportunities / benefits in hot, arid areas may include better grazing potential, more food production and more reliable water supplies.

Some may argue that climate change will have little or minor effect on their chosen example.

Good answers should progress beyond simply agreeing with, or rejecting, the statement and will discuss the validity of the statement by considering such things as the scale of the climate change, the degree to which indigenous population groups have assimilated in society, *etc.*

Another approach might be to provide a structured discussion of different kinds of opportunities and challenges found in an extreme environment and arrive at an evidenced conclusion.

At band D, expect some description of impacts on an indigenous population. (including answers that do not specify who the indigenous peoples are).

At band E, expect either more detailed explanation of opportunities and challenges for indigenous populations or a structured evaluation of the statement.

At band F, expect both of these elements.

Marks should be allocated according to the markbands.

6. (a) Describe how the characteristics of permafrost vary with latitude. [4]

Award [1] for each valid point, including:

- permafrost becomes thicker towards 70°N / the north [1]
- changes from discontinuous to continuous at 60°N [1]
- thin active layer becomes deeper towards the south/50°N [1]
- blocks of permafrost become smaller south of 54/55° north [1].

Maximum [3] if no quantification using depth or latitude.

- (b) (i) Outline how the seasonal changes taking place in the active layer differ between 50°N and 60°N. [2]

Award [1] for summer thawing and subsequent refreezing at both, and [1] for recognizing that the active season is much shorter at 60° north / shortens as latitude increases.

- (ii) Explain **two** ways in which the active layer creates challenges for settlement and/or communications in a permafrost area. [2+2]

In each case, award [1] for each challenge that is identified and [1] for further development/exemplification.

Challenges include:

- the action of solifluction
- thermokarst/subsidence heat from buildings
- heat from pipelines
- changes in vegetation cover
- frost heave
- the weight of vehicles
- keeping cold water flowing to towns
- accessibility of settlements.

For example: The heat from buildings leads to thawing of the active layer [1] causing subsidence of buildings [1].

- (c) “The opportunities for mineral extraction outweigh the challenges in hot, arid areas.”
Discuss this statement.

[10]

Areas of mineral extraction include, but are not limited to, oil in the Middle East, diamonds in Botswana/Namibia, uranium in Australia, uranium in Niger, copper in Arizona, copper in the Atacama (Chile).

The opportunities are economic gains from the resources being mined, which provides revenue for the country and for improvement of local infrastructure, eg communications, investment made into local area, eg health care, employment (and higher wages) provided for local people.

Challenges tend to be environmental and include contamination of scarce water resources, effects on local water supply/tables, aesthetic changes in the natural landscape, pollution, accelerated wind/water erosion, economic exploitation by the TNCs (mining companies), little regard for local environment or people; disagreements over land ownership and rights (eg aborigines in Australia), decreased sustainability in the long term.

Good answers should progress beyond simply agreeing with, or rejecting, the statement and discuss the validity of the statement. Another approach might be to provide a structured discussion of different kinds of opportunities and challenges found in hot, arid areas and arrive at an evidenced conclusion.

At band D, expect a description of some of the challenges and/or opportunities associated with mining in hot, arid areas.

At band E, expect either an explanation of the challenges and opportunities associated with mining in hot, arid areas or a structured discussion of the statement, which may include scale, wealth or power.

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) Describe the global distribution of **either** volcanoes **or** earthquakes. **[4]**

Award [1] for each of the following up to a maximum of [4]:

- concentrated around the Pacific rim/the “ring of fire”
- down the centre of the Atlantic Ocean
- the Caribbean archipelago
- East Africa rift valley
- Southern Europe/the Mediterranean
- Indonesian archipelago
- along plate margins
- any other valid distributional point (eg hotspots).

For the award of full marks the candidate must go beyond a simple list of countries (maximum [2]).

- (b) Suggest **three** factors that might affect an individual’s perception of the risk posed by tectonic hazards. **[2+2+2]**

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

Possible factors include:

- awareness of the risk of hazards
- level of education
- frequency of occurrence of previous hazards
- government-sponsored awareness programs
- low magnitude of previous hazards
- length of stay in a hazard-prone area
- belief that they are protected against the hazard
- individual personality – risk taker/minimizer.

For example: The frequency of occurrence of previous hazards **[1]**. An area experiences frequent earthquakes so the population is very aware of the possible risk of damage by earthquakes **[1]**. Length of residence **[1]** – a person who has lived somewhere a long time may have experienced a rarer, high magnitude event and may have a greater perception of the level of risk **[1]**.

- (c) “Hazard prediction is ineffective in reducing the impact of hazard events on people’s lives and property”. Discuss this statement, with reference to **two different** hazard types.

[10]

Candidates should describe differences of prediction of particular hazards and comment on their effectiveness. Some hazard events are more predictable than others, for example volcanic eruptions may be accurately predicted, but it is very difficult to predict earthquakes or droughts. The timing of a hazard event may be predicted, but it is often more difficult to predict their magnitude and areal extent. Measures taken to minimize the impact of hazards may be insufficient to prevent significant loss of lives and destruction of property. Technological hazards may not be predictable yet the impacts can be severe.

Good answers will compare the reliability of prediction for two different hazards and discuss their effectiveness. They might also discuss measures taken to reduce the risk of hazards, such as land-use zoning, building codes, development of protective infrastructure, evacuation plans, and awareness programs. They might discuss that these may be ineffective when the hazard is of a higher magnitude than planned for. Reference should be made to different examples.

For band D, expect some description of hazard prediction and effectiveness for two different hazard types

For band E, expect either a more detailed explanation of the relationship between hazard event prediction and hazard impacts, or a structured discussion of the effectiveness of prediction.

For band F, expect both of these elements.

Marks should be allocated according to the markbands.

8. (a) Referring to the diagram, briefly describe **two** atmospheric conditions shown in:
- (i) the eye; [1]
- clear skies
 - no rainfall.
- Must have both for [1].*
- (ii) the eyewall. [1]
- tall/thick clouds
 - rainfall.
- Must have both for [1].*
- (b) Briefly describe the surface pressure **and** winds likely to be found in:
- (i) the eye of a typical hurricane; [1]
- surface pressure is very low/lowest
 - wind speeds are low/calm.
- Must have both for [1].*
- (ii) the eyewall of a typical hurricane. [1]
- strong winds
 - surface pressure is low, but higher than the eye.
- Must have both for [1].*
- (c) Explain **three** conditions necessary for the formation of tropical hurricanes. [2+2+2]
- Award [1] for each relevant point and [1] for further development.*
- Conditions include:
- formation over warm tropical oceans / sea temperatures at least 26°C / significant depth of warm water in order to provide energy and moisture
 - sufficient distance from the equator for the Coriolis force to be significant
 - convergence of warm, moist air towards a centre of low pressure
 - rapid uplift of air causes condensation and the formation of clouds/rain
 - release of energy (latent heat) due to condensation results in further rapid uplift
 - cooler air descends in the eye of the hurricane; as it descends the air warms and no clouds develop.

For example, the Coriolis force must be sufficiently strong [1] to impart rotation of the air, so hurricanes rarely form close to the equator [1].

- (d) “Poorer communities are more vulnerable to the impacts of hazard events than richer communities”. Discuss this statement.

[10]

The vulnerability of a community to hazard events is affected by the demographic, social and economic characteristics of the population. Examples might be given at a variety of scales, from both rural and urban populations. Poorer communities are often more vulnerable because they often live in hazard-prone areas, they lack education and awareness, and are unable to afford measures that might be taken to reduce the impact of hazards. Richer communities are more able to plan and prepare for hazard events, have greater awareness and are better able to respond to the effects of a hazard. Technological hazards may affect rich and poor communities alike, but poorer people may live closer to the source of the hazard (as in Bhopal).

Good answers will discuss the vulnerability of poorer communities to hazards and the inability to respond to their effects, and will discuss the vulnerability of poorer and richer communities in different areas. Another approach is to discuss the scale of the hazard event, recognizing that all communities can be equally vulnerable, eg tsunamis. Another approach is to discuss temporal aspects of the hazard event, such as a poor community’s long-term vulnerability to diseases after the hazard event.

Accept both countries and communities.

For band D, expect some description of the vulnerability of poorer communities and/or richer communities to hazard events.

For band E, expect either a more structured and detailed explanation of the vulnerability of poorer and richer communities, or a discussion that reflects critically on diverse communities, hazards of different scales, different types of vulnerability.

For band F, expect both of these elements.

Marks should be allocated according to the markbands.

Option E — Leisure, sport and tourism

9. (a) (i) Describe the global pattern of the most visited cities. **[3]**

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

- concentrated in Asia and Europe
- only one in North America
- none in Africa/South America/Australia
- other valid statements, including MEDCs.

- (ii) State the median value of visitor numbers in 2013. **[1]**

9.20 (million)

- (b) (i) Outline what is meant by the term “ecotourism”. **[2]**

Award a maximum of [2] marks for any two of the following:

Ecotourism is defined as responsible travel to natural areas that conserves the environment **[1]**, sustains the well-being of the local people / is sustainable **[1]**, and involves interpretation and education **[1]**.

- (ii) Explain **one** strength **and one** weakness of ecotourism for local communities. **[2+2]**

The strategies should focus on the need to protect the natural environment, and the economic and social development of local communities.

Award [1] for each strength/weakness, and [1] for further development/exemplification in each case.

For example:

Strength: Responsible ecotourism provides jobs for local people **[1]**, eg guides in Kenya **[1]**.

Weakness: Limited potential for growth **[1]** because of likely commercialization of the traditional culture **[1]**.

- (c) For **one named** national sports league, examine the relationship between the location of its teams and the places where their supporters live. [10]

National Leagues that could be discussed include NFL (North America), Barclays Premier League (UK), ANL (Australia), ICL (India)

Good responses may examine what is meant by the relationship in terms of concepts, such as hierarchy and range, and may provide illustrative support. Another approach might be to examine temporal changes in the relationship linked to changing technology, globalization of sport, and so on.

Responses at band D will describe the location and residence of supporters of teams in the named sports league.

For band E, expect either more detailed explanation of where supporters of team reside, or a structured examination of the relationship using geographical concepts or addressing temporal/spatial changes.

For band F, expect both of these elements.

Marks should be allocated according to the markbands.

10. (a) Outline **two** types of carrying capacity that apply to rural areas. **[4]**

Award [1] for each outline of each type of carrying capacity, and a further [1] for some development of each.

Reference should be made to both *environmental carrying capacity* and *perceptual carrying capacity*.

For example:

Environmental carrying capacity is the maximum number of visitors before the local environment becomes damaged **[1]**. A large number of walkers in an upland area may cause extensive damage due to footpath erosion **[1]**.

Perceptual carrying capacity is the maximum number before a specific group of visitors considers the level of impact, such as noise, to be excessive **[1]**. Excessive numbers of people on a beach may cause stress due to overcrowding and noise **[1]**.

Do not award marks for reference to urban areas.

- (b) Explain how land values **and** accessibility can affect the distribution of sports facilities within urban areas. **[3+3]**

Responses must address both land values and accessibility; award [1] for each valid point, up to a maximum of [3] in each case.

For example: Sports facilities requiring a large area, such as cricket grounds, may not be able to afford to locate in central areas due to high land values **[1]**; they may locate on cheaper ground in the suburbs **[1]**. Gymnasias are less space-demanding and can locate in central areas **[1]**. Stadiums and arenas need to be accessible to a large number of participants/spectators **[1]** and therefore locate near good communication links **[1]**; golf courses have fewer participants and can locate in rural areas on the edge of an urban area **[1]**.

- (c) Evaluate the role of tourism as a development strategy in low-income countries. **[10]**

In recent years there has been a rapid growth of international tourism, and this has been viewed as a stimulus to economic development in developing countries. However, the effectiveness of using tourism as a development strategy has been questioned.

Good answers will put forward both sides of the argument, evaluating the advantages and disadvantages of tourism as a development strategy. On the positive side, it could be argued that tourism leads to the development of such things as infrastructure and communications, the multiplier effect, foreign currency, employment, and a greater integration into the world economy. On the other hand, it could be argued that the impacts of tourism are limited and spatially concentrated, including factors such as tourist enclaves, mainly low-paid and unskilled labour, “leakage” of revenues, domination by TNCs, and uncertainty regarding tourist numbers due to natural hazard events or political problems.

Inappropriate examples, eg MEDCs or cities, cannot progress beyond Band D

For band D, expect some description of the importance of tourism as a development strategy in one or more low-income countries.

For band E, expect either a more detailed explanation of the advantages and disadvantages of tourism as a development strategy, or an evaluation of the spatial and temporal role tourism can play in development.

For band F, expect both.

Marks should be allocated according to the markbands.

Option F — The geography of food and health

11. (a) Describe the pattern of life expectancy shown on the map. **[4]**

Award [1] for each of the following, up to a maximum of [4]:

- low (50–59 years) life expectancy in much of Africa
- lowest (<50 years) in central Africa
- highest life expectancy (80–86 years) in Western Europe/Japan/Australasia
- high (70–79 years) in Southeast Asia/North Africa/E. Europe
- moderate (60-69 areas) Russia/Central Asia/India/South Asia.

Allow other valid points (eg anomalies)

Some use of data is necessary for the full [4].

- (b) Explain **three** indicators, **other than** life expectancy, which can be used to measure the health of the population in a country. **[2+2+2]**

Possible indicators include:

- infant mortality rate
- HALE (health adjusted life expectancy)
- calorie intake
- access to safe water.

In each case, award [1] for a valid indicator and [1] for further development relating to how it is used to measure health

For example: Calorie intake **[1]** – countries where adults have fewer than 2000 calories a day would indicate undernourishment **[1]**.

Infant mortality rate **[1]** – high rate would indicate lack of access to clean water/healthcare **[1]**.

- (c) “Food miles are an excellent indicator of the environmental impact of agriculture.”
Discuss this statement.

[10]

Food miles are a measure of the distance that food travels from its source to the consumer. This can be stated either in units of actual distance or the energy consumed during transport.

The advantages of food miles include:

- they give an indication of the carbon footprint and allow consumers to know the origin of the food they are buying
- they are a relatively simple concept to apply
- they also provide some indication of the type of transport being used and the relative costs of different forms of transport.

The limitations of food miles as an indicator of environmental impact include:

- they do not take into account the carbon footprint of food production measures or the energy/water requirements of different food production systems
- locally produced food may have low food miles, but have very high inputs of energy, pesticides and fertilizers (such as intensive growing of fruit and vegetables under glass or in poly-tunnels) and therefore have a greater environmental impact
- food miles give no indication of the use of organic methods
- food miles ignore other measures of environmental impact of agriculture, such as the use of pesticides and chemical fertilizers.

Good answers will consider the concept of food miles and the extent to which they measure the environmental impact of agriculture at different scales. Candidates will provide a structured discussion of the advantages and limitations of food miles, and evaluate the concept as a measure of environmental impact.

For band D, expect some description of food miles and their advantages and disadvantages in measuring environmental impact.

At band E, expect either some greater range/depth of explanation of the advantages and disadvantages of food miles, or a structured discussion of the environmental impacts of agriculture and the value of using food miles as an indicator of this.

At band F, expect both of these elements.

Marks should be allocated according to the markbands.

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

Malnutrition means an inadequate/unbalanced supply of energy, vitamins or other food-based nutrients [1]. It includes both under-nutrition and over-nutrition/obesity [1].

(ii) State the obesity range of values for area X and area Z on map B. [2]

Area X = 41–70 % [1].

Area Z = 21–30 % [1].

(b) Using evidence from map A, suggest **two** reasons why the obesity rate in area X is different from that in area Z. [3+3]

In each case, award [1] for explicit map evidence and [2] for a possible reason with development.

Possible evidence, related to wealth and lifestyle include:

- high density street patterns in X/lack of roads in Z
- high density of housing in X/low density in Z
- rural/woodland versus urban area
- proximity to high school (education).

For example: Area X shows a densely built up area [1]; possibly including offices and fast food outlets [1]; obesity in the US is often associated with fast food [1].

Area Z shows a low-density settlement surrounded by green space/rural [1]; possibly occupied by higher-income groups of people [1]; higher income groups may be more aware of the benefits of exercise and so have lower obesity rates [1].

Allow other reasons for lower/higher obesity rates in the two areas.

- (c) Evaluate the success of management strategies applied in any country or region for **one** vector-borne, water-borne **or** sexually transmitted disease.

[10]

The type of disease being discussed should be made clear, together with the specific country or region.

Good answers will focus on a specific disease and country/region, and why it is necessary to combat this disease. They will evaluate the various strategies employed to combat the disease. A range of strategies might be considered, including measures of disease prevention, transmission and treatment. Possible strategies include vaccination/inoculation, education, pest control, improvement of water quality, development of suitable public health-care programs, making effective treatment options readily available and affordable, help from outside agencies such as the WHO. There should be some evaluation of the relative success/failure of such strategies.

Use of an inappropriate disease, such as the Ebola virus, may not progress beyond band D.

For band D, expect some description of management strategies related to a specific disease and region.

For band E, expect either a structured and detailed explanation of management strategies, or some evaluation of their relative success/failure.

For band F, expect both of these elements.

Marks should be allocated according to the markbands.

Option G — Urban environments

13. (a) (i) With reference to the map, describe the distribution of neighbourhoods with low incomes and high population density. [3]

Award [1] for each valid description point, up to a maximum of [3], which include the following:

- the main location is to the south-west of the city centre [1]
- many of the remaining sites are towards the periphery of the city [1]
- there are many scattered small areas/pockets located in western/south-western/eastern suburbs [1]
- some of the areas are more than 20 km from the city centre [1].

- (ii) Outline **three** possible **economic** reasons for the location of neighbourhoods with low incomes and high population density in the urban area shown on the map. [3]

Award [1] up to a maximum of [3] for the identification of each factor:

- many of the areas are located close to where jobs are found [1]
- there are more informal jobs located in the city centre [1]
- the land is relatively cheap on the outskirts [1]
- many of the areas are close to important routeways [1].

- (b) Analyse the contribution of natural change to population density patterns in urban areas. [4]

Award [1] for each valid point, up to a maximum of [4], which could include the following:

- positive natural change occurs when the birth rate is higher than the death rate [1]
- this leads to an increase in population density [1]
- areas of youthful populations (including areas of in-migration) tend to experience positive natural change [1]
- negative natural change leads to a decrease in population density [1]
- areas of ageing populations tend to have lower population densities [1].

Other contributing factors may be considered.

- (c) To what extent has **one named** housing management strategy been successful in creating a more sustainable city?

[10]

Housing management strategies include the provision of affordable and acceptable housing to all population groups, especially poorer ones. It includes shanty towns, apartments, private and public rented accommodation, as well as sustainable schemes such as Masdar City, BedZed, Curitiba. Features of housing management strategies include provision of loans, mortgages, self-help schemes, recycling, energy reduction, re-use of resources, etc.

Sustainable cities are those that encourage reduction in energy use, reduction in inputs, recycling and re-use of waste products, as well as pollution management strategies and traffic management strategies. Other strategies may include sustainable economic and social strategies.

Good answers are likely to consider the advantages of housing management strategies that address affordability, quality (acceptability), and sustainability (water and energy recycling and re-use, for example). They may also consider the disadvantages (cost to residents and governments). They may also consider the spatial limitations (the strategy may be in one neighbourhood only, not the whole city), or other elements of sustainability eg, issues with pollution, in-migration and employment.

Answers may use a single case study or a range of strategies in one city. Good answers may recognize the limitations of achieving a sustainable city.

At band D, candidates should describe the characteristics of one housing management strategy.

At band E, expect either a more detailed explanation of one housing management strategy or an evaluation linked to sustainability.

At band F, expect both.

Marks should be allocated according to the markbands.

14. (a) (i) Describe the changes in ground level ozone in Mexico City over the 24-hour period. [3]

Award [1] for each valid description, up to a maximum of [3].

For example: Ground level ozone is low during the night time/early morning [1] but rises rapidly between 1000 and 1500 hours [1]. It peaks at around 140 ppb mid-afternoon [1]. It then declines rapidly until about 2100 hours where it drops to below 20 ppb.

Award maximum [2] if no quantification.

- (ii) State **one** possible source of ground level ozone. [1]

Vehicle emissions/industrial emissions [1] or NO/NO_x/VOCs (methane/ethanol/alcohol) [1].

- (b) Explain **two** strengths **and one** weakness of **one named** city's attempt to reduce urban pollution. [2+2+2]

Award [1] for each strength/weakness and a [1] for further development/exemplification of each.

Responses may focus on air pollution but could also focus on water, soil, noise pollution, or waste and litter problems in urban areas.

In awarding marks – there is no mark for the strategy (eg planting trees), but [1] for each strength/weakness and [1] for development.

For example: *Strength:* In Beijing the planting of trees has reduced pollution by intercepting dust [1] and provided shade for cyclists [1].

Weakness: Replacing buses and old taxis was expensive [1] and there were economic losses when factories were closed [1].

Other strategies may include:

- public transport
- bus lanes
- cycle lanes
- subsidies for public transport
- mass transport schemes.

Award maximum [4] if no city named.

- (c) Examine the effects of the movement of economic activity to derelict land such as brownfield sites.

[10]

Economic activity includes retailing, services and manufacturing. This includes new economic activity and relocated economic activity.

Derelict sites and brownfield sites include abandoned and under-used industrial buildings and land that may be contaminated but has potential for redevelopment.

The movement of economic activity to derelict land may have many positive effects, such as job creation, investment in infrastructure, new buildings and services, increased tax base and spending in the local area (positive multiplier effect), in-migration of wealthy, young people (gentrification), etc.

Negative impacts include an increase in congestion and pollution related to construction (short-term), increasing land prices, increasing social inequalities, cost of cleaning contaminated land/making it safe for use for economic activity.

Good answers will show an understanding that there are positive and negative impacts occurring. Some developments may be large-scale (eg London 2012 Olympic Site) while others are small-scale (gentrification in Woodstock, Cape Town). Some impacts may be short-term, others long-term. The overall effects may depend on the city involved, the amount of government investment, the amount of private investment, its accessibility, the type of economic activity.

At band D, expect a description of some effects of the movement of economic activity to derelict land/ brownfield sites.

At band E, expect either a detailed explanation of the movement of economic activity to derelict land/ brownfield sites or a structured examination of different kinds of impact (may include different perspectives) and any interrelations between them.

At band F, expect both of these elements.

Marks should be allocated according to the markbands.