N13/3/GEOGR/BP2/ENG/TZ0/XX/M

International Baccalaureate®
Baccalauréat International
Bachillerato Internacional

MARKSCHEME

November 2013

GEOGRAPHY

Higher Level and Standard Level

Paper 2

29 pages

Paper 1 and 2 markbands

These markbands are to be used for papers 1 and 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

Optional Theme A — Freshwater – issues and conflicts

1. (a) Define the term *stream discharge*. ***[2]***

The volume/amount of water ***[1 mark]***, passing a given point in a given time ***[1 mark]***. Or also accept formula of velocity × cross-sectional area.

(b) (i) State the direction towards which the river is flowing at B. ***[1]***

South East.

(ii) State *three* changes to the river channel that result from this management strategy. ***[3]***

The new channel is straighter ***[1 mark]***, shorter ***[1 mark]***, and has a steeper gradient ***[1 mark]***.

Accept changes to processes, such as more erosion ***[1 mark]***.

(iii) Explain *one* benefit *and one* problem for people that might result from this management strategy. ***[2+2]***

Benefits: better for navigation due to shortening of the channel, flood water removed more quickly.

Problems: flood moves faster downstream, flood is larger downstream, lag time downstream is reduced, navigation upstream is harder, erosive power of the river is increased.

Award ***[1 mark]*** for each correct statement and a further ***[1 mark]*** for a valid explanation.

(c) Examine the benefits *and* problems of different river management strategies (*other than* that shown in the diagram). ***[10]***

Candidates should refer to at least two different strategies. (No credit should be given for strategies that look at channel straightening.)

The following approaches may be relevant:

- multi-purpose schemes (dams) that have flood control dimensions
- hard engineering approaches including levees, diversion channels, spreading grounds, walls, flood relief channels
- other approaches to stream management including river restoration schemes (restoring natural surfaces, channel shape, habitats); water quality legislation and actions (for example, nitrate control); wetland restoration.

Also accept drainage basin schemes that impact on river processes or water quality, for example, afforestation; river hazard management schemes, for example, land-use zoning that leaves unoccupied areas for river to occupy during flood.

The use of only one river management strategy which includes benefits and problems is unlikely to progress beyond the D/E border.

To achieve band E there must be an attempt at evaluation of two strategies. At band F expect a well balanced evaluation.

Marks should be allocated according to the markbands.

2. (a) Identify *and* describe process A *and* process B shown in the diagram. ***[2+2]***

A – Suspension ***[1 mark]*** – finer load carried along in the channel above the bed ***[1 mark]***.
B – Saltation ***[1 mark]*** – coarser material bounces along the river bed ***[1 mark]***.

(b) Draw a labelled diagram to show the main input, outputs, transfers and stores of the hydrological cycle for an *un-vegetated* drainage basin. ***[6]***

- Input: precipitation ***[1 mark]***.
- Outputs: evaporation / run-off / river discharge ***[1 mark]***.
- Transfers: must have at least four for two marks (or two for one mark): infiltration, throughflow, overland flow, groundwater flow / base-flow ***[2 marks]***.
- Stores: must have at least four for two marks (or two for one mark): atmosphere, soil, groundwater/water table, lakes, river water, surface store/surface depression, snow, water tanks/water butts ***[2 marks]***.

Either a systems diagram or a pictorial image of a drainage basin is acceptable.
Award up to a maximum of ***[3 marks]*** if there is no diagram.

(c) "Of all the impacts of agriculture on water quality, salinization is the most damaging." Discuss this statement. ***[10]***

Responses should show an understanding of salinization and its effects. Salinization is widespread in arid and semi-arid environments where groundwater extraction in coastal areas leads to saline incursion; salt water drawn upwards by capillary action results in salt enrichment of the soil/surface. Irrigation is another cause as, over time, levels of salt build up through repeated watering – leaching of the salts by flooding can lower water quality in rivers. Local geology can also play an important role in some contexts. Salinization damages livelihoods for farmers by limiting agriculture/reducing yields.

As the counter-argument, responses could also examine the impacts of agro-chemicals, sedimentation due to increased run-off, the effects of animal wastes, groundwater pollution and eutrophication of rivers, streams, lakes and/or wetlands where relevant. (Not all of these are required.)

Good answers may question who or what is damaged (land, incomes, ecosystems, local businesses), and should recognize it is a more serious concern in some parts of the world than in others.

Responses that are mainly descriptive and/or look only at salinization should not progress above band D.

At bands E and F responses should discuss the relative importance of at least one other agricultural impact on water quality. At band F there should be a well balanced evaluation.

Marks should be allocated according to the markbands.

Optional Theme B — Oceans and their coastal margins

3. (a) Using map evidence, describe *two* depositional landforms found on this coastline. ***[2+2]***

Award ***[1 mark]*** for identifying each landform and ***[1 mark]*** for development/description provided map evidence is used (may use: names, scale, grid reference, compass bearing, *etc*). For example, award ***[2 marks]*** for "the map shows a spit approximately 8 km long".

The map includes:

- spit (barrier island / bar)
- beach
- dunes
- marsh
- mudflats.

(b) Explain how *one* geopolitical conflict has developed in relation to a *named* oceanic resource. ***[6]***

Likely resources could include oil, gas and/or fish. However, other resources are equally valid, for example, manganese, gold, diamonds, gravel. Award ***[1 mark]*** for the resource that is shown to be a cause for conflict.

For example, for oil, some may use the Falklands/Las Malvinas, Rockall or North Sea as their chosen conflict/conflict area, or Australia/East Timor. In each case, the countries involved in any dispute should be identified ***[1 mark]*** for the resource that is shown to be a cause for conflict. The remaining ***[4 marks]*** should be awarded for the explanation of how and/or why the conflict developed, or was subsequently managed/developed.

(c) "The fishing industry can never be sustainable." Discuss this statement. ***[10]***

Overfishing occurs widely within the industry. Overfishing occurs when catches exceed the maximum sustainable yield for any year or other period of time. It occurs because fishing technology has become too mechanized/large-scale, such as with the use of factory ships and on-board technology such as sonar (used routinely to locate fish). The growing demand for fish as incomes rise in emerging economies means pressures are only increasing for higher yields.

However, remedies designed to conserve fish stocks and make fishing more sustainable include:

- increasing mesh size and discouraging the catch/marketing of juvenile fish
- reducing the fishing yields by restricting time spent at sea, or length of fishing season, or the size and number of boats
- imposing fishing permits, quotas (for example, EU's Common Fisheries Policy) and import tariffs
- satellite and logbook surveillance and penalties for illegal landings.

Candidates are not expected to include all of these, the relevance of which depends on the example chosen.

At band D, responses are likely to be descriptive of the problems of sustainable fishing.

At bands E/F candidates need to consider how fishing can become more sustainable, and at band F there should be a clear conclusion.

Marks should be allocated according to the markbands.

4. (a) Define the term *exclusive economic zone*. ***[2]***

The exclusive economic zone is the area in which a sovereign state has rights ***[1 mark]***. Award the second ***[1 mark]*** for either of the following concepts (words need not be exact):

- "over the economic resources of the sea, seabed and subsoil"
- "extending up to 200 nautical miles from the coast".

(b) Briefly describe what is meant by *continental shelf*. ***[2]***

The continental shelf is the gently sloping extension of most continental areas ***[1 mark]*** beneath the shallow ocean waters. Award an additional ***[1 mark]*** for any development of this idea such as "the width of the shelf is highly variable (from 0–1500 km)" or "the water depth over the shelf never exceeds about 200 m".

Note that full credit should also be given if a candidate describes the alternative meaning of continental shelf, as used in the UN Convention on the Law of the Sea, which states that it is the stretch of the seabed (regardless of depth) ***[1 mark]*** adjacent to the shores of a particular country to which it belongs ***[1 mark]***.

(c) Explain the environmental *and* economic value of mangrove swamps. ***[3+3]***

Environmental values include coastal stabilization/protection, the conservation of biodiversity, a breeding ground for species, a refuge for many species, mitigation of storms (including tropical storms). They also act as natural filters, absorbing nutrients from farming and sewage disposal.

Mangroves have much economic value, such as providing large quantities of food, fuel, building materials and medicine. "Value" can be for local people (protection, fuel) or other groups/people, for example, TNCs, tourist industry.

Award ***[1 mark]*** for each value/benefit that is explained, and further marks for developed explanation, or applied use of examples, up to the maximum of ***[3 marks]*** for environmental and ***[3 marks]*** for economic value. For example, award ***[2 marks]*** for a statement such as: "One ha of mangrove in the Philippines can yield 400 kg of fish and 75 kg of shrimp".

(d) Discuss the conflicts that occur from attempts to manage coastal hazards. ***[10]***

Coastal hazards include: tsunamis, storm surges, coastal retreat, coastal erosion and cliff failure.

Conflicts may occur between different land-uses, for example, tourism providers and environmental protection agencies (EPAs) (for example over the construction of coastal defences that spoil the aesthetics); land-use disputes/land zoning/managed retreat policies can conflict with plans of developers; local residents may object to development if they perceive that it will adversely affect property values; the allocation of funding (different organizations/users may be competing for limited funding). There may be conflict between environmentalists and EPAs as some hard engineering structures might interfere with sediment movement. Conflicts in LEDCs might focus on the need to maintain mangroves as coastal protection *versus* aquaculture development (prawn fisheries) or tourist developments.

Answers that introduce hazards not confined to the coastline (for example, earthquakes) should be credited on their merits but may be self-limiting.

To achieve band D responses will describe some conflicts relating to a coastal hazard.

At band E there will be at least two conflicts and at least two hazards using relevant details.

At band F expect a well balanced discussion and evaluation.

Marks should be allocated according to the markbands.

Optional Theme C — Extreme environments

5. (a) Referring to the table, describe *four* characteristics of the climate of Timbuktu. ***[4]***

Award ***[1 mark]*** for each of four characteristics:
- temperatures are hot or warm all year
- maximum mean monthly temperature (34°C) is in May and June
- lowest average monthly temperatures are in December and January (22–23°C)
- annual rainfall is low/around 200 mm in total
- seasonality of rainfall – mostly in summer / there are five months with no rainfall
- May–July high temperatures suggest northern hemisphere climate
- high temperatures coincide with wetter season.

Do not credit simple listing of monthly data.

Award a maximum of ***[3 marks]*** if there is no quantification.

(b) With reference to a *named* hot, arid environment, explain *two* geographic factors (*other than* climate) that can make them extreme. ***[6]***

Likely factors should include human discomfort, inaccessibility, remoteness and relief. (credit other valid factors, such as poor soils). Award ***[1 mark]*** for each factor that is identified and a further ***[1 mark]*** for the named example of a recognizable extreme arid environment.

The remaining ***[3 marks]*** should be allocated for the explanation of the factors, for instance explaining how inaccessibility could limit development and habitation opportunities because tourism, or other forms of economic activity, cannot be easily implemented.

(c) Contrast the landforms that result from erosional and depositional glacial processes. ***[10]***

The landforms could be contrasted in terms of shape, size, material, location and origin/formation, links to advance/retreat of ice.

Likely erosional features will include cirques, arête, pyramidal peaks, glacial troughs, hanging valleys, roche moutonnées and striations. Depositional features are likely to include till plains, moraines, kames, eskers, erratics and drumlins.

Erosional features are more likely to be located in upland areas, while depositional features are more commonly found in lowland areas. Erosional features are often formed of solid rock while depositional features are formed of unconsolidated material, whether sorted (fluvioglacial) or unsorted (glacial). Erosional features tend to be rugged, whereas depositional features are usually subdued with lower amplitude of relief.

To achieve band D, both erosion and deposition features should be covered and described with an attempt to contrast.

At band E and there should be a clear attempt at contrasting the features.

At band F, answers should show an awareness that many landforms owe their origin to a combination of erosional and depositional processes.

Marks should be allocated according to the markbands.

6. (a) (i) Define the term *aridity*. ***[2]***

Aridity refers to a lack of moisture ***[1 mark]***. Award a further ***[1 mark]*** for quantification (precipitation less than 250 mm), or a link with evapo-transpiration rates.

(ii) Define the term *infertility*. ***[2]***

Infertility refers to the lack of nutrients/bases in soils ***[1 mark]***. Award a further ***[1 mark]*** for recognition of lack of biomass; or low weathering rates/inputs of nutrients; partial decomposition; insufficient to supply plant-based agriculture/crops.

(b) Explain *three* factors, *other than* aridity and infertility, that affect the sustainability of human activities in extreme environments. ***[2+2+2]***

The factors may either promote or reduce sustainability. Possible factors include population density (possibly leading to usage exceeding carrying capacity), changes to natural vegetation/habitat (likely to decrease carrying capacity), overuse (whether for agriculture, grazing, mining, tourism), the implementation of conservation measures, provision of irrigation (provided source of water is sustainable), *etc*. Award ***[1 mark]*** for identifying/describing each valid factor and a further ***[1 mark]*** for development or exemplification.

(c) "Periglacial areas offer more opportunities for human activities than hot, arid areas." Discuss this statement. ***[10]***

Opportunities in both cases are widespread and include farming/cattle herding, mineral extraction, and tourism. Problems are likely to include climate, remoteness, and inaccessibility – as well as low temperatures in periglacial areas, as opposed to a lack of water in hot desert areas.

Opportunities could be for a range of players/stakeholders, including local people, TNCs/energy companies, tourists.

Answers should cover opportunities in both periglacial areas and hot, arid areas. The use of only one extreme environment which includes a range of opportunities is unlikely to progress beyond the D/E border.

To access band E both environments should be considered.

At band F expect detailed examples of opportunities in both environments and a clear conclusion.

Marks should be allocated according to the markbands.

Optional Theme D — Hazards and disasters – risk assessment and response

7. (a) (i) State the height in metres of the highest point west of gridline 35. ***[1]***

11 metres (allow 7 metres)

(ii) State the four-figure grid reference for the square in which this point is located. ***[1]***

3419 (3320 for height of 7 metres in part (i))

(iii) State the shortest distance by road, in kilometres, between the school and the ferry at Cupola. ***[2]***

Award the full ***[2 marks]*** to answers in the range 2.6 to 2.8 km.
Award ***[1 mark]*** to answers in the range 2.4 to 2.5 km or 2.9 to 3.0 km

(b) ***Using map evidence only*****, explain why the inhabitants of this area were particularly vulnerable to the impacts of Hurricane Irene.** ***[6]***

Explanations based on the map include:

- low relief (must state actual heights)
- limited evacuation possibilities by road – one road to the east and possible congestion
- limited evacuation possibilities by sea – only one ferry shown
- presence of a school – particularly vulnerable age group
- lack of protection from the south as hurricane approaches – though coast dunes appear higher than inland areas
- flatness and large areas of marsh increase the flood risk from heavy rainfall and potential flooding on evacuation routes
- exposure to the ocean and flat relief – means little friction therefore very high potential wind speeds
- situated directly in path of the hurricane track (as photograph on map shows).

Award ***[1 mark]*** for each explanation based on the map, and another ***[1 mark]*** for any further development (as indicated above).

The full ***[6 marks]*** can be awarded for six explanations without further development, or three explanations with development, or any combination thereof.

(c) "The level of economic development is *not* the main factor affecting the impact of a tectonic hazard event on a community." Discuss this statement, with reference to *either* earthquakes *or* volcanoes. ***[10]***

Answers should refer to examples of only one tectonic hazard type (earthquakes or volcanoes). Discussions should balance hazard events where the level of economic development proved to be a main factor affecting the impact, with other hazard events where this is not the case. In addition to economic development, factors such as population density, intensity of the hazard, time of day, awareness, prediction and warnings, ability to evacuate, preparedness, landscape, geology, and proximity to the hazard source could be taken into account. It is acceptable to argue that many/some of these may relate indirectly to levels of economic development.

If the response only looks at the factor of economic development it should not be credited above band D.

At band E candidates should provide some balance between economic and other factors and begin to show some attempt at evaluation.

At band F there should be a well balanced evaluation/conclusion.

Marks should be allocated according to the markbands.

8. (a) (i) Describe what is meant by hazard risk. ***[2]***

Risk is the probability of a hazard causing deaths, injuries, property and environmental damage ***[1 mark]***. Award ***[1 mark]*** for developing the idea by means of exemplification or identification of a factor that affects risk (location/magnitude/frequency/recurrence).

(ii) Describe what is meant by vulnerability to hazards. ***[2]***

Vulnerability refers to the conditions (demographic, social, economic or environmental) that affect the susceptibility of people to a hazard ***[1 mark]***. Award ***[1 mark]*** for developing the idea by means of exemplification or identification of a vulnerable group in a population (elderly/poor/gender).

(b) Explain how building design and land-use planning can limit the potential damage from one *named* hazard type. ***[6]***

Building design: hurricane/flood surge protection may refer to large, raised shelters or individual house construction methods (metal shutters, thick concrete walls, secure roofs, stilts). Earthquake designs might include reinforced concrete foundation platforms, metal frames, shock absorbers, counterweights, safety glass, or in LEDCs light wooden frames, woven cane walls, light roofs, cement footings, concrete stilts in tsunami areas. In volcanic areas, buildings that have reinforced roofs to withstand the weight of ash or steep roofs to shed ash, or prefabricated sectioned homes that can be moved to avoid damage by lava flows.

Land-use planning: there are many possibilities, depending on the hazard type chosen, including prohibited development in areas with a known risk, evacuation routes, shelter access, buffers, mangroves, land-use zoning, building height restrictions.

Award ***[1 mark]*** for each idea, and additional marks for exemplification or extended explanation.

A simple list of factors without an explanation should not be awarded more than ***[3 marks]***.

If only building design or only land-use planning is addressed, award up to a maximum of ***[4 marks]***.

Accept answers that explain a number of designs in general or fewer detailed explanations.

(c) "The faster the speed of onset, the greater the impact of the hazard event." Discuss this statement, with reference to examples. ***[10]***

Responses should examine at least two different, named hazard events with varying speeds of onset and discuss the relationship between the speed of onset and the impact of the hazard event. A balanced argument is required that takes into account hazard events with a rapid speed of onset, such as earthquakes, tsunamis or volcanic explosions, and those with slower onset, such as hurricanes or droughts which may have an equally large impact in the longer term.

Responses that do not make use of examples should not progress beyond band D.

Candidates might focus either on different hazard types (*eg* drought compared to earthquakes) or different events of the same hazard type (*eg* volcanic eruptions).

At band D responses are likely to be descriptive.

At band E expect a reasoned discussion between at least two different hazard events and an attempt at a conclusion.

At band F there should be a well balanced conclusion.

Marks should be allocated according to the markbands.

Optional Theme E — Leisure, sport and tourism

9. (a) (i) Define the term *leisure.* ***[1]***

Any freely chosen activity or experience that takes place in non-work time.

(ii) Define the term *tourism*. ***[1]***

Travel away from home for at least one night ***[1 mark]*** usually for the purpose of leisure.

(b) Suggest *two* reasons why demand for international tourist services has increased rapidly in recent decades. ***[2+2]***

Award ***[1 mark]*** for each valid reason offered. Possible reasons include: rising incomes, increased leisure time, cheaper tourist packages generating greater demand, advertising, growth of international chains/tourist TNCs, "no-frills" airlines, more student travel, ease of internet booking raising demand, "aging" population of "sun-seekers". There may be other valid reasons.

In each case award another ***[1 mark]*** for development or exemplification of the growth of international demand, for example, one which explains incomes are rising in post-industrial MEDCs, or new emerging middle-class in India/China.

(c) Explain *two* ways in which environmental damage from tourism has been minimized in *one named* city or large town. ***[2+2]***

Answer is context-specific but award ***[1 mark]*** for each action described and ***[1 mark]*** for each link established with environmental protection, for example, reduced vehicle emissions, reduced noise pollution, pedestrianized areas, provision of bicycles for tourists, waste disposal strategies, control of effluent from coastal towns, usage zoning.

In Oxford ***[1 mark]*** increased traffic congestion resulting from tourism has been reduced by traffic management strategies ***[1 mark]***.

Damage limitation should be specific to the chosen town/city (do not credit "reduced carbon footprint", *etc*). Award no more than ***[3 marks]*** if case study not given.

(d) Examine the view that tourism offers a guaranteed route towards economic development for low-income countries. ***[10]***

Answer invites debate around "guaranteed", in addition to recognizing that there are positives and negatives in any case, which in itself makes the statement controversial.

Economic benefits can be discussed for individuals working in the tourist industry or for national income. Expect details of multiplier effects, foreign earnings. This must be balanced against financial losses (leakage of profits from foreign-owned ventures). Good answers should recognize that tourism is not a one-size-fits-all development strategy: it may not be the best strategy in some cases (and parallel strategies might exist).

For band D, there should be an understanding of how tourism may lead to economic development, and an awareness of the limitations of tourism to economic development.

At band E the general truth of the statement should be explored, using exemplification.

At band F there should be a balanced evaluation.

Marks should be allocated according to the markbands.

10. (a) Identify *two* possible sport or recreational facilities that Map C might be showing. ***[2]***

Likely answers might include:
- sports stadium
- music arena
- multiplex cinema
- large theatre
- museum
- art gallery
- theme parks.

Do not accept individual sports; sport facilities must be identified.
There may be other examples appropriate to a larger settlement in the hierarchy. Award ***[1 mark]*** for each valid suggestion.

(b) Analyse the maps for evidence of a leisure hierarchy. ***[4]***

Possible answers might include:
- a settlement hierarchy is observable, comprising city, large towns, small towns *etc* ***[1 mark]***
- this is linked to a leisure services hierarchy – higher-order functions, for example, golf courses only appear in/around larger towns ***[1 mark]***
- people are prepared to travel further for high-order services / high-order services have greater range/larger catchment ***[1 mark]***
- presence of highest-order services in highest-order places is also linked to settlement size / need for threshold population to be met ***[1 mark]***
- high-order places have low-order functions too ***[1 mark]***.

Award a maximum of ***[3 marks]*** if no quantification (may compare numbers of settlements shown on maps or estimate distances being travelled).

(c) Explain *two* ways in which ecotourism is a sustainable industry. ***[2+2]***

Environmental sustainability is met by conserving or preserving environmental amenities so that future generations can enjoy them too. This can be achieved through strict carrying capacity controls *etc*. Credit examples.

Socio-economic sustainability is met by providing jobs for local/indigenous people, for example, as tour guides ("hunters turned gamekeepers"). This provides long-term employment and gives future generations a chance to make a living. Credit examples.

Award up to ***[2 marks]*** for each developed idea. It is acceptable for both ideas to come from either branch of sustainability (natural environment or local communities).

(d) "Leisure, sports and tourism bring more problems than benefits to urban areas." Discuss this statement. ***[10]***

Candidates are expected to have evaluated the impacts of tourism on a named urban area and to also be able to discuss the role sports and recreation play in urban regeneration. Some reference to all three activities should be made, but balanced treatment is not expected.

The statement is presented as a discussion, encouraging candidates to argue both for and against. On the one hand, positive effects can follow from large sporting events / new stadia (for example, London Olympics 2012). Some regeneration successes are strongly linked with sports and recreation. On the other hand, long-term effects are hard to measure/debatable / recovery may be limited/stall.

A broader look at environmental and social costs could draw on carrying capacity concepts, *etc.* The statement's truth (or not) may hinge on the effectiveness of management strategies.

For band D both problems and benefits in an identified urban area should be described.

At band E problems and benefits should be discussed in a balanced way.

At band F there should be a well balanced attempt at evaluation of the statement.

Marks should be allocated according to the markbands.

Optional Theme F — The geography of food and health

11. (a) (i) State which income category is likely to represent the wealthier individuals in this country, and justify your choice. ***[1+1]***

B ***[1 mark]***.
Because fewer suffer from each of the three conditions, incidence of which is related to access to education / access to health services / lifestyle (accept any of these, or other valid statement) ***[1 mark]*** (and therefore to relative poverty).

Accept A ***[1 mark]*** and, if justified ***[1 mark]***.

(ii) State which of the three health conditions shown on the graph is most related to income category, and justify your choice. ***[1+1]***

Diabetes ***[1 mark]***.
Since its (relative) rate more than doubles from Category A to B ***[1 mark]*** (whereas the other conditions increase, but by less than 100 %).

(b) Using examples of diseases, distinguish between diseases of affluence and diseases of poverty. ***[6]***

Diseases of affluence are those diseases such as degenerative diseases that are associated with different lifestyles and/or increased overall life expectancy ***[1 mark]*** typical of wealthy societies. They include coronary heart disease, cancer, asthma, type 2 diabetes, peripheral vascular disease, obesity, hypertension, some allergies.

Diseases of poverty tend to be infectious diseases resulting in lower life expectancy, and associated with poor public health and access to medical services ***[1 mark]***, or malnutrition and poor female education (alternative route to this ***[1 mark]***). They include malaria, tuberculosis, AIDS, measles, pneumonia, and diarrheal diseases).

Award the remaining ***[4 marks]*** for applied use of examples that distinguishes between the two types either according to geographical distribution, or how they are acquired or transmitted.

Award ***[6 marks]*** only if the distinction between the two types is fully explicit.

(c) To what extent was *one* recent *named* famine caused by crop failure? ***[10]***

Famines usually result from the interaction of a variety of factors including not only physical factors (for example, adverse climate, soil failure) but also demographic (for example, rapidly expanding population), economic (lack of resources) and political (for example, war zones, refugees), among others.

Stronger responses are expected to look at one example of a recent famine and display some understanding of the different factors involved in causing it to occur/develop. Crop failure need not be a significant factor for the chosen example and full credit is available for answers that mainly focus on the role of alternative factors.

Responses that do not focus primarily on a specific recent famine are unlikely to progress beyond band D.

Reponses that look at the combination of causes that led to a specific famine occurring, and then draw some conclusion about the relative importance of crop failure, are likely to access band E.

For band F expect the above with a well balanced attempt at evaluation.

Marks should be allocated according to the markbands.

12. (a) (i) Identify the farming system shown on the graph which has the highest energy output. ***[1]***

China: rice (hand-cultivated) ***[1 mark]***.

(ii) Identify the farming system which has the highest energy efficiency ratio. ***[1]***

Tanzania: cassava ***[1 mark]***.

(b) Referring to the graph, suggest how mechanization contributes to the different energy flows (inputs and outputs) for rice farming systems shown in China and Japan. ***[4]***

Japan's inputs are about double those of China but China's outputs are more than double ***[1 mark]***. Award ***[1 mark]*** for additional quantification, or identification of China's EER as much higher than Japan's.

Up to ***[3 marks]*** for reasons such as:
Mechanization involves high fossil fuel usage ***[1 mark]*** but does not necessarily increase energy output. Output level also depends on the intensity of cultivation (tiny farms may have very high yields) ***[1 mark]***. Mechanization may be responsible for only some of the additional energy inputs, so the higher outputs may be associated with fertilizer or other agro-chemical use ***[1 mark]***.

(c) Explain *two* changes in agriculture, *other than* mechanization, that have helped to boost food production in some areas. ***[2+2]***

Possibilities include irrigation, HYV crops (Green Revolution) bringing new land into use, better pest controls, (organic) fertilizers, glass-houses, poly-tunnels, subsidies and introducing GM crops. Accept other valid suggestions. For each change, award ***[1 mark]*** for identifying or describing the change and ***[1 mark]*** for a development/exemplification/quantification that helps establish a clear link to an increase in food production in an area.

(d) "Free trade is more important than food aid in helping to solve (alleviate) food shortages." Discuss this statement. ***[10]***

There are many possible approaches to this question.

Responses are expected to show a clear understanding of the differences between food aid and free trade, and also indicate that there are many different kinds of food shortages, such as short-term/seasonal/long-term/chronic (temporal) and local/national/regional (spatial). Strong responses are likely to show that the relative importance of food aid, as opposed to free trade, will depend on the temporal and spatial extent of the food shortage in question.

The very best answers may challenge the role of free trade and/or food aid in alleviating food shortages and offer examples where the reverse is true.

Responses that fail to use any examples or fail to clearly distinguish between food aid and free trade are unlikely to progress beyond band D.

Responses that discuss most aspects of the question with examples, and attempt some conclusion are likely to access band E.

At band F expect a well balanced attempt at evaluation.

Marks should be allocated according to the markbands.

Optional Theme G — Urban environments

13. (a) Identify what Benefit A (environmental) and Benefit B (socio-economic) might be. ***[1+1]***

A could be: improved wildlife/bird habitat; microclimate modification; increased biodiversity; reduced noise pollution.

B could be: recreational space; increased land/property values; increased community pride; less crime.

Accept other valid suggestions (for example, aesthetics, feelings, improved health, firewood/fuel).

(b) (i) Define the term *urban ecological footprint*. ***[2]***

The theoretical measurement of the amount of land and water ***[1 mark]*** a population requires to produce the resources it consumes and to absorb its waste ***[1 mark]*** (under prevailing technology).

(ii) Explain how *one* of the benefits named on the diagram (excluding "Other") would reduce the city's ecological footprint. ***[2]***

For example, energy savings: award ***[1 mark]*** for explaining how trees might lead to energy savings (due to reduced need for air conditioning in summer) and ***[1 mark]*** for relating this to a reduction in the resources/land area required to meet the lower energy needs.

(c) Explain how human activity in cities may result in an urban heat island effect. ***[4]***

Urban temperatures are higher than surrounding areas ***[1 mark]***. Further development of this definition, or applied use of an example, could merit another ***[1 mark]***, for example, mentions daily or annual variations in strength or has vertical and lateral components. Award up to ***[3 marks]*** for explaining how human activities (domestic cooling/heating, construction, transportation, industries, changes to nature of surfaces/albedo) help cause it.

(d) Examine the reasons why economic activities (such as retailing, service and/or manufacturing industries) sometimes change location within an urban area. ***[10]***

Wide variety of possible approaches, depending on examples chosen. The causes of retail movements include shifts in population (for example, suburbanization), the changes in average age within an urban area (life cycle), location of employment opportunities, availability of land for "big-box" stores/superstores and out-of-town shopping centres, range of costs driving retailers out of CBD (including online competition), transport links, regeneration projects, gentrification, *etc.* Manufacturing movements may be influenced by land-use zoning, environmental considerations, proximity to labour, transport links and markets, *etc*.

At band D, candidates should be able to describe the changing location of economic activities in a named urban area.

At band E, locational changes should be explained for more than one type of activity and a range of reasons given.

At band F there should be accurate and detailed knowledge and understanding, with well developed case studies.

Marks should be allocated according to the markbands.

14. (a) State which megacity is predicted to grow most rapidly. ***[1]***

Lagos (Nigeria).

(b) Describe the global distribution of the megacities listed in the table. ***[3]***

Award ***[1 mark]*** for each statement made, up to ***[3 marks]***.
A listing, with no attempt to identify any pattern or overall distribution, may not be awarded more than ***[1 mark]***.

For example:
- there are many more (more than twice as many) megacities in Asia than in any other continent
- North America and South America each have three megacities
- Africa and Europe have fewer megacities than any other continent
- most megacities are in lower income countries.

Other valid distributional statements may be made.

(c) Using examples, explain why some large urban areas have much higher population growth rates than others. ***[6]***

Population growth in large urban areas is a result of (a) net migration and (b) natural population change. As a guideline, award up to ***[2 marks]*** for comments about in-migration, ***[2 marks]*** for comments about natural increase and ***[2 marks]*** for using valid examples. This balance may be adjusted for responses which are stronger on one component than the other.

For the full ***[6 marks]*** both components of population growth should be included alongside valid examples of urban areas with different rates of population growth.

(d) "Sustainable strategies in cities can only succeed when cities have zero population growth." Using examples, discuss this statement. ***[10]***

Candidates are expected to have studied examples of management strategies of housing provision, pollution control and controlling in-migration. In each case they are expected to be able to take an evaluative approach. They may use any or all of these to help support their answer.

In general, population growth in cities tends to negate the positive benefits of strategies designed to improve sustainability. Sustainable strategies attempt to alter numerous aspects of a city's system, so that, for example, energy and resource usage are reduced, waste disposal is reduced, green sources of energy are encouraged, air pollution is controlled and socially sustainable housing is readily available.

An answer which only considers sustainable strategies, for example Curitiba, without reference to population growth, should be limited to the C/D boundary.

Answers reaching band E are expected to consider how population growth tends to negate the benefits of sustainable strategies, and show some attempt at evaluation.

At band F there should be a well balanced attempt at evaluation.

Marks should be allocated according to the markbands.