

Version



**General Certificate of Education (A-level)  
January 2012**

**Geography**

**GEOG1**

**(Specification 2030)**

**Unit 1: Physical and Human Geography**

**Post-Standardisation**

***Mark Scheme***

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Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all examiners participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for standardisation each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, examiners encounter unusual answers which have not been raised they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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## **GEOG1, GEO4A and GEO4B General Guidance for GCE Geography Assistant Examiners**

### **Marking – the philosophy**

Marking should be positive rather than negative.

### **Mark schemes – layout and style**

The mark scheme for each question will have the following format:

- a) Notes for answers (nfa) – exemplars of the material that might be offered by candidates
- b) Mark scheme containing advice on the awarding of credit and levels indicators.

### **Point marking and Levels marking**

- a) Questions with a mark range of 1-4 marks will be point marked.
- b) Levels will be used for all questions with a tariff of 5 marks and over.
- c) Two levels only for questions with a tariff of 5 to 8 marks.
- d) Three levels to be used for questions of 9 to 15 marks.

### **Levels Marking – General Criteria**

Everyone involved in the levels marking process (examiners, teachers, students) should understand the criteria for moving from one level to the next – the “triggers”. The following general criteria are designed to assist all involved in determining into which band the quality of response should be placed. It is anticipated that candidates’ performances under the various elements will be broadly inter-related. Once the Level has been determined, examiners should initially set the mark at the middle of the mark range for that level (or the upper value where no mid value exists). Then refine the mark up or down using the General Criteria, Notes For Answers and the additional question specific levels guidance. Further development of these principles will be discussed during Standardisation meetings. In broad terms the levels will operate as follows:

#### **Level 1: attempts the question to some extent (basic)**

An answer at this level is likely to:

- display a basic understanding of the topic
- make one or two points without support of appropriate exemplification or application of principle
- demonstrate a simplistic style of writing perhaps lacking close relation to the terms of the question and unlikely to communicate complexity of subject matter
- lack organisation, relevance and specialist vocabulary
- demonstrate deficiencies in legibility, spelling, grammar and punctuation which detract from the clarity of meaning.

#### **Level 2: answers the question (well/clearly)**

An answer at this level is likely to:

- display a clear understanding of the topic
- make one or two points with support of appropriate exemplification and/or application of principle
- give a number of characteristics, reasons, attitudes (“more than one”) where the question requires it
- provide detailed use of case studies
- give responses to more than one command e.g. “describe and explain..”
- demonstrate a style of writing which matches the requirements of the question and acknowledges the potential complexity of the subject matter
- demonstrate relevance and coherence with appropriate use of specialist vocabulary
- demonstrate legibility of text, and qualities of spelling, grammar and punctuation which do not detract from the clarity of meaning.

**Level 3: answers the question very well (detailed)**

An answer at this level is likely to:

- display a detailed understanding of the topic
- make several points with support of appropriate exemplification and/or application of principle
- give a wide range of characteristics, reasons, attitudes, etc.
- provide highly detailed accounts of a range of case studies
- respond well to more than one command
- demonstrate evaluation, assessment and synthesis throughout
- demonstrate a sophisticated style of writing incorporating measured and qualified explanation and comment as required by the question and reflecting awareness of the complexity of subject matter and incompleteness/ tentativeness of explanation
- demonstrate a clear sense of purpose so that the responses are seen to closely relate to the requirements of the question with confident use of specialist vocabulary
- demonstrate legibility of text, and qualities of spelling, grammar and punctuation which contribute to complete clarity of meaning.

**CMI+ annotations**

- The annotation tool will be available for levels response questions.
- Where an answer is marked using a levels response scheme the examiner should annotate the script with 'L1', 'L2' or 'L3' at the point where that level has been reached. At each point where the answer reaches that level the appropriate levels indicator should be given. In addition examiners may want to indicate strong material by annotating the script as "Good Level...". Further commentary may also be given at the end of the answer. Where an answer fails to achieve Level 1 zero marks should be given.
- Where answers do not require levels of response marking, the script should not be annotated. For point marked questions where no credit-worthy points are made, zero marks should be given.
- The following is a list of the annotations available on the CMI+ system:

**Generic**

adv	-	advantage	expl	-	explanation
ass	-	assesses	h	-	human
char	-	characteristic	i	-	illustrates
com	-	comment	l	-	links
desc	-	description	own kn	-	own knowledge
disadv	-	disadvantage	p	-	physical
dis	-	discusses	sup	-	support
ex	-	examines	sust	-	sustainability
eg	-	example/case-study	twe	-	to what extent

**Other mechanics of marking**

- Various codes may be used such as: 'rep' (repeated material), 'va' (vague), 'NAQ' (not answering question), 'seen', etc.
- Unless indicated otherwise, always mark text before marking maps and diagrams. Do not give double credit for the same point in text and diagrams.

**SECTION A**

**Question 1**

- 1 (a)** Months of January, February, March and December have surplus. **(4 marks)**  
2 marks if all 4; 1 mark if three, likely to be January – March.  
June or July – where evapotranspiration exceeds precipitation by 45-50mm approx. **AO1 – 2**  
**AO2 – 1**  
Soil moisture recharge is the replenishment of stores of water used during warmer months when evapotranspiration has exceeded precipitation, when there is a net balance in favour of precipitation, water lost from the soil will be replaced. **AO3 – 1**  
Maximum 3 on first 2 parts and last part.
- 1 (b) (i)** Sketch plan should show recognisable outline of river channels and build – up of land along them, with infilling between those on the right-hand side of plan. **(4 marks)**  
Labels likely to include – distributaries, bird's foot shape of delta, land extending along distributaries, levees, evidence of deposition/shallower water on edges of land, large amounts of sediment present in waters off the developed part of the delta. **AO1 – 1**  
**AO2 – 1**  
**AO3 – 2**  
Allow 1 for sketch and 3 for appropriate labels.
- 1 (b) (ii)** There are certain conditions that are present which encourage the formation of deltas. The presence of a large amount of sediment is essential – brought down by large rivers. Mississippi transports 450m tonnes per year. The limited removal of this by small range of tides is also significant – thus deltas form in areas such as the Mediterranean, Gulf of Mexico. The presence of relatively calm seas encourages the deposition of material, as does the process of flocculation where the salt present in the water in the sea generates an electrical charge that causes particles to stick together, increasing cohesion and weight and encouraging deposition. There may be reference to the land extending out especially along distributaries and the fact that the largest material is deposited first. This links in with reference to topset, foreset & bottomset beds. **(7 marks)**  
**AO1 – 5**  
**AO2 – 2**

**Level 1 (Basic) 1-4 marks**

Begins to explain – ideas separate initially.  
There is a partial sequence and begins to link ideas at top end.  
Some use of appropriate terminology present at the higher end.

**CMI annotation**

**L1 Begins to explain separate ideas.**

**L1 Partial sequence**

**Level 2 (Clear) 5-7 marks**

Explanation is clear/sequence given.  
Links between different aspects and interrelated nature is recognised.  
Appropriate geographical terminology is used.

**CMI annotation**

**L2 Clear expl/sequence**

**L2 Recognises links in sequence**

**1 (c)** There may be some discussion of the concept of flooding – which occurs when rivers exceeds bankfull level. **(15 marks)**

There should be a recognition of the **physical** factors responsible – such as periods of heavy rain, especially when preceded by earlier wet conditions (Tewkesbury, Sheffield etc 2007), the role of snowmelt (Malton 2000 – 01), natural hazards such as Hurricane Katrina in New Orleans or deep depressions in areas such as UK, the part played by impermeable rock, steep slopes, shape and size of drainage basin, drainage density. There should be recognition of how these cause flooding, linked to rates of runoff versus infiltration and causes of rapid runoff.

**AO1 – 7**

**AO2 – 8**

**Human** causes should also be discussed – with reference to urbanisation – building of impermeable surfaces and then installing drainage systems – deforestation and river management such as straightening, building of levees and dams being the most likely inclusions. Again there should be recognition of the impact of these and reference to how they cause floods.

Examples/case studies are not a requirement, but are a useful way of illustrating causes. There should be an assessment of the relative importance that reflects the content of the answer.

**Level 1 (Basic) 1-6 marks**

Identifies physical causes and/or human causes.

Tentative links to how flooding results from e.g. intense rainfall.

Information likely to be generic.

Some use of appropriate terminology present at the higher end.

**CMI annotation**

**L1 Identifies phys and/or hum causes**

**L1 Links cause to fl tentatively**

**Level 2 (Clear) 7-12 marks**

Seeks to explain how physical factors and/or people cause flooding - links to runoff and infiltration are present.

There may be imbalance between the two causes.

May relate to case studies/illustrate points made.

Appropriate geographical terminology is used.

Tentative/implicit assessment of relative importance.

**CMI annotation**

**L2 Begins to explain**

**L2 Tentative/implicit assessment**

**Level 3 (Detailed) 13-15 marks**

Explains clearly how physical factors and people cause flooding – clearly appreciates sequence of events set in motion linked to drainage basin hydrological cycle.

There will be balance between the two aspects.

May use case studies/detail and purpose in exemplification.

Specific terminology is used throughout.

Explicit assessment of relative importance – probably suggesting overall importance of physical factors, but made worse by role people play.

***CMI annotation***

***L3 Clear sequence of explanation***

***L3 Explicit assessment – supported by evidence***

**Question 2**

- 2 (a)** There is a net loss in all years in both the glacier and the ice sheet. In both, the rate of loss appears to be accelerating from -1.09 to -2.29, an increased net loss of 1.20 metres of water equivalent per year for the glacier and -90 to -220, an increased net loss of 130km<sup>3</sup> of ice for the ice sheet. The ice sheet has a sustained loss, with rates increasing for the period shown. However, the loss fluctuates for the glacier, reducing in 1984 especially from the 1974 start date, before increasing in 1994 by 0.28 and a substantial increase in 2004 from 1994 of 1.70 metres of water equivalent. **(4 marks)**
- AO1 – 2  
AO2 – 1  
AO3 – 1
- 4 x 1 Allow 1 mark for valid use of evidence on each part of the table – where figures are manipulated, not just lifted from the table.  
Maximum 3 on one half of table.
- 2 (b) (i)** X – Extensional/extending flow. Y – Compressional/compressing/rotational Flow **(2 marks)**  
2 x 1
- AO2 – 1  
AO3 – 1
- 2 (b) (ii)** Internal deformation refers to ice movement that leads to the disorganisation of the individual ice crystals so that it changes shape and acts like plastic. The crystals orientate themselves in the direction of ice movement, but move at different rates. **(2 marks)**
- AO1 – 2
- Those at the bottom are likely to remain still, whilst those above slide due to gravity.  
2 x 1
- 2 (c)** There should be a recognisable sketch of a pingo (open system or East Greenland type) identified as a dome shaped hill. Size may be added – from 1m up to 50/60m in height and 0.5/0.6km in width. Some may show a dome that has collapsed in the middle (closed system or Mackenzie type). There is likely to be a small lake at the centre of these. **(7 marks)**
- AO1 – 4  
AO2 – 2  
AO3 – 1

Explanation should refer to the formation of an ice lens or core beneath the dome shape which increases in size due to upward movement of additional water under pressure. The lens causes the doming at the surface and cracks to appear within the formation.

Alternatively, explanation may refer to the process of development beneath lakes. The lakes insulate the land below and prevent it from freezing. However, the lake infills as sediment is deposited in it, it loses its insulating effect and permafrost present around it begins to encroach it. This traps the sediment on the former lake bed, between the advancing permafrost. The trapped groundwater also freezes, forming a mass of ice that pushes up the former sediment of the lake bed.



**Level 1 (Basic) 1-4 marks**

Recognisable shape of a pingo.  
One or two labels describing shape.  
Begins to explain.  
Answer may be partial – and an emphasis placed on one element.  
Sequence will be incomplete.  
Some use of appropriate terminology present at the higher end.  
No sketch – Level 1.  
Open system description with closed system explanation or vice versa.

***CMI annotation***

***L1 Basic sketch***

***L1 Begins to explain***

**Level 2 (Clear) 5-7 marks**

Shape is clearly that of a pingo – will have some detail.  
Clear labels describing shape accurately, perhaps with reference to size.  
Response is more balanced with landforms being more fully explained.  
Explanation is clear.  
Sequence is complete so resulting landform is clear.  
Appropriate geographical terminology is used.

***CMI annotation***

***L2 Detail/accuracy in sketch***

***L2 Clear sequential explanation***

**2 (d)**

There is a need to focus on more recent developments as indicated in the question – these are oil (likely to be in Alaska), fishing and tourism.  
**Oil** is likely to relate to exploitation in Prudhoe Bay and the subsequent building of the trans-Alaska pipeline to Valdez and the 1002 lands within the Arctic National Wildlife Refuge where oil exploitation has been proposed. The need to build the pipeline to allow the oil to be taken to market is likely to be considered in the light of economic concerns – the need to secure supplies of oil, given issues in the Middle East and the size of the reserves – largest in North America. Environmentally, care was taken to construct the pipeline so that it runs above ground away from the permafrost for over half its length, with sideways movement permissible. Where it crosses beneath roads, or goes underground so as to avoid caribou migration routes, it is encased in thick insulation. The pipeline cost \$8 billion and shifts 1.4 million barrels maximum per day.  
**Fishing** has become much more feasible given developments in technology related to shipping (including factory ships that process the catch and freeze at sea), locating fish and clothing that allows people to cope with harsh conditions more effectively. Since 1960s Southern Ocean has been exploited for a variety of fish, such as Antarctic rock cod (now so depleted that it cannot be fished), icefish and more recently the Patagonian toothfish. There are limits put in place (maximum sustainable yield) but these are exceeded and it is believed that actual amounts taken are 5 times the official figures – 113000 tonnes in 2001 (87% krill and 13% Patagonian toothfish). The Patagonian toothfish is easy to overfish as it lives a long time – 40 years – but its reproduction rate is low.

**(15 marks)**

**AO1 – 8  
AO2 – 7**

Fish caught that are not required are also lost as are albatross caught on lines – which can be reduced by baiting at night. Krill is the staple of the marine ecosystem and if this is overfished there are implications for the whole food chain. It is believed to be at sustainable levels at present largely due to the break-up of the Russian fleet following the demise of the USSR. Fishing is monitored in the Southern Ocean by the Convention on the Conservation of Antarctic Marine Living Resources.

**Tourism** is likely to refer to Alaska or Antarctica – this has seen significant increase in recent years with over 6000 visitors in 1992-3 and over 37000 in 2006-7. Most visitors arrive by boat – usually relatively small, although some carry 960 passengers – and are taken ashore in limited numbers with well-versed guides, who inform an interested audience. It is an expensive destination – costing in excess of £4000 per person. No litter/waste is left and research suggests that seals and penguins are not affected by tourists (although terns appear to be). Landing sites – 95% are not damaged. There is the need for caution however as it is a fragile environment, the re-introduction of flights over the area may have an impact, marine pollution – the sinking of the M/S Explorer off southern Shetland Islands in 2007.

**Sustainability** should be an integral feature – whereby the use of the area does not lead to irrevocable environmental damage, but leaves it for future generations to experience. So too is the potential for economic sustainability, dependent on the activity and is linked to careful management.

**Level 1 (Basic) 1-6 marks**

Describes development(s).

Possible basic reference to sustainability/a definition of sustainability.

Points made are simple and random.

***CMI annotation***

***L1 Describes developments***

***L1 Defines sustainability***

**Level 2 (Clear) 7-12 marks**

Description of development(s) is more specific and precise.

Begins to target content to purpose.

Considers links to sustainability.

Points are supported in places.

Tentative/implicit assessment of 'to what extent'.

***CMI annotation***

***L2 Begins to link to sustainability***

***L2 Tentative/implicit two***

**Level 3 (Detailed) 13-15 marks**

Clear, purposeful description of more than one development.

An organised account that is purposeful in responding to the question.

Exemplification is used to support answers.

Clear, explicit and integrated links to sustainability.

Explicit assessment of 'to what extent'.

***CMI annotation***

***L3 Clear links between developments and sustainability***

***L3 Explicit twe – supported by evidence***

**Question 3**

- 3 (a)** There should be reference to the links between wind speed and wave height or to links between one or both of these and location for credit. There appears to be a relationship between wind speed and wave height – as wind speed increases, wave height increases. This is especially clear for sites A and E, and largely for B and C also. D is the exception with a much higher wind speed in comparison to wave height – being second highest in speed but fourth for height. Generally, the wind speed and wave height decrease eastwards, with D being the exception. B and C are quite similar, despite the position of C being further away from the coast. Openness /exposure of site valid. Relating to both elements of the relationship. Allow 2 marks for valid use of evidence – where figures are manipulated, not just lifted from the table.  
4 x 1 **(4 marks)**  
**AO1 – 2**  
**AO2 – 1**  
**AO3 – 1**

- 3 (b) (i)** **Figure 6a** – Spring tide. **(2 marks)**  
**Figure 6b** – Neap tide.  
**AO2 – 1**  
**AO3 – 1**

- 3 (b) (ii)** There should be reference to the gravitational pull of both the sun and the moon, which when aligned give higher high tide and lower low tide, increasing the range. When the sun and moon are at right angles to the Earth, the gravitational pull is less effective rather than aligned and so the high tide is less and the low tide is higher, giving a smaller tidal range.  
2 x 1 **(2 marks)**  
**AO1 – 2**

- 3 (c)** There should be a recognisable sketch showing a gently sloping (4-5 degrees) wave cut platform. **(7 marks)**  
Explanation should refer to the formation of a wave cut notch at the base of the cliff marking the tidal range/high water mark. This will be the result of hydraulic action and abrasion and possibly solution. The notch will increase in size, causing the overlying rock to overhang. This will ultimately collapse, causing the cliffs to retreat. In front of the cliffs is a gently sloping wave cut platform – this is the result of the retreat of the cliffs and is extended as the process of erosion of the cliff base continues.  
**AO1 – 4**  
**AO2 – 2**  
**AO3 – 1**

**Level 1 (Basic) 1-4 marks**

Recognisable profile/sketch of wave cut platform.

One or two labels describing wave cut platform.

Begins to explain.

Answer may be partial – and an emphasis placed on one element.

Sequence will be incomplete.

Some use of appropriate terminology present at the higher end.

**CMI annotation**

**L1 Basic sketch**

**L1 Begins to explain**

**Level 2 (Clear) 5-7 marks**

Clearly recognisable profile/sketch of wave cut platform.  
Clear labels describing wave cut platform.  
Explanation is clear.  
Sequence is complete so resulting landform is clear.  
Appropriate geographical terminology is used.

**CMI annotation**

**L2 Detail/accuracy in sketch**

**L2 Clear sequential explanation**

**3 (d)**

Sea level increase and its rate may form part of the answer – an increase of 1.8mm/yr between 1965 and 1993 and by 3.1mm/yr between 1993 and 2005. Predictions vary between 1990 and 2090 from 3.7mm/yr to 8mm/yr.

**(15 marks)**

The focus of the question is on the impact(s) of sea level rise. There may be reference to impact on **coastal processes and landforms**, with cliffs more susceptible to erosion encouraging cliff and coastal retreat and loss of land, homes threatened as on Holderness coast, continued drowning of river and glacial valleys to create rias and fjords.

**AO1 – 8**

**AO2 – 7**

**Ecosystems** may be threatened – wetlands, saltmarshes and sand dune areas will be at risk – and impact will depend on speed of rise and time available for adaptation behind advancing waters. There will be an impact on habitat of birds, insects and animals. NNR and SSSI will be at risk – many which provide breeding grounds and feeding areas for birds and seals.

Emphasis is likely to be on **flooding** with reference to areas at risk – in UK areas such as the Thames and Humber estuaries (and low lying areas in-between) or world (island countries such as Maldives, Seychelles, a 1 metre rise would inundate approx 25% of Bangladesh, coastal areas of Egypt within 30km of Mediterranean would be flooded with a 1m rise including Alexandria. These are densely populated areas and world cities such as London, Tokyo and Kolkata would be threatened in this context. Huge costs would be incurred as people were displaced, homes lost as well as businesses and the infrastructure. There will be an increased impetus for **management** and flood and erosion protection – increasing the cost of this. Decisions will need to be taken whether to allow the retreat of some areas or pay out for effective defences. Similarly, decisions will need to be made as to whether to focus on hard or soft engineering or both.

**Level 1 (Basic) 1-6 marks**

Identifies impact(s) of sea level increase.  
May drift onto cause or management per se or out of coastal area.  
Will focus on limited range – or have many, list like effects.  
Points made are simple and random.

**CMI annotation**

**L1 Identifies impact(s)**

**L1 Describes impact(s)**

**Level 2 (Clear) 7-12 marks**

Description of impact(s) is more specific and precise.  
Begins to target content to purpose.  
Begins to consider impact in an analytical way.  
Focus is on impact(s) and there is some engagement in debate.  
Some support is present in an organised account.

***CMI annotation***

***L2 More detailed desc/illustration***

***L2 Begins to discuss***

**Level 3 (Detailed) 13-15 marks**

Description of impact(s) is specific and precise.  
Clearly considers impact in an analytical way.  
Impact is to the fore and there is purposeful engagement in debate.  
Support is present.  
An organised account that is purposeful in responding to the question.

***CMI annotation***

***L3 Specific/illustrated description of impact(s)***

***L3 Clear discussion***

**Question 4**

**4 (a) (i)** Peak discharge is 90 cumecs and lag time between 1 hour and 1 hour 15 minutes.  
2 x 1 **(2 marks)**  
AO2 – 1  
AO3 – 1

**4 (a) (ii)** Rain is heavy and intense and so there is no time for infiltration. This gives rise to rapid surface runoff, meaning water reaches streams very quickly. Ground will be dry and baked, reducing the likelihood of infiltration further. After rain, evaporation rates high, reducing discharge quickly. Infiltration will begin to occur.  
2 x 1 / 1x(1+1) **(2 marks)**  
AO1 – 2

**4 (b)** There should be a recognisable sketch of wadi likely showing a narrow, steep sided valley, perhaps with much material within it and no stream or the presence of an intermittent/ephemeral stream. A wider, more gently sloping valley in lower course is also acceptable. **(7 marks)**  
AO1 – 4  
AO2 – 2  
AO3 – 1

Explanation should refer to the significance of the intermittent stream and the power that it has to erode due to its flashy nature. The energy generated allows large items of material to be eroded and subsequently transported by traction and a huge amount of material to be carried in suspension. As the river cannot be sustained due to the limited duration of the rainfall, the capacity and competence of the stream reduces and it becomes choked with the sediment it is transporting. This is then deposited, strewn along the bed to await the next rainstorm.

**Level 1 (Basic) 1-4 marks**

Recognisable shape of a wadi.

One or two labels describing shape.

Begins to explain.

Answer may be partial – and an emphasis placed on one element.

Sequence will be incomplete.

Some use of appropriate terminology present at the higher end.

***CMI annotation***

***L1 Basic sketch***

***L1 Begins to explain***

**Level 2 (Clear) 5-7 marks**

Shape is clearly that of a wadi – will have some detail.

Clear labels describing shape accurately.

Response is more balanced with landform being more fully explained.

Explanation is clear.

Sequence is complete.

Appropriate geographical terminology is used.

**CMI annotation**

**L2 Detail/accuracy in sketch**

**L2 Clear sequential explanation**

- 4 (c)** Areas at greatest risk from desertification are generally located adjacent to existing deserts. This is clearly the case adjacent to the Sahara – where there is the largest continuous area at risk to the south (the Sahel) – and Namibia, Western Australia and those in USA. Some adjacent areas appear not to be at risk – e.g. southern side of the Arabian Desert. The main areas at risk are around the Tropics, but desertification risk is clearly not confined to these areas in USA. (4 marks)
- AO1 – 2  
AO2 – 1  
AO3 – 1
- 4 x 1
- 4 (d)** Likely to begin by defining desertification – the expansion of the desert into areas that previously would not have been classified as part of it. The process is seen as being long-term (unlike drought) and has serious repercussions for people as the ability of land to be productive effectively has disappeared – in a temporary or even permanent sense. The focus of the question is on the discussion of the impacts of the process. (15 marks)
- AO1 – 8  
AO2 – 7
- Land** – a critical effect is soil erosion caused by removal of vegetation and exposure of the topsoil to wind and water enabling its removal. Without topsoil, fertility declines. The presence of salts, especially at the surface due to limited rain and at times irrigation reduces the fertility of the soil further. Gullies form and carve up the landscape following removal of vegetation and soil. Sand dunes extend or form due to increasing amounts of sand in the landscape.
- Ecosystems** – areas become devoid of trees – around Khartoum it is thought that this extends in a 90km radius. As trees are taken for fuelwood and regrowth is not easy in areas of desertification, the key species are depleted – especially climatic climax vegetation – and diversification is threatened.
- People** – droughts over a long period of time have led to famines, especially in 1968 – 74 and 1979 – 84. 100 000 people died during these periods in the Sahel. Food shortages remain a problem in the Sahel especially, with declining productivity due to the problems outlined above. There has been much international aid – some of which has tried to look at long term improvements as well as emergency aid from governments and charities. Out-migration from the areas has occurred as conditions remain difficult and population growth makes long term improvements difficult to sustain.



**Level 1 (Basic) 1-6 marks**

Describes one/two impacts of desertification.

May drift onto cause.

Will focus on limited range – or have many list like effects.

Points made are simple and random.

***CMI annotation***

***L1 Identifies impact(s)***

***L1 Describes impact(s)***

**Level 2 (Clear) 7-12 marks**

Description of impacts is more specific and precise.

Begins to target content to purpose and addresses at least 2 categories given in question.

Begins to consider impact in an analytical way.

Focus is on impacts and there is some engagement in debate.

Some support is present in an organised account.

***CMI annotation***

***L2 More detailed desc/illustration***

***L2 Begins to discuss***

**Level 3 (Detailed) 13-15 marks**

Description of impacts is specific and precise.

Content clearly related to purpose throughout – 3 categories given are addressed.

Clearly considers impact in an analytical way.

Impacts are to the fore and there is purposeful engagement in debate.

Support is present.

An organised account that is purposeful in responding to the question.

***CMI annotation***

***L3 Specific/illustrated development of impacts***

***L3 Clear discussion***

**SECTION B**

**Question 5**

- 5 (a) (i)** There is a need to make clear contrasts between the two areas chosen. **(4 marks)**  
Individual description awarded up to 2 marks only. Reference may be made to any (housing) characteristics such as age, type, size (qualified), number of storeys, specific features such as type of windows, building materials, garages, gardens, drives, environment immediately adjacent to houses, etc. Features described must be visible in Figure 9. Clear, explicit contrasts supported by evidence can attract 1 + 1 mark.  
4 x 1/1 + 1 x 2  
**AO1 – 1**  
**AO2 – 1**  
**AO3 – 2**
- 5 (a) (ii)** Suggested reasons are likely to relate to contrasting time periods, areas where built and the impact of this e.g. inner area houses did not have gardens due to lack of leisure time, builders sought to build at high density to make more money; or relate to those for whom the houses were built – likely jobs the residents have and level of wealth, first time buyers or families, role of local authorities – leading to improvements in housing versus private developers building new houses; changes that may have taken place – such as splitting up/renting out terraces in inner-city areas and use of village areas by commuters, or the amount of land available and cost of land. **(4 marks)**  
**AO1 – 2**  
**AO2 – 2**  
4 x 1/1 + 1 x 2
- 5 (b) (i)** Infant mortality is the number of deaths under the age of 1/ per 1000 live births per year. **(2 marks)**  
**AO1 – 2**
- 5 (b) (ii)** Natural population change clearly varies – it is, with one exception – Russia – positive. Rates vary – being highest – over 2 in African country of Nigeria. Lowest rates occur in richest area of UK with China being the exception in this context. Generally, areas with low infant mortality rates have low increases or a decrease – UK and Russia. China is an exception with a natural increase of 0.5 but an infant mortality rate over 20. Countries with high rates of increase generally have high rates of infant mortality – Nigeria and India. This suggests a higher rate of births where there are higher numbers of infant deaths. Comment should refer to possible links to other data items, reasons or an assessment of extent of variation, implementation of population policies. **(5 marks)**  
**AO1 – 2**  
**AO2 – 2**  
**AO3 – 1**

**Level 1 (Basic) 1-3 marks**

Describes information shown in table.  
Refers to individual countries.  
May be general and random.  
Will emphasise natural change.  
Comment, if present, will be tentative.

***CMI annotation***

***L1 Describes info – focus on natural change***

**Level 2 (Clear) 4-5 marks**

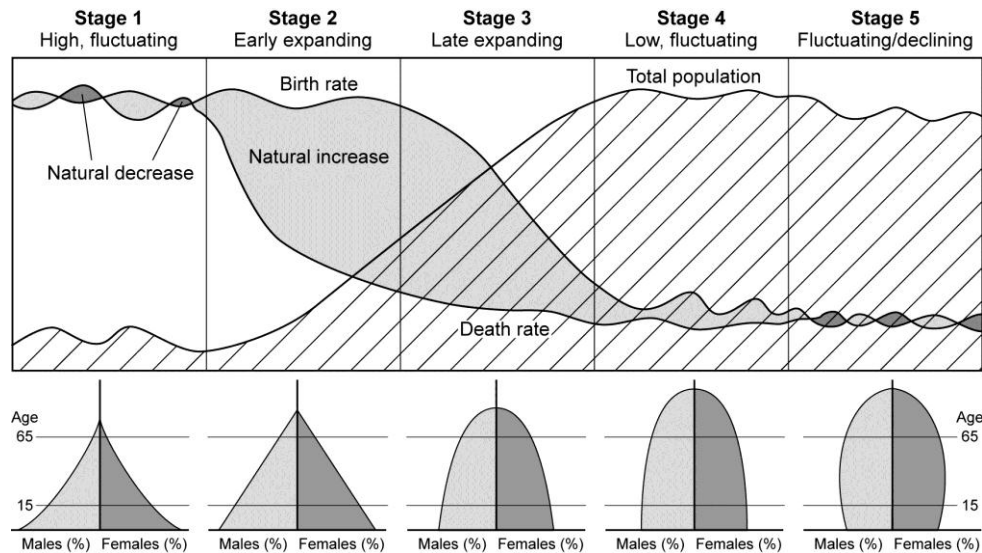
Description of rates of population change is clear and supported by evidence. Considers in the light of other information – such as births, deaths, imm or notes of anomalies.

Clear, explicit comment.

**CMI annotation**

**L2 Reference to other info; comments**

- 5 (c)** Structure of answer is given in the question. There is likely to be reference first to how population structure changes throughout the stages of the DTM, with a narrowing base, an increase in height and width and an overall change in the shape from concave expanding profile to a stable, convex pyramid to a contracting one (see diagrams). There may be reference to a country, such as the UK, and how it has changed over time or different countries as they are today at different stages may be used to illustrate. **(15 marks)**
- AO1 – 8**  
**AO2 – 7**



**Level 1 (Basic) 1-6 marks**

Describes DTM or population structure only.  
Describes the population structure for 2 stages of DTM – likely to be 2 and 4.  
DTM and population structure separate.  
General statements – applicable to any area.  
Points made are simple and random.

**CMI annotation**

**L1 Describes DTM and/or population structure**

**L1 Two aspects separate**

**Level 2 (Clear) 7-12 marks**

Description focuses on change – may relate to only 2 stages of DTM.  
Begins to link DTM and population structure – increasing through the level.  
Points are supported in places.  
Tentative/ implicit comment/analysis as changes examined.

**CMI annotation**

**L2 Begins to link structure to stages in model**

***L2 Tentative/implicit examination***

**Level 3 (Detailed) 13-15 marks**

Clear, purposeful summary of changes, considering at least 3 stages of DTM.

Purposeful in responding to the question - explicit links between stages and population structure.

Support is present throughout.

Clear, explicit comment/analysis as changes examined.

***CMI annotation***

***L3 Clear links between structure and stages in model***

***L3 Clear/explicit examination***

**Question 6**

- 6 (a)**      **Intensive arable** farming is concerned with the growth of crops, such as rice and wheat, whilst **pastoral** involves the rearing of animals, such as cattle and sheep. Intensive farming occurs where there is an attempt to maximise output via high inputs of labour – as with rice growing – or capital, machinery and fertilisers as with the growth of wheat in East Anglia. **Extensive pastoral** farming involves the use of large amounts of land, with limited inputs and outputs. A level of production is accepted below that of maximum, as with sheep rearing in Australia, pastoral nomadism in north Africa. **(4 marks)**
- Maximum of 3 on either aspect. **AO1 – 4**  
4 x 1; 2 x (1 + 1), any combination.

- 6 (b)**      Answers should recognise how appropriate technology has led to an increase in food production – by providing a source of water that is reliable and allowing production of a variety of food crops for the poorest residents. There should be consideration of the advantages of the scheme – it uses rainwater – free and available locally, a simple pump that is solar powered so that it is small scale and available to all, with no need for detailed technical knowledge to set it up or to maintain it. The power is renewable and cheap. **(5 marks)**

**Level 1 (Basic) 1-3 marks**

One advantage.

Describes how food supply is to be increased.

Some (tentative), separate reference to advantages.

May rely heavily on Figure 11.

**CMI annotation**

***L1 Describes how food supply increased***

***L1 Relies on Figure 11***

**Level 2 (Clear) 4-5 marks**

Clear awareness of how food supply will be increased.

Purposefully links this to advantages of appropriate technology.

Clear statement of advantages in this context.

Uses own knowledge as well as Figure 11.

**CMI annotation**

***L2 Aware of advantages of app tech in increasing food prod***

***L2 Uses own knowledge***

- 6 (c)** GM crops are engineered so that they develop certain characteristics that allow the seeds/crops to flourish – e.g. by making the strain resistant to diseases or pests, by encouraging the growth of a plant that likes water by modifying it to include gene of a plant that is drought resistant. These potentially offer solutions to the limited amount of food in certain parts of the world – if crops can be grown in semi-arid areas for example. They have been accepted in USA, Australia and in China where they offer huge potential for feeding the population and encouraging its development with GM varieties of rice. However, there has been opposition in Europe, with UK to the fore. There are concerns that the genes are transferable between GM and non-GM crops, contaminating these and perhaps speeding up insecticide resistant pests. Organic farms may lose their status if contaminated and superweeds could result as well as the cross-breeding with wild plants. There are uncertainties about impact on human health. Reference to livestock is also a valid response. **(6 marks)**

**AO1 – 3**  
**AO2 – 3**

**Level 1 (basic) 1-4 marks**

Describes features of genetic modification of crops.

Describes advantages.

Sees aspects of characteristics and increasing food production separately.

May add tentative comment.

**CMI annotation**

**L1 Describes GM and/or advs**

**Level 2 (Clear) 5-6 marks**

Description is clear and purposeful, with clear links to food production and makes a case for success.

May be aware of potential disadvantages/limited acceptance in certain areas.

Clear comment on whether it is successful, partly successful etc linked to content of answer.

**CMI annotation**

**L2 Links GM to food prod increase**

**L2 Clear comment**

- 6 (d)** Environmental impacts likely to be referred to are food miles, the trade in seasonal foodstuffs and the increasing carbon footprint. This should be supported with reference to specific foodstuffs imported into the UK for example and the distances travelled and impact – especially of use of air freight. Some may recognise that this may be a better option than storing apples for almost a year and the costs incurred in this to keep appropriate temperatures. There may be reference to the need to cut down areas of forest, such as Amazon to provide land for cattle rearing and environmental impact of this linked to forest itself, climate and soil. There is similar adverse impact on soils where cattle feed is grown in poorer countries for export to richer ones – so called ‘ghost acres’ as monoculture depletes fertility. Cattle also require vast quantities of water and implications of this. **(15 marks)**

**AO1 – 7**  
**AO2 – 8**

**Level 1 (Basic) 1-6 marks**

Describes environmental impact(s) of food production.

May be tenuous link to global trade.

Points made are simple and in a random sequence.

***CMI annotation***

***L1 Identifies impacts***

***L1 Describes impacts***

**Level 2 (Clear) 7-12 marks**

Begins to target information to purpose in an ordered response.

Will link impacts to global trade.

Points are made with some support.

Begins to discuss/debate.

***CMI annotation***

***L2 Begins to link to global trade***

***L2 Begins to discuss***

**Level 3 (Detailed) 13-15 marks**

Clear, purposeful description of environmental impacts linked to global trade in foodstuffs.

Support is given throughout.

Clear, explicit discussion.

***CMI annotation***

***L3 Clear links to global trade***

***L3 Clear discussion***

**Question 7**

**7 (a)** Primary energy is that in its raw material and therefore unprocessed form. It includes wood, fossil fuels and (nuclear – ) uranium, as well as renewable sources such as solar, tidal. Some of these may be burnt directly – such as wood, coal, oil and gas or they may be manufactured/converted into secondary sources – such as electricity for commercial, industrial and domestic use and petrol for transport. **(4 marks)**  
4 x 1; 2 x (1 + 1), any combination. **AO1 – 4**

**7 (b)** Expect reference to the UK, possibly Germany, France, China or Brazil. There should be reference to the sources of primary energy, with relevant proportions of primary sources. E.g. for UK in 2004, natural gas was narrowly ahead of oil (38% versus 35%), followed by 16% for solid fuels (coal). (This is despite huge reserves of coal but deemed too expensive to extract – cheaper to import and coal seen as a ‘dirty’ fuel). 9% for nuclear and only 2% for all renewables. This is very low given the variety available and the resource potential in UK. There may be reference to change over time. Comment should recognise the relative importance of different sources, suggest why some are more important than others or consider reasons for changes. **(6 marks)**  
**AO1 – 3**  
**AO2 – 3**

**Level 1 (Basic) 1-4 marks**

Defines/describes features of energy mix.  
Description is appropriate for country.  
Some awareness of relative proportions at top end.  
May be a tentative comment.

**CMI annotation**

**L1 Defines energy mix**

**L1 Describes energy mix**

**Level 2 (Clear) 5-6 marks**

Description of energy mix is clear and purposeful.  
Clear specific reference to country, partly supported with figures.  
Clear comment on relative proportions in mix, reasons for mix or changes and reasons.

**CMI annotation**

**L2 Clear specific desc**

**L2 Clear comment**

**7 (c)** The extract looks at the search for new resources of oil. It refers to Russia placing a flag on the bed of the ocean and claiming the area as Russian territory. Significantly, beneath this area are many tonnes of oil and gas in an area that is not really owned by any country. The ‘statement’ by Russia is the signal for other countries to dispute the claim or consider similar claims (especially those adjacent to the Arctic Ocean) as the race is on to find new, accessible resources given technology in 21<sup>st</sup> century. **(5 marks)**  
**AO1 – 1**  
**AO2 – 2**  
**AO3 – 2**



**Level 1 (Basic) 1-3 marks**

Describes events in Figure 12.  
Some (tentative), separate reference to conflict.  
May rely heavily on Figure 12.

***CMI annotation***

***L1 Describes events***

***L1 Relies on Figure 12***

**Level 2 (Clear) 4-5 marks**

Clear awareness of how events in Figure 12 illustrate conflict.  
Uses information to support illustration.

***CMI annotation***

***L2 Uses info in Figure 12***

***L2 Clear links/reference to conflict***

- 7 (d)** A definition should be expected – where appropriate technology is seen as fitting to the level of wealth, expertise, demand and resources available. Although often used interchangeably with intermediate technology, this term refers as it says to a specific level, whereas appropriate technology can include high technology if countries are clearly wealthy and have necessary resources. The concept needs to be seen in the context of providing sustainable development – i.e. facilitating progress/growth that is long term, where needs of future generations are not compromised and the environment is not harmed. Content will depend on examples studied, but likely to include reference to: the growth of renewables – including biomass fuels – in Brazil, USA, China and others (clean, readily available, cheap but take land out of food production, has an impact on levels of pesticides and fertilisers and leads to monoculture); development of solar, wind, tidal and HEP options – at different scales – e.g. large scale wind farms in USA, growing in importance in UK, China and India; photovoltaic cells used to convert light to electricity in California and Spain and use of solar cookers in sub-Saharan Africa. The use of small wind turbines and solar panels linked to housing developments may be discussed. Nuclear energy can also feature where the technology exists. It is a long term option if carefully managed and used significantly in France, for example. A case could be made for coal in China with reference to its economic growth, but at a substantial environmental cost. Large scale developments such as dams and reservoirs for HEP may be considered in different settings – USA versus China. There may be reference to the development of more efficient technology that can reduce consumption – such as more fuel-efficient cars, less wastage of energy, low energy light bulbs etc.
- (15 marks)**  
**AO1 – 7**  
**AO2 – 8**

**Level 1 (Basic) 1-6 marks**

Defines appropriate technology and/or sustainable development.  
Describes one or two appropriate technology methods briefly e.g. renewable.  
Limited support.  
Links to question are tentative.  
Points made are simple and in a random sequence.

***CMI annotation***

***L1 Defines app tech/sust dev***

***L1 Desc app tech***

***L1 Ideas separate***

**Level 2 (Clear) 7-12 marks**

Understands concepts of appropriate technology and/or sustainable development.  
Begins to develop points and sequence them.  
Offers some support.  
Engages with theme and considers clearly at least one appropriate technology method (in detail) or two if more superficial.  
Tentative/implicit assessment of 'to what extent'.

***CMI annotation***

***L2 Begins to link app tech to sust dev***

***L2 Tentative/implicit tve***

**Level 3 (Detailed) 13-15 marks**

Clearly understands concepts of appropriate technology and sustainable development.  
Develops points and sequences them.  
Purposeful response with support present.  
Focus is on co-operation with necessary exemplar material.  
Clear/explicit assessment of 'to what extent'.

***CMI annotation***

***L3 Clearly links app tech to sust dev***

***L3 Clear/explicit tve***

**Question 8**

**8 (a)** Mortality refers to deaths within the population. It is measured by the crude death rate – the number of deaths per 1000 population per year or by age specific rates such as the infant mortality rate or case mortality rate – linked to a specific cause. In contrast, morbidity relates to the ill-health of the population. This is from a register of certain infectious diseases, such as cholera, flu or derived from census data when people have to categorise their general state of health and whether they have a limiting long-term illness. **(4 marks)**  
**AO1 – 4**  
4 x 1; 2 x (1 + 1), any combination.

**8 (b)** There is a wide range in both the worst and best figures – the greater range being in the worst – of 51.6 on the scale – compared to 17.9 for the best. Four of the worst figures are in excess of 100 with the worst – Southwark North and Bermondsey 14.9 ahead of the second worst in Glasgow Shettleston. The worst areas appear to be confined to major urban areas – and a concentration within them of Glasgow – with more than half, followed by Manchester based ones with 2. The best areas are more widespread, but are more orientated to the southern half of England, especially areas around London – such as areas of Oxfordshire, Buckinghamshire and Essex. Overall, there is a huge range, with the worst being almost double the UK average and the best being about half of it. The best figures are in relatively rural areas of e.g. South Norfolk and parts of Gloucestershire. Comment likely to refer to relative differences between figures and/or location aspects. **(6 marks)**  
**AO1 – 2**  
**AO2 – 2**  
**AO3 – 2**

**Level 1 (Basic) 1-4 marks**

Describes information in Figure 13. Refers to a limited number of locations. May be generalised or detailed, begins to have an overview at the top end. May be a tentative comment.

***CMI annotation***

***L1 Desc info in Figure 13***

***L1 Begins to have overview***

**Level 2 (Clear) 5-6 marks**

Clear, purposeful description of data.  
Points made are supported with evidence.  
Clear, relevant comment.

***CMI annotation***

***L2 Points supported with evidence***

***L2 Clear comment***

- 8 (c)** Response will depend partly on disease studied – CHD and Type 2 diabetes are likely to be selected. May look at cancer, stroke, obesity, mental health. Impact on health – likely to shorten life expectancy, reduce quality of life as a result of ill-health. CHD will lead to increase in breathlessness and blood pressure. Lifestyle will suffer as a result – exercise will become difficult – even walking short distances ultimately will become a struggle. Thus, the person will be unable to work and take care of basics such as going shopping without the need for help or transport. Sufferers will struggle to be independent and may rely on carers – either from within the family or externally. Should be clear reference to one disease as this is a requirement of the specification. **(5 marks)**

**AO1 – 2**  
**AO2 – 3**

**Level 1 (Basic) 1-3 marks**

Describes impacts – probably in a random order – may only consider one category.

General points with limited support.

**CMI annotation**

**L1 Identifies/lists impacts**

**L1 Describes impacts**

**Level 2 (Clear) 4-5 marks**

Aware of varied impacts – will categorise into health and lifestyle.

Specific, elaborated points with support.

**CMI annotation**

**L2 Both categories described**

**L2 Some support**

- 8 (d)** **Famine** –when there is an inadequate **amount** of food available so that extreme hunger and potentially death results. In simple terms, the **cause** relates to a shortage of food and the underlying reasons for this. There is likely to be reference to the environmental aspects of drought and possibly other natural hazards linked to food shortages – drought in sub-Saharan Africa is likely to feature as an example with famines between 1968 – 74, 1979 – 84 and Ethiopia's severe drought of 1984 – 5 and then 2000; the impact of drought in 2005 in Chad and Niger. Underlying causes related to failure of rains, impact on groundwater and crops and livestock should be considered. Population increase outstripping food supply is another likely consideration, especially when linked to refugees – a sudden influx of migrants. No matter what the circumstances are within a country, not all people face famine and more perceptive should refer to the economic and social aspects – related to the poor being the most likely to suffer the problems with the distribution of food and the price level too high for the poorest in society. In Niger 61% of the population live on less than \$1 a day and the country's wealth is concentrated in 20% of population. Government policy does little to break the cycle of poverty and so they are also culpable in terms of cause. There may be reference to war, corruption, poor distribution of aid. **(15 marks)**

**AO1 – 7**  
**AO2 – 8**

**Consequences** may refer to direct effects such as death of livestock, scarcity of food such as milk, increasing food prices, death of people, out-migration, a shift to both camps and cities and subsequent impacts there – living conditions, malnutrition. Reference to large international aid efforts which may be seen in the push to eradicate hunger – Millennium Development Goals – short term – emergency aid, longer term access to resources, irrigation etc also education regarding improved farming techniques and higher yielding varieties of seeds and possibly linked to controlling population growth and health. There needs to be organisation to facilitate the fair distribution of aid with an appropriate infrastructure and targeting of those in greatest need.

**Level 1 (Basic) 1-6 marks**

Describes causes and/or consequences of famine.

Points are simple and random.

Limited support.

***CMI annotation***

***L1 Identifies causes and/or consequences***

***L1 Describes causes/and or consequences***

**Level 2 (Clear) 7-12 marks**

Begins to target information to purpose in an ordered response.

Begins to develop points, with some reference to causes and consequences, although may be imbalanced.

Points are made with some support.

Begins to discuss/debate.

***CMI annotation***

***L2 Some support for causes/consequences***

***L2 Begins to discuss***

**Level 3 (Detailed) 13-15 marks**

Clear, purposeful description of both causes and consequences with a degree of balance.

Support is given throughout.

Clear, explicit discussion.

***CMI annotation***

***L3 Detail on causes and consequences and support***

***L3 Clear explicit discussion***