



ASSESSMENT and
QUALIFICATIONS
ALLIANCE

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GCE

Geography A

Unit GGA1

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Unit 1: Core Concepts in Physical Geography

General guidance

Quality of Written Communication

As required by QCA, the marking scheme for this unit includes an overall assessment of quality of written communication. There are no discrete marks for the assessment of written communications but where questions are “Levels” marked, written communication will be assessed as one of the criteria within each level.

- Level 1:** Language is basic, descriptions and explanations are over simplified and lack clarity.
- Level 2:** Generally accurate use of language; descriptions and explanations can be easily followed, but are not clearly expressed throughout.
- Level 3:** Accurate and appropriate use of language; descriptions and explanations are expressed with clarity throughout.

Levels marking – general criteria

The following general criteria relate to knowledge, understanding and their critical application and the quality of written communication as outlined in the AQA Geography A subject specification. They are designed to assist examiners in determining into which band the quality of response should be placed, and should be used when assessing the level of response an answer has achieved. It is anticipated that candidates’ performances under the various dimensions will be broadly inter-related and the general guidelines for each level are as follows:

- Level 1:** An answer at this level is likely to:
- display a basic understanding of the topic;
 - make one of two points without support of appropriate exemplification or application of principle;
 - demonstrate a simplistic style of writing perhaps lacking close relation to the term 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:** 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;
 - 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:** 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;
 - 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.

NB: A perfect answer is not usually required for full marks. Clearly it will be possible for an individual candidate to demonstrate variable performance between the levels. In such cases the principle of best-fit should be applied. Experience suggests that the use of exemplars within this mark scheme and the discussion which takes place during the Standardisation Meeting normally provides sufficient guidance on the use of levels in marking.

Annotation of scripts

- Where an answer is marked using a levels of response scheme the examiner should annotate the script with 'L1', 'L2' or 'L3' at the point where that level is thought to have been reached. The consequent mark should appear in the right hand column. Where an answer fails to achieve Level 1, zero marks should be given.
- Where answers do not require levels of response marking, each script should be annotated to show that one tick equals one mark. It is helpful if the tick can be positioned in the part of the answer which is thought to be credit-worthy.

General advice

It is important to recognise that many of the answers shown within this marking scheme are only exemplars. Where possible, the range of accepted responses is indicated, but because many questions are open-ended in their nature, alternative answers may be equally credit-worthy. The degree of acceptability is clarified through the Standardisation Meeting and subsequently by telephone with the Team Leader as necessary.

Question 1

(a) (i) Overall trend is increasing. **1 mark**

Use of values: must relate to trend line, not individual bars. **1 mark**

Or below the average line in mid 1970's above the average line in 1990's. **1 mark**

Alternatively for one mark, could refer to fluctuations between 1961 and 2001. **1 mark (2 marks)**

(ii) This is a PHYSICAL QUESTION and relates to processes listed to heavy rain.

Acceptable processes are:

Evapotranspiration/Interception/Infiltration/Throughflow/Percolation/
Overland Flow

- When precipitation exceeds evapotranspiration there is a water surplus (1 mark)
- After persistent and heavy rainfall the stores become filled and more water enters the river, causing it to overflow its banks. (1 mark).
- one mark max. for correct understanding of the relationship of the processes.
- **Evapotranspiration** – will be reduced if temperatures are relatively low, also if vegetation is bare of leaves there will be less uptake by vegetation and lower rates of transpiration. More precipitation will be available for rivers (up to 2 marks).
- **Interception** – interception is reduced during heavy, persistent rain because leaves can hold only a certain amount of water. Beyond this point, water will drip down to the ground as stem flow and leaf drip, hence more water available for infiltration/percolation and overland flow. (up to 2 marks).
- **Infiltration and/or Percolation** – Infiltration and percolation occur until the storage capacity of the soil or rock is reached. When soil/rock is saturated no more water can soak into the soil/rock and so water travels as overland flow to rivers (up to 2 marks)
- **Throughflow** – water travels horizontally through the soil, particularly on slopes, pulled by gravity towards rivers. With heavy rain when soils are saturated throughflow occurs rapidly and feeds rivers, contributing to flooding (up to 2 marks).
- **Runoff** = precipitation – (evapotranspiration ± changes in storage) (do not expect to see this but if you do credit with 2 marks)
- Types of precipitation, e.g. snow where run off might be delayed. **(6 marks)**

2 basic marks available for the first 2 bullet points.

Further credit is available for elaborated points linked to

Evapotranspiration/Interception/Infiltration/Percolation and throughflow.

6 marks are available without the first two basic points.

(b) **Human consequences**

LEDW **WHY:** Little warning, few flood protection scheme, inadequate rescue services, few covered by insurance. Many subsistence farmers in LEDW rely on growing their own food.

HOW: crops ruined, particularly damaging to subsistence farmers. However, flooding might be relied upon for rice farming so could be a positive consequence. Need for foreign aid after large scale flood. Possible longer term effects. Many lose their homes, lives. Secondary diseases, eg cholera. Social costs high. Disruption of transport, bridges destroyed. Economic losses – lower value than MEDW.

MEDW **WHY:** Better developed early warning monitoring systems of weather and river levels (eg UK's Environment Agency). Many flood protection schemes, particularly in built-up areas. Most people/businesses covered by insurance. Emergency services eg fire service can cope, evacuate and drain flooded premises. Army often brought in to assist. In MEDW most people work in Tertiary/Secondary industry few rely on subsistence crops. When flooding does occur economic impact might be high because ruined buildings/cars are of a high value

HOW: Disruption of communications and industry situated on floodplains, economic costs high eg cost of insurance claims. Farmers might have to move animals, some crops might be ruined but less so than in the LEDW as flooding often occurs out of the growing season. Few will lose their homes or their lives. Temporary disruption, social costs limited.

- Level 1** Simple comparison between un-named or inaccurate countries. E.g. LEDCs are poor countries, many crops, which people rely on, are ruined. Flooding leads to many deaths, as people are not warned. May describe the effects of flooding. Both examples from the MEDW/LEDW – Top of L1 max. **1-3 marks**
- Level 2** More effective answer, which begins to address why a greater range of consequences occur. Mentions a relevant country but lacks detail. E.g. LEDCs, such as Bangladesh flooding is a regular event. Many live on the floodplains and rely on rice as their main food crop. Flooding can destroy the crop, which will cause economic problems and may lead to starvation and malnutrition because people rely on the harvest. May be unbalanced towards the UK or a LEDC. Concentrates on WHY. **4-5 marks**
- Level 3** Convincing argument. Is able to explain why the effects differ and can use a relevant example with a certain amount of factual detail. E.g. Large scale flooding has been experienced recently in the UK during the autumn of 2000, when rivers such as the Severn flooded on more than one occasion. Economic problems resulted from the disruption to major communication routes, and many farmers were forced to move their livestock. After the event costly insurance claims caused many companies to raise their premiums. However, the consequences were relatively short term compared to the flooding in Mozambique in 2000. Human costs were limited because the UK has emergency services which can quickly evacuate people at risk. **6-7 marks**
- (7 marks)**

Question 2

- (a) (i) 1 mark for sketch which must be v shaped and the base of the valley must lie above 100m for credit.

1 mark for a label, e.g. v shaped/steep valley sides/narrow valley floor, using arrows or labelled directly on to the diagram.

(2 marks)

- (ii) A – B - dominant erosional processes - Vertical erosion
Headward erosion

C – D – dominant erosional processes – Lateral erosion

(Up to 2 marks for processes named and correctly located)

A – B – Landforms which can be outlined for up to 2 marks:
Potholes – downcutting in the river bed, pothole drilling
V-shaped valley – boulders in river bed are transported during heavy flow and scour into the river bed therefore downcutting.
Waterfalls/Rapids – can be explained as either headward or vertical erosion.
Gorges – linked to either headward or vertical erosion.

C – D Landforms which can be linked to Lateral erosion.
 Meander formation, outside bend, creation of river cliff.
 Ox-bow lake can be credited as neck of meander is broken through by erosion.
 Bluffs – where interlocking spurs have been cut off by lateral erosion on the valley sides.

- For correct processes at A-B and C-D 1 mark for naming each process (2 marks max).
- For landforms at A-B 1 mark for naming landform and 1 mark for elaboration. (2 marks)
- For landforms at C-D, 1 mark for naming landform and 1 mark for elaboration (2 marks).
- Up to 3 marks for 1 well elaborated.

(6 marks)

- (b) Deposition occurs when there is a sudden drop in the competence/velocity of a river. When the river slows down it is unable to carry its load so it is deposited. This can happen anywhere along the course of a river, particularly if the river is affected by variations in flow, for example when discharge is increased following a period of heavy rainfall/after snow melt, when discharge is reduced/after a dry spell of weather/ when the load is suddenly increased after a landslide/river floods overflowing its channel etc/sudden decrease in gradient.
Upper Course/boulders on the river bed/braiding or eyots/alluvial fans.
Middle course/predominantly on the inside bends of meanders
Lower course/levees/braiding/cut off meanders – ox-bow lakes.
Allow the development of deltas.

Level 1 Describes features of deposition, but these may be restricted to the lower course. Basic understanding of why deposition occurs. **1-3 marks**

Level 2 Understands why deposition occurs and makes some reference to middle and lower course. One factor causing deposition throughout the profile covered well, (probably a decrease in the amount of water in the river or sudden drop in velocity). **4-5 marks**

Level 3 Well focused on the question, explains more than one factor which can cause rivers to deposit. May cover deposition in the upper course, at the top of Level 3. **6-7 marks**

(7 marks)

Question 3

- (a) (i) • Partial evidence because the number of extreme events are only compared over a short space of time (from 1990's to 2000).
1 mark + 1 for elaboration. (2 marks).
- However number of extreme events has clearly increased over the timescale (1 mark) / almost doubled between 1990's and 2000 (1 mark) – gone up by 192 (1 mark).
- Other factors such as urbanisation, El Nino might be the cause of increased flooding (up to 2 marks). (2 marks)
- (ii) • Flooding – a relatively short term event (1 mark) . In MEDW people can be evacuated for short periods and floods can be monitored.(1 mark)
- Flooding – many rivers are at least partly protected by flood protection schemes (1 mark) which limit the effects of floods particularly in urban areas where population densities are high (1 mark)
- Drought – long term event. In the LEDW drought may last for years, (1 mark) so people's lives are effected for a long time, particularly if they are subsistence farmers growing crops to live on. No water means no crops and therefore no food. People suffering from mal-nutrition are more susceptible to disease (1 mark). People can't be evacuated in large numbers for long periods (1 mark).
- Drought – often widespread but flooding is more localised, around rivers. Drought may cover a national area.
Any combination (4 × 1) (2 × 2). (4 marks)
- (iii) **Floods** – Polar ice caps melting linked to global warming and rising sea levels (1 mark), thermal expansion of water/more water (1 mark). Low lying areas, e.g. Bangladesh, Holland, will be under water (1 mark)
- Floods** – can also be linked to higher precipitation / more intense rainfall in certain areas (1 mark) linked to a rise in ocean temperatures (1 mark).
- Storms** – violent storms linked to warmer ocean temperatures (1 mark) and instability of air masses / more energy available in the atmosphere from warming (1 mark).
- Landslides** – linked to higher precipitation levels (1 mark), slopes become saturated and unstable and landslides result (1 mark).
- Droughts** – tropics and sub-tropics will become warmer and dryer, high pressure climate belts will expand (1 mark). Sahara expected to shift northwards into the Mediterranean (1 mark). Great plains of the USA is another area expected to become drier (1 mark).

(2 × 1 mark) (2 marks)

(b) International NOT National in this question. (Do not credit Ozone)

Policies; Rio Summit (1992) – 150 nations signed treaties aiming to reduce green house effect. Evaluation – as they were non-binding many failed to act. Set up UN Commission on sustainable development to monitor the progress of countries.

Kyoto conference – late 1997 – Kyoto Protocol was a compromise agreement signed by 84 nations, aiming to reduce CO₂ emissions (by 5.2%) by 2010. US and Australia reneged.

Johannesburg Earth Summit – 2002 – to agree to implement Rio Agreement.

Evaluation: Limits only applied to MEDCs, mainly LEDCs such as China are big polluters. USA has not reduced its emissions, preferring to purchase carbon credits from other countries who have reduced their emission significantly. Politically unpopular.

Level 1 Concentrates mainly on the strategies used to help reduce global warming/emissions, e.g. use of catalytic converters, more public transport, probably on a national scale. Answer is not focused on the international aspect of the question. **1-3 marks**

Level 2 Acknowledges the international emphasis of the question, knows about international agreements but precise detail is lacking e.g. the USA promised to cut its emissions at a conference but prefers to buy carbon credits from other countries. Evaluation might be rather weak, does not directly say how successful these policies have been. **4-5 marks**

Level 3 An answer at this level refers to conference/agreements such as Kyoto and Rio accurately. An obvious attempt is made to evaluate the success, or more likely lack of success, of recent treaties. **6-7 marks**

(7 marks)

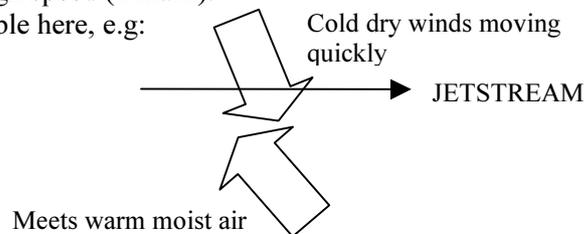
Question 4

- (a) (i) Violent storm / fierce hailstorm / gale force winds / very strong winds / torrential rain / spiralling winds / violent updraught in the centre / decrease in pressure / decrease in temperature / lightning (1 × 2 marks).
Allow very high waves if linked to wind. (2 marks)

- (ii) Tornado only measured 500m in diameter./This is very small compared to a tropical revolving storm which might measure hundreds of kilometres in diameter./Passed over in less than a day, struck late Wednesday had gone by Thursday./This is a short time span for a storm. (2x1m) (2 marks)

- (iii) Usually form over land. (1 mark) in low latitudes/warm climates (1 mark) where intense heating of the land surface causes rapid uplift of air (1 mark). At the junction of air masses along a weather front (1 mark). Form during summer (1 mark) where intense heating of land causes a rapid uplift. At the junction between 2 air masses (in the northern hemisphere) a flow of warm tropical air from the south (1 mark) meets a cold dry air mass from the high latitudes (1 mark) carried by the jet stream racing east at very high speed (1 mark).

Diagrams are creditable here, e.g:



Simple labelled diagram up to 2 marks.

Fully annotated up to 4 marks.

(4 marks)

- (b) **Human impact of a tornado;** Very small-scale damage compared to that caused by a hurricane, however, everything in its path is likely to be destroyed. Homes and businesses, infrastructure, power lines can all be uprooted. Tornadoes are less predictable than hurricanes and it can be difficult to evacuate/board up/prepare.

Human impact of a tropical revolving storm; damage much more widespread. In MEDW hefty insurance bills. However advance warning due to satellite tracking means that people have time to prepare/board up /evacuate. In the Caribbean the tourist industry can be damaged if hotels etc. are damaged. In LEDW many may lose their homes / flooding might be a consequence leading to disease.

Level 1 A general response, which concentrates on the effects of either a tornado or hurricane or finds it difficult to distinguish the impact between the two hazards. **1-3 marks**

Level 2 Understands that a hurricane causes more widespread damage, detail is sketchy but emphasises human effects. Example mentioned in passing. **4-5 marks**

Level 3 A well-focused attempt, which can effectively compare the extent of human impact of each hazard and can back up the answer with relevant locations. **6-7 marks**
(7 marks)

Question 5

- (a) Ecosystems = the links which exist in the natural area between the living and non-living environment (1 mark). Can be small scale e.g. a pond or hedge through to a large scale unit e.g. tropical rainforest (1 mark).
Biome = the very large scale/global ecosystems (1 mark), which are closely linked to climate (1 mark).
Ecosystem can be any size from local to global scale. Biome is global scale only (1 mark).
Must directly link or compare statements for 3 marks. **(3 marks)**

- (b) Picture shows that reeds have already started to grow at the edge of the lake (1 mark). Dead, decaying trees are evident in the lake (1 mark).

These plants will trap more organic sediment and as they die and decay will add to the organic content so increasing the soil depth and reducing the area of open water. (Up to 2 marks for explanation along these lines.)
Areas where mud is deep will start to dry out (1 mark) and (wet) grassland will start to grow (1 mark).

Next small bushes, saplings and shrubs might start to grow/the beginnings of woodland. Eventually, the climax vegetation, probably oak, will develop so long as the lake remains unmanaged. The climatic climax is the stage where one species is dominant.
Credit annotated diagrams, up to 3 marks.

Tick descriptive points (d), explanative points (e). Up to 4 marks for identifying seral stages. Up to 4 marks for explaining the changes (1/4 or 4/1 split). **(5 marks)**

- (c) Will probably be Tropical Rainforest or Tundra.

TRF grows in humid tropics where rainfall often exceeds 2000mm and is evenly distributed throughout the year, (although there might be a short dry season). Temperatures are uniformly high, mean monthly temp. 27 degrees. Temperature for continuous vegetation growth.

Trees have slender trunks and thin smooth barks to allow maximum water loss and because there is no need for protection from frosts. Leaves often have drip tips to enable them to shed water and encourage transpiration. Buttress roots allow massive uptake of water. Up to 5 layers of vegetation. Undergrowth is sparse, except along river banks and in clearings.

Leaves are grown and cast off continually to reflect the year long growing season. Climate encourages great diversity of species, often more than 200 different species in one hectare.

Tundra grows in high latitudes where temperatures are below freezing for at least 6 months of the year. Precipitation is low, around 250mm per annum, mostly falling as snow. Land is subject to permafrost with some surface thaw in the summer. Winds are strong throughout the year.

Vegetation is sparse, generally no trees. Low species diversity, most plants are mosses, lichens, grasses, sedges and dwarf shrubs. Only one layer of vegetation. Frost and wind resistant species, no tall plants. Shallow roots to cope with permafrost. Plants are adapted to conserve moisture; they have thin and often hairy leaves, thick cuticles.

- Level 1** Will probably describe the vegetation with no or only passing reference to climate. Will not consider the ways that vegetation has adapted to cope with the climate. Might relate answer to sunlight. LISTING, confine to Level 1. **1-3 marks**
- Level 2** Both vegetation and climate will be considered and there will be an attempt to explain how vegetation has adapted to the conditions. There will be little precise detail, e.g. no use of data when describing climate. At least one adaptation, such as drip tip leaves will be identified. **4-5 marks**
- Level 3** An answer at this level will stand out because there will be more precision in the response, e.g. temperatures will be quoted, the npp might be used, species might be named. There will be a good attempt to explain how vegetation has adapted to the climate, more than one adaptation will be mentioned. **6-7 marks**
(7 marks)

Question 6

(a) (i) Changes in soil types occurring down a slope (1 mark). Showing sequential soils which reflect local difference in microclimate, slope angle, (temperature/ wind/precipitation), drainage and water table (up to 3 marks). The underlying rock is uniform (1 mark). (3 marks)

(ii) Variations in soil type are mainly linked to variations in slope angle (1 mark)
High nutrient matter at A because this is an accumulating/receiving zone (1 mark). Nutrients have been washed in from upslope, partially accounting for **higher % of organic matter** (1 mark). Accept more chemical weathering.

Lower water content at A because the slope has a steeper angle (1 mark) than at B. Therefore more retention of water at B where slope is more gentle (1 mark). Could also be higher water content at B because rainfall amounts might be marginally higher (and temperatures lower therefore lower evaporation) (1 mark).

Low organic matter at B because this is a shedding zone at the top of a slope (1 mark) nutrients are leached down through the soil and by throughflow down the slope (1 mark).

Lower organic matter at B because vegetation is likely to be more acidic e.g. heather or coniferous trees (1 mark). Higher organic matter at A because vegetation is likely to be deciduous trees which decay into mull humus (1 mark).

1 mark for first point then A = 3 marks max. B = 3 marks max. (5 marks)

(b) **Positive impacts;** modern farming techniques seen as beneficial will be mainly linked to organic farming, minimal use of synthetic fertilisers, pesticides and other chemicals, which can damage soil quality. Crop rotation and use of crop residues to maintain soil quality. Weed and pest control using biological methods such as introduction of natural predators. Minimum use of heavy machinery limits soil compaction. Organic matter in the soil helps to maintain soil structure, retains moisture yet encourages free drainage. Organic matter content also minimises soil erosion. Additionally, techniques such as contour ploughing can halt soil erosion. Drainage channels would also be beneficial to prevent waterlogging. Allow the use of chemical fertilisers.

Negative impacts; Use of chemicals which can damage soil. The removal of hedgerows to increase field size has left soil open to erosion from wind and water. Monoculture in LEDC's could also be used as an example linked to soil erosion where fields are left bare for part of the year. Irrigation has been linked to salinisation in some parts of the World. Deforestation and subsequent cattle grazing is really of minimal use here because cattle ranching does not really utilise modern techniques.

Annotate using n and p.

Level 1	A one-sided response which considers only negative or positive impacts. The range of points made is limited, probably damage soil by chemicals. May drift into irrelevant impacts, such as eutrophication/loss of wildlife/deforestation.	1-3 marks
Level 2	Mentions both positive and negative impact on soil but the range of points made are limited. There will probably be an imbalance in the answer. Unlikely to mention soil structure.	4-5 marks
Level 3	Both positive and negative impacts on soil are equally covered. An answer at this level will refer to either soil structure or texture OR will use good examples/support to lift the quality of the response.	6-7 marks
		(7 marks)

Question 7

- (a) Main impacts caused by URBANISATION, DEFORESTATION RIVER MANAGEMENT

Inputs: precipitation; degree of impact slight, could argue that increases in precipitation are linked to climate change and global warming, however, this is not at the drainage basin scale. Local increase in thunderstorms over urban areas also creditable.

In some areas **inputs** from rainfall have increased due to deforestation, e.g. Nepal and Brahamaputra.

Stores; artificial lakes made by the damming of rivers, e.g. the Nile and Lake Nasser. Urbanisation leads to less storage in the soil due to the impermeable nature of tarmac surfaces.

Groundwater stores may become depleted due to the extraction of water for human use.

Interception storage is limited as deforestation occurs as towns are extended.

ALL of these are greatly affected.

Outputs: Reduction in evaporation/evapotranspiration linked to changes in land use, e.g. urbanisation causes a reduction in evapotranspiration because of the reduction in vegetation.

Channel flow can be considered a store, transfer or even an output from the system and is greatly modified by human activity, management of rivers can moderate discharge, channelisation, weirs and irrigation schemes all affect channel flow. In some cases management can even intentionally increase flow e.g. Farraka Dam, India and effects downstream

Flows: interception/stem flow is reduced by deforestation. FLOODING is not relevant.

Level 1	May describe the drainage basin hydrological cycle, does not really attempt to explain man's impact. Will refer to one type of human activity.	1-4 marks
Level 2	Is able to refer to at least one store/transfer. Understands the meaning of the drainage basin hydrological cycle and frames the answer on the modification aspect. Somewhat unbalanced and little reference made to examples of rivers or drainage basins.	5-7 marks
Level 3	A well-balanced answer referring to at least two human activities. Likely to make good use of named river basins to back up the answer. Attempts to state which elements of the cycle are most affected.	8-10 marks
		(10 marks)

- (b) This question is not just about flood control, the very best answers will refer to other aspects of river management, e.g. dredging, so that large ships can navigate the river, or sewage treatment/laws on dumping and water quality. Management strategies may also be linked to increasing the recreational use of water and the need to supply a growing water demand. Multi-purpose schemes, such as the Aswan Dam or the Hoover Dam will be appropriate. Such examples will include detail on irrigation and hydro-electric power generation.

It is expected that most answers will relate to the success of the scheme. The very best will refer to negative impacts as well and will weigh up the positive and negative.

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| Level 1 | A general answer naming no actual scheme or one which drifts between a number of rivers. No attempt to ‘evaluate’ the success. The Three Gorges Dam (the scheme is incomplete) can reach the top of this level. | 1-4 marks |
| Level 2 | A named scheme is used. Good description is worth 5 marks. Answers at this level will be unbalanced, in that they concentrate on the success (or failure) of the scheme. There may be no obvious evaluation at the bottom of the level, i.e. they will not state that the scheme has been a success or failure overall. A Level 2 answer may concentrate on flood control. Alternatively, although a single river is named, there will be little specific detail to tie the answer to the example. | 5-7 marks |
| Level 3 | Answers at this level will generally refer to more than flood control, however, an excellent flood management example could reach Level 3, depending on the knowledge of the case study. Evaluation must be present, e.g. “the benefits of the scheme have outweighed the costs because ...”. | 8-10 marks

(10 marks) |

Question 8

- (a) **Temperature;** urban heat island effect caused by human activity, factories, cars etc. Temperatures can be up to 10°C higher, but the average is 2-4°C.
Heat radiated by buildings and urban surfaces, buildings have a higher capacity to conduct heat.
Less heat loss as a result of air pollution, urban pollution can trap outgoing radiant energy.
Less heat loss by evapotranspiration.
Temperature differences are most marked during anti-cyclonic weather during Winter

Cloud Cover; more cloud in Summer, Radiation fogs/smog in Winter.

Wind speeds; generally lower although funnel effect may occur along streets where buildings are multi storey. Lower wind speeds can partly explain the higher temperatures as there is reduced ‘wind chill’ in cities.

Humidity; lower, condensation is increased because of the air pollution particulates which act as condensation nuclei.

Precipitation; summer thunderstorms more frequent, heat leads to greater rates of convection and tall buildings encourage the uplift of air. Higher incidence of thicker cloud cover in Summer because of increased convection.

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| Level 1 | Answer probably concentrates on heat island. May drift into air quality which is irrelevant. Explanation weak, predominantly description. At the bottom of the level only passing reference will be made to one element of weather, at the top of the level, an attempt to explain why this element occurs. | 1-4 marks |
| Level 2 | Refers to two elements of the weather, which are modified, with some understanding. Likely to name cities. Might outline one element of the weather very well and mention a second. | 5-7 marks |
| Level 3 | Explains more than one aspect of urban weather in detail. Probably uses values as support e.g. is able to quote temperature differences between city centre and periphery. The quality of the explanation indicates a sound understanding. | 8-10 marks

(10 marks) |

- (b) **Where:** mainly but not exclusively in cities of the MEDW. Expect London, Los Angeles, Mexico City, Athens or Paris.

Measures: Clean Air Act, London. Lower car tax for vehicles with smaller engines and stricter emission tests in the UK. Improvement of public transport infrastructure e.g. trams in Manchester, L.A's public rapid transport system. Promotion of natural gas to power cars in Mexico and the restriction of cars without catalytic converters using the roads one day per week. Similar vehicle restrictions in Athens and Paris. China aims to convert power stations to natural gas from coal.

Success: Works well with London and the Clean Air Act, no smog in recent years like that of 1952. Otherwise attempts to improve air quality linked to vehicle use have been less successful, although unleaded petrol and emission testing have helped in the UK. In Manchester the Metrolink drew some commuters away from their cars. Car use still rising and in LEDW pollution levels will rise even further as many cars are old and lack catalytic converters, also lax environmental pollution laws and industrialisation in LEDW may result in even worse air quality. As countries in the LEDW become more developed car ownership is increasing rapidly.

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| Level 1 | Describes the effects of air pollution, smog, and probably explains the sources/reasons for this pollution in relation to factories/cars etc. Might refer to one measure taken to reduce pollution, e.g. promotion of public transport. | 1-4 marks |
| Level 2 | Focuses the answer on the question more successfully, refers to a relevant city but the answer is pretty general with nothing that ties the measures to the example/examples named. The degree of success is touched upon. | 5-7 marks |
| Level 3 | A well-focused answer, which relates clearly to the city or cities named. More than one measure taken to improve air quality is assessed, e.g. Clean Air Act and promotion of public transport. The degree of success of the measures taken is covered. | 8-10 marks
(10 marks) |

Question 9

- (a) Climatic climax vegetation. The group of species that is best able to exploit the prevailing environmental conditions. The dominant species are the tallest plants able to grow in the environment i.e. deciduous forest/mainly oak in the UK but beech and ash dominated in other areas due to local variations in geology. Deciduous woodland is also climatic climax vegetation for large areas of Europe and North America. Here, the climate is temperate, there is a moisture surplus and the dominant soil type is brown earth.

Relevant human activity modifications; Agriculture, woodland management, (woodland for fuel, building etc) mineral extraction, urban land uses, introduction of exotic species such as sycamore from abroad, re-afforestation in upland areas, mismanagement, recreation, industry and acid rain. Over recent years, many forests in NW Europe have experienced acid rain, resulting in damage and even the death of trees. Acid rain contains sulphuric and Nitric acid, whose sources are mainly power stations and vehicle emissions. Over 50% of trees in some German forests show signs of acid rain damage. Only 9% of UK now wooded, this includes areas where coniferous plantations have been planted. The most important cause of forest removal during the 20th century was agriculture and urban development. Most of the UK is therefore a secondary succession or even a plagioclimax, which has been prevented from reaching climatic climax.

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| Level 1 | Some understanding of the meaning of climatic climax vegetation. Answer might concentrate on how the countryside has become built up/woodland has been chopped down. A general answer which accepts that natural vegetation has changed but only covers the obvious. Deforestation of tropical rainforests can be awarded 2 marks as most trees are deciduous. | 1-4 marks |
| Level 2 | Clear understanding that the climax vegetation of deciduous woodland in W. Europe was originally oak. Is able to refer to at least one modification to the natural vegetation accurately. | 5-7 marks |
| Level 3 | Understands and clearly explains the climax vegetation of deciduous woodland possibly making reference to some regional variations. States a range of modifications and knows that agriculture and urban development were the two most important at the top of the level, changing the face of N.W. Europe from its original deciduous woodland. | 8-10 marks

(10 marks) |

- (b) This question is issues based. A tropical rainforest response is expected here. Deforestation is an international and national concern and the issues are wide-ranging. On a national scale, many countries need the revenue from deforestation. However, on a global scale there are many international issues. MEDC's are mainly against deforestation but LEDC's are mainly in favour because they see it as a resource which can and should be used to help them develop.
- Deforestation contributes to global warming because tree burning increases CO₂ in the atmosphere. Also contributes towards lower levels of oxygen in the air because trees give out oxygen during the day. Rio Earth Summit (1992) included agreements on bio-diversity and forestry. Set up UN commission on sustainable development. (AGAINST)
 - 20% of all drugs used in the MEDW use tropical products, therefore MEDW is reliant on their survival. (AGAINST)
 - Cheap meat supplies for MEDW Burger King/Macdonalds cattle ranches in the Amazon. It is in the interests of MEDW multinationals that deforestation continues because the land capability declines rapidly after deforestation. (FOR)
 - Hardwood from TRF is in demand in MEDCs, however individual types of trees, such as Mahogany, don't grow in clusters so a large area might be cut down just for one tree. (FOR)
 - Countries such as Brazil see deforestation as a way of earning money which help to pay off their debts to MEDCs. Debt is a global issue. If governments and banks in the MEDW cancelled foreign debt there might be less need for deforestation. (FOR)
 - Conservation groups such as WWF regard deforestation as an important issue because species are endangered as their habitat is removed, e.g. orang-utan in Africa. (AGAINST)
 - Rainforests provide more land for settlement in countries such as Indonesia, where population pressure on the land has caused the government to introduce its transmigration policy. This is a national issue. Other national issues might include deforestation to use underlying natural resources e.g. oil, bauxite, iron ore (Amazon). Deforestation for firewood, as in Nepal, has resulted in negative impacts in Bangladesh, due to disruption of the hydrological cycle. This is a creditable international issue.

Level 1	Might be a cost and benefits response, otherwise, just problems caused by deforestation. Support is lacking. Might be conflict between groups of people wanting to use the rainforest or general reasons why the rainforests have experienced deforestation. Skirts around the question.	1-4 marks
Level 2	There may be reference to both international and national issues. Some support is used, however there is little precise detail. One issue may be covered well, probably global warming. Different views for and against begin to be established.	5-7 marks
Level 3	A range of issues are identified and support is more precise. There will be some relevant comment. This may be linked to the need for LEDC's to exploit their rainforests and the hypocrisy of the MEDC's in trying to restrict deforestation.	8-10 marks (10 marks)