

Markscheme

May 2016

Geography

Higher level and standard level

Paper 2

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Paper 2 markbands

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

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

Option A — Freshwater – issues and conflicts

1. (a) Identify **and** locate **two** natural river landforms found on the Clutha River's floodplain. **[2+2]**

Award [1] for naming each feature eg meander, braiding, marshland, slip-off slope, river cliff, oxbow lake, distributary, eyot/ait/island, levee.

Award [1] for either a four-figure grid square reference or a valid locational/situational statement for each.

For example:

There is a meander [1] southeast of Stirling [1].

There is oxbow lake [1] at 4971 [1].

- (b) (i) Briefly explain how **one** human modification of the floodplain shown in area A (outlined in black) may reduce river flooding. **[2]**

Award [1] for identifying a modification and [1] for explanation.

For example:

Stopbank/artificial levee/embankment [1] allows higher discharge/flow/increased capacity [1].

Drainage ditches/canals [1] carry water off the floodplain [1].

River deviation scheme [1] diverts water away from the main channel [1].

- (ii) Suggest **two** ways in which the settlement of Balclutha may have led to increased river flooding. **[2+2]**

Award [1] for each valid suggestion and [1] for why it may have led to increased flooding.

Possibilities include:

- building on the floodplain
- infrastructure eg, roads on floodplain
- growth of town-impermeable surfaces
- bridge(s) over river
- railway embankment
- drains, culverts and sewers
- deforestation
- clearing of land for agriculture.

For example:

Road bridge over the river [1] constricts river flow and allows ponding/overflow of water [1].

Urban growth of Balclutha increases concrete/asphalt [1] which is impermeable so water runs into river [1].

- (c) Examine how the environmental impacts of agriculture and irrigation on water quality vary from place to place.

[10]

Responses should show an understanding of a variety of impacts (from agriculture and irrigation) on water quality *eg*, eutrophication, salinization, agro-chemical run-off, groundwater pollution.

It would be expected that the causes and environmental consequences of at least two impacts should be explained.

Variation/scale/place-to-place should be considered.

Good candidates may consider, for example, that eutrophication is widespread wherever there is arable or pastoral farming with unregulated run-off into water courses and it is found worldwide. May affect rivers, lakes, wetlands and coastal margins.

At band D, answers are likely to be mainly descriptive and/or look only at one impact.

At band E, expect either a more detailed explanation of a range of impacts or an examination of how different places are affected in varying ways.

At band F expect both.

Marks should be allocated according to the markbands.

2. (a) Outline how water is transferred through a drainage basin by:

(i) infiltration; [2]

Award [1] for a simple description and [1] for some development.

For example:

Infiltration is the downward movement of water [1] from the surface/into the soil [1] / may be influenced by vegetation cover/slope angle/human impact [1].

(ii) throughflow. [2]

Award [1] for a simple description and [1] for some development.

For example:

Throughflow is the sideways/lateral movement of water within the soil [1] where downward movement is restricted [1] / moves through pores/cracks/fissures or natural pipes in the soil [1].

(b) Suggest how a change in the balance of water stored in oceans and ice could result in:

(i) **one** environmental consequence with **positive** effects for people; [3]

Consequences include: retreat of glaciers and ice shelves / ice caps; accessibility to more land (for farming); new sea floor resources found; increased water supply; changes in tourism; new shipping routes.

Award [1] for the consequence and [2] for development and/or exemplification.

For example: Arctic ice melting [1] is allowing the discovery of previously unknown oceanic resources [1], eg oil [1].

(ii) **one** environmental consequence with **negative** effects for people. [3]

Consequences include: rising sea levels caused by ice melt; flooding in low-lying areas; drowned features on coastlines or emergent features; coastal inundation; increased river flows; water insecurity; changes in tourism; environmental refugees.

Award [1] for the consequence and [2] for development and/or exemplification.

For example:

Ice melt is causing rising sea levels [1] which are inundating coastal areas/low-lying islands, eg Pacific atolls [1] leading to migration [1].

- (c) “The benefits gained from the construction of large dams outweigh any costs.”
Discuss this statement with reference to **one or more** major dams.

[10]

At least one example of a major dam should be named and located. Both benefits and costs should be discussed.

Costs could include: biodiversity loss; increased siltation; changing river load downstream (and water temperature change with ecosystem impacts); loss of water through increased evaporation; increased chances of diseases (such as bilharzia); loss of nutrients due to flood control; salinization; seismic activity; increased landslides; forced migration/displacement of population; loss of farmland; loss of historic sites; drowning of settlements; disruption of transport links.

Benefits include: power generation; industrialization; economic spin-off; prestige, water supply; irrigation; transport/navigation; flood control; supplements low river levels; fishing; recreation and tourism.

Good candidates may question from whose perspective the statement is made or may apply concepts. Another approach may be to apply scale or timescale, *ie* many people benefit over a broad area while only local people lose their homes, or the benefits and costs may only become clear over time.

To access band D, there should be description of some costs and benefits – do not expect balance.

For band E, there should be either explanation of a greater range/depth of costs and benefits or some discussion of the statement (considers perspective, scale, time, etc).

For band F, expect both.

Marks should be allocated according to the markbands.

Option B — Oceans and their coastal margins

3. (a) Referring to the graph:

(i) describe how ocean salinity varies with depth; [2]

Award up to [2] for any two points, provided at least one point has been quantified.

- Ocean salinity is lower nearer the surface (around 32.5 ppt) [1].
- Salinity increases very slowly in the top 100 m of ocean [1].
- Between 100 m and around 750 m ocean salinity increases quite rapidly (from 32.5 ppt to over 34 ppt) [1].
- From 750 m to about 1500 m ocean salinity increases slowly (from over 34 ppt to less than 35 ppt) [1].

(ii) describe how ocean temperature varies with depth. [2]

Award up to [2] for any two points, provided at least one point has been quantified.

- Temperature is highest nearer the surface (13–15°C) [1].
- Temperature is fairly constant in the top layer of water (to about 100 m) [1].
- Temperature decreases rapidly from about 100 m to 250 m (from about 13–15°C down to about 5°C) [1].
- Below 250 m temperature decreases slowly [1].

(b) Explain **three** economic benefits of mangrove swamps. [2+2+2]

Award [1] for each economic benefit and a further [1] for development/exemplification.

Mangrove swamps provide many economic benefits, including:

- food, especially fish such as shrimp – these form the basis of a fishing industry
- fuel – the wood can be burnt for fuel
- building material – the wood can be used for fencing/housing
- protection against hurricanes/tsunamis – reduces losses/reconstruction costs
- high levels of biodiversity – unique wetland environment so ecotourism
- some species are used for medicines – eg for skin disorders, sores and for throat cancer; this has indirect economic benefits
- reduced costs for environmental clean-up agencies by absorbing nutrients from farming and sewage disposal.

For example:

Mangrove swamps support a fishing industry [1] because they provide a breeding ground for fish [1].

- (c) To what extent have the management strategies adopted to resolve human pressures on **one named** coastline been successful?

[10]

There are many different pressures in coastal areas: tourism and recreation; fishing; transport; energy developments; conservation; settlement; trade; industrial development; water abstraction; sand mining *etc.* These pressures tend to lead to conflicts over management strategies.

Conflict may be small-scale *eg* between dog walkers and families on Studland Beach, or between fisher folk and conservationists in Soufriere, St Lucia. It may also be large-scale, *eg* the proposed coal mining and transport of coal via the Great Barrier Reef, Australia.

Coastal management strategies include land-use zoning; coastal protection schemes; managed retreat; conservation areas; coastal reclamation; hard and soft engineering schemes; user fees; seasonal; establishment of management bodies; preparation of information materials (such as notice boards); inclusion of all stakeholders.

Good candidates may recognize that it is not possible to resolve conflicts/please all stakeholders but a good strategy may involve compromise that different parties can live with, *eg* aesthetically pleasing defences. Also, conflicts may become more common and therefore harder to resolve as tourism grows, technology develops and land-based activities put more pressure on the coastal zone. There may be conflicts within stakeholder groups, *eg* some fishermen are mainly subsistence whereas others are commercially orientated.

An alternative approach might be to compare management strategies on two coastlines in order to assess their relative success.

At band D expect a description of coastal management strategies for a named coastline.

At band E expect either an explanation of coastal management strategies or an attempt to evaluate the relative success of named coastal management schemes in resolving conflicting pressures.

At band F expect both.

Marks should be allocated according to the markbands.

4. (a) (i) Describe what is meant by the term “aquaculture”. [2]

Raising aquatic organisms commercially/fish farming [1]. This is common in coastal margins / gives a locational example [1]. Other valid points may be credited.

- (ii) Describe the trends in coastal aquaculture shown on the graph. [2]

Award up to [2] for any two points made, provided at least one point has been quantified.

For example:

Aquaculture begins at a very low level and has increased dramatically since the 1980s [1].

Over the period aquaculture has grown from about 5 million tonnes to 70 (allow 68–70) million tonnes [1].

- (b) (i) Briefly outline the sovereignty rights of nations in relation to oceanic resources. [2]

Award [1] for a statement about sovereignty rights, and a further [1] for further development/exemplification (eg resource and nation).

For example:

Coastal countries may claim exclusive/sole rights over oceanic resources in their own coastal waters [1].

Oil fields off the coast of Nigeria [1].

- (ii) Explain how oceanic resources are the cause of **one** geopolitical conflict. [4]

Award [1] for the identification of the countries involved in the conflict and the nature of the conflict.

Award [1] for extended description of where/when the conflict arose, for example Japan and Korea’s claims over the Sea of Japan / East Sea date back to the Second World War.

Award a further [2] for the explanation of why this resource is the cause of conflict.

The explanation may focus on the changing value of the resource, changes in accessibility, eg thinning of Arctic ice, multiple claims on the same area by neighbours, provides greater detail of why an area of sea floor does not fall into the EEZ of only one particular country.

For example: There is ongoing conflict between the UK and Argentina over the UK’s claim to the sea around the Falkland Islands (Las Malvinas) [1]. There was war at one point in the 1980s [1]. The sovereignty dispute is partly related to substantial reserves of oil in the region [1]. This oil could be worth more as global demand rises so the conflict may continue [1].

- (c) Compare the importance of coastal processes and lithology for the formation of **two or more** coastal features.

[10]

Coastal processes include wave action (erosion, transport and deposition), wind action, littoral drift, and subaerial processes (weathering, eg salt crystal growth, and mass movement, eg slumping).

Coastal features include erosional landforms such as cliffs and wave-cut platforms, as well as depositional landforms such as spits and bars.

Lithology, in its broadest sense, refers to rock properties eg strength, hardness, permeability (jointing) and chemical composition. Rocks can generally be divided into relatively strong and relatively weak rocks. Lithology may be relatively unimportant for some depositional features (eg sand dunes and salt marshes) whereas it is very important for the development of cliffs and marine (wave-cut) platforms.

Good candidates will recognize that most coastal landforms are the result of the interplay of coastal process and lithology. For example, a high energy coast acting on a strong, jointed rock may produce caves, arches, stacks and stumps.

At band D, expect some description of two features/landforms, and some reasons for their formation.

At band E, expect either greater explanation of how coastal processes and lithology (do not expect balance) give rise to coastal landforms/features or some explicit comparison of their importance.

At band F expect both.

Marks should be allocated according to the markbands.

Option C — Extreme environments

5. (a) (i) Identify the month with the highest rainfall. [1]

February [1]

(ii) Estimate the annual temperature range. [1]

17°C (allow 16–18°C) [1]
(accept “from 24 to 41°C”)

(iii) Suggest why October is a more challenging month for human activity than June. [2]

Two valid points required, such as:

- same temperature
- October has had longer (the previous four months) without rain
- water stores used up (dry).

(b) Explain **two** processes of weathering or erosion that operate in hot, arid areas. [3+3]

Award [1] for identifying a specific weathering, wind or water process, [1] for a basic explanation of how the process operates, and [1] for further development.

For example:

Wind abrasion [1] occurs when wind blows sand particles against rock [1]. This process operates mainly close to the ground/results in undercutting of rock near ground level [1].

Exfoliation/onion skin weathering [1] is when repeated heating and cooling [1] affects the outer layers of the rock, causing them to peel away [1].

Hydraulic action and/or abrasion (by water) [1] occurs after flash floods (and high energy run-off) [1] causing wadis/canyons [1].

- (c) “All cold extreme environments are equally challenging for human activity.”
Discuss this statement.

[10]

The question can be answered in different ways. An account of different periglacial areas would be sufficient. Candidates may equally compare polar/glacial/periglacial/high mountains.

Challenges include extreme cold, permafrost, remoteness, isolation, daylight hours, fragile ecosystem, climate change.

Likely human activities include mining, tourism, agriculture (nomadic herding), fishing, settlement and communications.

Good candidates may explicitly discuss the very different types of challenge (permafrost or high altitudes), or may discuss ways in which different societies or activities encounter different challenges.

At band D, expect a general description of the challenges and possible human activities in one or more cold extreme environments.

At band E expect either explanation of some range of activities in two cold environments or some explicit discussion of whether all cold extreme environments are equally challenging.

At band F expect both.

Marks should be allocated according to the markbands.

6. (a) (i) Estimate the distance of Mawson Station from the South Pole. [1]
1400 km (accept 1300 km to 1500 km)

(ii) Estimate the latitude of the Vinson Massif. [1]
80° / 80°S [1] (accept 78° to 82°)

(iii) State **two** reasons why most of Antarctica is covered in ice. [1+1]
high latitudes / high altitude / lack of insolation / high albedo
Accept any two for [1] each.

(b) Referring to **at least one** example, suggest **three** reasons why mineral extraction has led to the growth of settlements in extreme environments. [2+2+2]

Award [1] for each valid reason and a further [1] for development of each reason, up to a maximum of [5], reserving the final [1] for an example.

For example:

- in-migration of workers [1] increases demand for housing [1]
- export of mineral/resource [1] leads to the development of roads and other transport infrastructure [1]
- growth of population creates demand for services [1] eg retailing, electricity, gas [1]
- identifies located resource, eg uranium mining in Niger for final [1].

- (c) Using located examples, discuss the opportunities and risk associated with the use of irrigation in hot, arid environments.

[10]

Responses may include some description of the techniques of irrigation. There should be an understanding of what is meant by opportunity, *ie* in this case an ability to support human occupation by increasing food supply and security. Terms such as “water balance” might be included in better answers as well as why irrigation is necessary. Risks may include salinization, depletion of groundwater, pollution. Accept other reasonable suggestions.

Good candidates may recognize that there are a range of societies in hot, arid environments, some of whom have the capital and technology to unlock considerable opportunities. Credit should also be given to candidates who understand that though the risk is present it can be managed. Some may even discuss how the extraction of water for irrigation in one area may lead to problems elsewhere, *ie* risk and opportunity are not in the same place. A good discussion might evaluate how risks vary between different irrigation techniques.

At band D, describes some opportunities and/or risk.

At band E expect either a more detailed explanation, with located examples, of some opportunities and risk (do not expect balance) or a discussion of the overall balance between opportunity and risk.

At band F expect both.

Marks should be allocated according to the markbands.

Option D — Hazards and disasters – risk assessment and response

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

Lower than expected/average rainfall [1]

Plus a development [1] such as:

- for an extended period of time
- or may distinguish between meteorological/agricultural/hydrological drought.

- (ii) Outline **one** climatic reason for the occurrence of **one named** drought. [2]

Award [1] for detail of why low rainfall occurs, and a further [1] for appropriate named location.

Possible reasons: anticyclone / air mass movements; ENSO/El Niño/ La Niña cycles; jet stream movements; North Atlantic Oscillation; climate change.

For example: California [1], ENSO cycles [1].

El Niño [1] has caused droughts in East Africa/Ethiopia [1].

- (b) Referring to **either** earthquakes **or** volcanoes, explain **three** reasons why fewer deaths are caused by these hazards than in the past. [2+2+2]

In each case, award [1] for a basic reason why fewer lives are being lost to natural hazards than in the past and [1] for some further development using applied knowledge of earthquake or volcanic hazards.

For example:

- improved monitoring / short-term prediction [1] and may develop / provide examples [1]
- education / drills [1] and may develop / provide examples [1]
- greater knowledge of plate boundaries and where risks are present [1] and may develop / provide examples [1]
- land-use zoning [1] and may develop / provide examples [1]
- community preparedness eg emergency kits [1] and may develop / provide examples [1].

For example: People in Iceland are aware of the dangers of volcanoes [1], keep emergency supplies in their houses [1].

- (c) Using located examples, examine why the intensity of hurricanes varies over time.

[10]

Possible arguments include:

- during the passage of a hurricane, wind speed varies over time
- different hurricanes follow different tracks / make landfall in different areas
- variable hurricane strengths within a single season, perhaps linked to latitude, temperature and depth of water
- climate change could bring long-term increase in temperature of atmosphere and ocean.

Good answers are likely to conceptualize “intensity” in varying ways (different events or different phases of the same event), or may adopt different time scales as part of their answer (hurricane strength varies within a single season but there could be a long-term increase in intensity linked with climate change). Credit answers that look at spatial variations as well as temporal variations.

At band D responses are likely to describe some reasons for the differences in the strength of different hurricanes over time.

At band E, expect either more detail / range of reasons with located examples, for the varying intensity of different located hurricanes or some discussion of what “over time” means (eg seasonal or long term).

At band F, expect both.

Marks should be allocated according to the markbands.

8. (a) (i) Using map evidence, determine which state was worst affected and outline why. [2]

New Jersey [1], and identifies two of the following: highest deaths, most people affected by power outages, three types of travel disruption [1].

- (ii) Using map evidence, determine which state was least affected and outline why. [2]

Delaware [1], and further justification [1], for example, no deaths, least transport disruption [1].

or

Washington [1], and further justification [1], for example, no deaths, fewest power cuts [1].

- (iii) Suggest how land-use planning (zoning) could help reduce vulnerability to hurricanes in this area. [2]

Award [1] for each action. A single action can gain [2] if the idea is developed/exemplified.

Possible actions include:

- housing restrictions in low-lying/coastal areas mean fewer people/properties will be at risk [1]
- other land uses, eg golf courses, parks [1].

- (b) Suggest why the distinction between a hazard event and a disaster is not always completely clear. [4]

A hazard event is the realization of a threat to human life/property, resulting in harm/damage [1].

A disaster is a major hazard event that causes widespread disruption to a community or region, and the affected community is unable to deal with it adequately without outside help [1].

Award the remaining [2] for an attempt to address the distinction:

- What is meant by “outside” help is not clear – this has national / international dimension for instance.
- What is meant by “widespread disruption” may not be clear eg how many deaths/how much damage.

Credit other valid points that relate to the distinction.

- (c) Referring to **two or more** types of hazard, examine why the highest magnitude hazard events are not necessarily the most harmful.

[10]

The most likely framework will be to compare two or more events in very different contexts. Two named types must be discussed in some depth for the award of full marks.

Good answers are likely to conceptualize “harmful” in varying ways (injuries, deaths, property damage *etc*).

A good discussion should consider a range of arguments, such as:

- population vulnerability, density and distribution, and events in unpopulated areas
- socio-economic context (level of development and resilience/vulnerability/adaptation costs)
- timing of events (night-time or daytime)
- trajectory of hurricanes.

At band D answers are likely to describe some basic reasons for differences in the impacts of one or two hazards (eg knows that hurricane or tectonic events are likely to bring higher mortality in less developed countries).

At band E, expect either more detail / a range of reasons for the varying impacts that two or more hazards will have or some discussion of what constitutes harmful (contrasts mortality and property losses for instance).

At band F, expect both.

Marks should be allocated according to the markbands.

Option E — Leisure, sport and tourism

9. (a) (i) Describe what is meant by the term “heritage tourism locations”. [2]

Heritage tourism is tourism based on a historical legacy [1]. Award [1] for additional development eg historic building, historic event, landscape feature, or cultural significance.

Do not accept a named example.

- (ii) State examples of **two** different kinds of heritage tourism. [2]

Award [1] for each valid example.

For example:

Great Wall of China [1]

Somme battlefields [1]

Yosemite National Park [1]

To achieve [2] at least one of the examples must be named.

Each kind of heritage tourism should be a distinctive type, eg, an historic building, or a landscape feature.

- (b) (i) Suggest what is meant by the term “remote tourist destination”. [2]

Relatively inaccessible location [1] and either “that attracts visitors [1]” or identifies a valid example [1].

- (ii) Suggest **two** reasons for the growth of tourism in **one named** remote tourist destination. [2+2]

Award [1] for each valid reason.

Possible reasons include: developments in transport; rising incomes; more leisure time; marketing; raised awareness through the media (including the internet); a desire to escape from mass tourism.

In each case award a further [1] for further development.

For example:

More tourists are travelling to Uluru, central Australia, due to cheaper and improved transport [1] which makes it more accessible [1]. Developments in the media [1] generate interest/awareness in remote tourist destinations [1].

If a remote tourist location is not named, award a maximum of [3].

If the example is inappropriate regarding “remoteness”, award a maximum of [2].

- (c) Evaluate strategies that have been designed to make tourism more sustainable in different environments.

[10]

Sustainable tourism aims to protect the natural environment and also local culture/society/economy. Expect good candidates to distinguish between these different aspects of sustainability.

There should be recognition of the negative impacts of tourism in different environments, and a discussion of strategies for sustainable tourism, together with examples from at least two different environments.

Negative impacts might include: depletion of local water resources; disruption of the natural environment; destruction of coral reefs; pollution from tourist resorts; impacts on local cultures.

Strategies might include: protection of the natural environment; reducing the ecological footprint; managing tourist numbers; involvement of local communities; designation of national parks; increased education and awareness of tourists.

Responses at band D are likely to be largely descriptive accounts of strategies of sustainable tourism.

At band E there should either be greater explanation of two strategies/environments or some evaluation of whether the strategies can be described as sustainable in the fullest sense.

At band F expect both.

Marks should be allocated according to the markbands.

10. (a) Describe the geographical distribution of Formula One motor racing tracks shown on the map. [4]

Award [1] each for any of the following:

- the majority are in the Northern Hemisphere
- three in the Southern Hemisphere
- the majority are in North West Europe
- there are none in Africa or India
- four are in Southeast Asia
- other valid statements, eg HICs, MEDCs, core–periphery.

Award maximum [2] for a simple listing of countries.

- (b) Explain **two** reasons for increased global participation in sport. [3+3]

Participation may refer to professionals or individuals playing sport in their leisure time. Credit explanations related to supporting sport in a public place.

A range of possible factors could be cited, for example:

- rising incomes and affluence have made participation in sport more affordable
- increased leisure time
- increased provision of sporting facilities
- media coverage increases awareness of sporting events eg Paralympics.

Award [1] for the reason and award [2] for further development and/or exemplification.

For example:

A major sporting event, such as the Tour de France watched by millions on the television [1], has stimulated interest in cycling and resulted in increased participation in cycling activities [2].

Also, increased provision of sport facilities [1], such as swimming pools and gyms, together with more disposable incomes and leisure time, has resulted in the growth of these sports [2].

- (c) For **one** national sports league you have studied, examine the relationship between the location of the teams and the residence of its supporters. [10]

An example of a national sports league should be clearly identified, together with the location of the teams and residence of its supporters.

Teams at the top of a hierarchy, such as in the English Premier Football League, are located in major urban areas and have a wide sphere of influence. They have supporters from around the world, as well as many local supporters. Teams that are lower in the hierarchy, including many small local clubs, are located in many towns and villages, and their supporters are mainly drawn from the local area. These may also be supporters of much more important teams that are higher in the hierarchy.

Good answers may show a recognition of a sports hierarchy and the sphere of influence of its supporters, supported by examples. Mention could also be made of other factors, such as the role of the media, sponsorship and advertising, in influencing the sphere of influence. Another approach would be to question how the relationship changes over time or to query what “national” means.

Responses that achieve band D are likely to be descriptive accounts of a sports league and its supporters. The response should refer to a national sports league, eg the Bundesliga (German soccer), or Indian Cricket League.

At band E, responses either provide greater explanation and detail of the relationship or begin to examine the different scales or timescales of the relationship.

At band F, expect both.

Marks should be allocated according to the markbands.

Option F — The geography of food and health

11. (a) (i) Outline what is meant by the term “diseases of affluence”. [2]

Award [1] for each valid point from the following:

- mainly affect wealthier people
- due to longevity/sedentary lifestyle/diet/lifestyle choices
- or an example, eg cancer.

- (ii) Briefly describe the global distribution of diseases of affluence. [2]

Primarily economically wealthy countries [1], but also in some socio-economic groups within less wealthy countries [1].

- (b) Referring to **one named** water-borne or vector-borne disease, distinguish between policies relating to its prevention and policies relating to its treatment. [6]

Award maximum [3] if no specific disease named, or disease is not either water-borne or vector-borne, eg HIV/AIDS, Ebola.

Award maximum [4] if policies only relate to either prevention or treatment.

For example:

Malaria is a vector-borne disease, carried by mosquitoes [1].

Policies related to malaria prevention include: *Award [1] each.*

- removing/covering open bodies of still water (ponds, buckets, puddles)
- eradicating mosquitoes (spraying)
- encouraging use of bednets, preferably pre-sprayed with mosquito pesticide
- encouraging use of anti-malarial tablets.

Policies related to malaria treatment include: *Award [1] each.*

- ensuring rapid diagnosis (provision of laboratories, training of medical staff, including doctors) ensuring easy access to medical attention and medicines needed to treat malaria (healthcare systems, education, purchase of stockpiles of malarial medicines)
- establishing a national database of malarial patients so that they might be treated more effectively and appropriately.

- (c) Examine the effects of transnational corporations (TNCs) and fair trade on the level of sustainability of agriculture.

[10]

The relationship between TNCs and sustainability is complex. While some TNCs probably increase agricultural sustainability, others probably decrease it. Equally, the actions of some TNCs probably have no effect on sustainability whatsoever.

An example of how sustainability might be increased is when TNCs introduce/adopt more efficient irrigation techniques (such as drip feed instead of flood irrigation) to grow crops. However, sustainability is only increased if the pumping of water for the new irrigation system does not involve using large amounts of additional energy coming from non-renewable sources.

On the other hand, TNCs that introduce GM herbicide-resistant crops may decrease sustainability. For example, some TNCs have patented or otherwise protected their rights to certain types of seed, meaning that farmers have to purchase new seed every year and are no longer allowed to use seed from a previous crop, as is normally done in conventional farming. This may be economically unsustainable, especially over the long term. In other cases, for example where the seed of some hybrid crops will not germinate and grow new crops, the changes brought by TNCs may be ecologically unsustainable.

The adoption of fair trade is designed to increase sustainability, especially the social and economic aspects of sustainability. The discussion of fair trade might extend into considering the sustainability of marketing and supply chains. This should not be penalized but is likely to be self-limiting given the wording of the question.

TNCs and fair trade are not always mutually exclusive. One example of an overlap between TNCs and fair trade is Starbucks coffee. The firm is a TNC, but it advertises and commercializes fair trade products.

Candidates are expected to show some awareness that the concept of sustainability has several strands, including economic, environmental and social. It is also likely that many candidates will refer to ways in which sustainability can be measured/assessed. The strongest responses are likely to include references to food miles and/or energy efficiency as measures of sustainability.

It is not necessary for TNCs and fair trade to be discussed in equal depth for the award of full marks. A strong, evidenced discussion of TNCs may well offset a weaker discussion of fair trade, or vice versa.

Responses at band D are likely to describe some ways in which TNCs and/or fair trade affect sustainability of agriculture.

At band E, expect either greater explanation of how TNCs and fair trade affect sustainability of agriculture or some explicit examination of what is meant by sustainable agriculture.

At band F, expect both.

Marks should be allocated according to the markbands.

12. (a) (i) Referring to the graph, briefly describe the change in food production in India from 1980 to 2010. [3]

Award [1] for recognition of increase, [1] for recognition of step/steps and [1] for some correct quantification. For example: 250-300m tonnes in 1980 and 500-750m tonnes in 2010 (both years do not need to be quantified for the additional [1]).

- (ii) **Other than** increasing global yield, state **one** reason why global production has increased. [1]

Award [1] for recognizing that a greater area of land (new land) is now being cultivated/farmed. For example, “increased irrigation has led to more land being farmed”, or, “the use of HYVs/GMOs allows two or more crops per year from the same plot”.

- (b) Explain **two** ways in which the yield of some food crops can be increased. [3+3]

Note: yield is not the same as output.

Reasons for increases in yield include: increased use of fertilizers; pesticides; irrigation; adoption of high-yielding varieties.

Accept other valid suggestions.

Award [1] for identification of valid factor, [1] for its development, and [1] for a clear link to yield rather than just output.

For example:

Yield may increase if more farmers apply more or better fertilizers [1] to their crops. This provides plants with extra nutrients [1] and means that they produce more crops off the same area of land [1].

Yields (amount produced off a given area of land) [1] may increase if farmers use pesticides more effectively [1] because pests that normally reduce the yield of that crop are reduced or eliminated [1].

- (c) Referring to **two** diseases, compare the factors affecting their spread from place to place.

[10]

Geographic factors include environmental, physical, demographic, socio-economic, *etc.* The factors that are relevant will depend on the two diseases chosen, and on any particular examples utilized in the response.

Good responses may draw comparisons using concepts such as diffusion, spread by relocation, the presence or absence of barriers to diffusion.

Responses at band D are likely to describe some factors that influence the spread of two diseases (do not expect balance).

At band E, expect either greater explanation of the factors affecting the spread of both diseases with located examples, or some explicit comparison focused on key factors/concepts.

At band F, expect both.

If only one disease is referred to, the response may not advance beyond band C.

Marks should be allocated according to the markbands.

Option G — Urban environments

13. (a) (i) Estimate the number of people worldwide living in megacities (10 000 000 people and over) in 1990. [1]

Accept responses within the range 130 million to 175 million.

- (ii) Describe changes in the total number of people living in small cities of less than 500 000 people. [3]

Award [1] for each valid change and reserve [1] for quantification.

For example:

- increased rapidly between 1970 and 1990 [1] by approximately 50 % [1].
- increased very slowly from 1990 to 2011 [1], to about 135 million [1].

- (b) Explain **two** characteristics of the distribution of **one named** economic activity within **one named** urban area. [3+3]

Economic activity can include manufacturing industries, retail and service industries. In some urban areas there are primary industries (mining towns).

Examples must be developed. For example, would need to identify locational features of the industry eg transport corridors, edge of town, close to the CBD, rather than a generic example such as the motor industry in Detroit.

Award [1] for each characteristic identified, and a further [2] for an explanation of the features of the spatial distribution, up to a maximum of [5]; reserve the final [1] for the example of the urban area.

For example, retailing in Cardiff is concentrated in the CBD [1] due to accessibility [1] (transport), leading to a higher pedestrian flow [1].

- (c) “Managing a city sustainably requires a wider range of strategies than those that only limit its ecological footprint.” Discuss this statement.

[10]

Sustainable cities are those that seek to maintain and improve the quality of life for current and future urban dwellers. Ecological footprints are the theoretical measurement of the amount of land and water a population requires to produce the resources it consumes and to absorb its waste under prevailing technology.

There are many factors used in an ecological footprint calculation, which is a measure of the environmental impact/requirements of people:

- bioproductive (currently used) land such as farmland, gardens, pasture and managed forest
- bioproductive sea used for human consumption
- energy land – the amount of land that would be required to support renewable energy instead of non-renewable energy
- built land – land used for development such as roads and buildings
- biodiversity land – land required to support all of the non-human species
- non-productive land such as deserts is subtracted from the total land available.

Other aspects of sustainability may be social (housing quality, social equality, crime), economic (type of employment, employment, unemployment) and/or environmental (air, water, land resources).

Good responses are likely to discuss the definition of urban sustainability. They may refer to social indicators (the percentage of people in over-crowded conditions, crime rates, educational achievement/literacy levels, *etc*) or economic indicators (Gini coefficient and unemployment rates). Candidates may question whether all of the data can be collected or even whether it is possible to accurately measure ecological footprints. Ecological footprints are therefore only one part (albeit important) of the sustainable city.

Answers may draw from a number of examples – Curitiba, Masdar City, and Bedzed and/or from sustainable strategies for transport, housing management, in-migration.

At band D, responses are likely to describe urban ecological footprint management or another urban sustainability strategy.

At band E expect either a more detailed explanation of how ecological footprints and other strategies (at least one) are used to manage urban sustainability or a discussion of urban sustainability/issues in a more varied way.

At band F expect both.

Marks should be allocated according to the markbands.

14. (a) Describe the changes in the size of Detroit’s population between 1900 and 2015. [4]

Award [1] for each of four valid statements, for example:

- Detroit’s population increases between 1900 and 1950
- the most rapid growth was between 1910 and 1930
- the city’s population has declined from its peak in 1950 until 2015
- in 2015 its population was the lowest it has been since about 1915.

There may be other valid descriptive statements.

Maximum [3] if no quantification (must quote some data from y axis).

- (b) Using examples, explain **two** push factors and **one** pull factor that help explain counter-urbanization movements. [2+2+2]

Counter-urbanization is the movement of population away from inner urban areas to a new town, a new estate, a commuter town or a village on the edge of just beyond the city limits/rural–urban fringe.

Counter-urbanization is influenced by many push and pull factors.

Award [1] for the identification of a factor affecting counter-urbanization, and a further [1] for development, up to a maximum of [5], reserving the final [1] for an example.

Push factors include:

- the high price of urban living
- congestion in urban areas
- pollution
- lack of services
- declining employment opportunities
- social problems such as high crime rates.

Pull factors include:

- the perceived improved community relations
- better schools
- bigger houses
- cleaner environments
- space.

Accept other valid suggestions eg improvements in transport, improved ICT links enabling teleworking.

For example: High crime rates in Johannesburg [1] have led to many people leaving the inner urban areas for smaller areas/relocating [1].

For example: Perceived high quality selective educational establishments in Tonbridge, Kent [1] have resulted in increased population in-migration [1].

Do not credit both mirror statements eg poor housing/good housing used as two factors.

- (c) Using examples, discuss the varied effects of human activity on urban microclimates.

[10]

The effects of human activity on urban climates is varied eg urban heat islands, increased cloud cover and incidence of smog, increased instability, reduced snow cover, lower air pressure, increased tunnelling of winds, ie “the canyon effect”, decreased relative humidity and so on.

The impacts depend on a number of factors: size of city, the function of the city (industrial versus post-industrial), land-use in the city (open spaces versus industrial/retail zones), population density, vehicle density.

In some cities, negative impacts of earlier urban development have been reversed by recent developments eg the Olympic Park in London, slum clearance in Barcelona to create La Rambla or the reintroduction of the Cheong-Gye-Cheon river in Seoul. These have led to reduced temperatures, reduced wind speeds, and increased humidity. Sustainable transport strategies may reduce the number of vehicles in city centres.

Good candidates may examine the scale of the city, improvements to a city’s climate and the nature of the settlement. Good candidates should be able to explain specific aspects of the microclimate and relate it to named human activities (building, transport systems, power generation).

Responses at band D are likely to describe a limited range (at least two) of effects of human activity on microclimates.

At band E candidates will either discuss the effects in greater range/depth/types or provide some discussion of what “varied” might mean (eg negative/positive, planned/unplanned, varied locations).

At band F expect both.

Marks should be allocated according to the markbands.
