GCE 2004 June Series



Mark Scheme

Geography A (GGA1)

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 meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting 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 the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting 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.

Further copies of this Mark Scheme are available from:

Publications Department, Aldon House, 39, Heald Grove, Rusholme, Manchester, M14 4NA Tel: 0161 953 1170

or

download from the AQA website: www.aqa.org.uk

Copyright © 2004 AQA and its licensors

COPYRIGHT

AQA retains the copyright on all its publications. However, registered centres for AQA are permitted to copy material from this booklet for their own internal use, with the following important exception: AQA cannot give permission to centres to photocopy any material that is acknowledged to a third party even for internal use within the centre.

Set and published by the Assessment and Qualifications Alliance.

The Assessment and Qualifications Alliance (AQA) is a company limited by guarantee registered in England and Wales 3644723 and a registered charity number 1073334. Registered address AQA, Devas Street, Manchester. M15 6EX. Dr Michael Cresswell Director General

SECTION A

Question 1

Basic statement for variation in levels, 1 mark for elevation using maths.

(a)	(i)	The river would have relatively high levels during the winter months of November-April, when most of the rain falls. (1)	
		Very low levels of flow during Summer, ie May-October. (1) Peak flow in late February/early March. (1)	(2 marks)
	(ii) (iii)	 Costs population displaced to make way for lakes behind the dams; salinisation is possible, hot dry summers would lead to high rates of evapotranspiration; multicropping would need the application of fertilisers, could lead to eutrophication of rivers; irrigation channels provide home to bilharzia snails and possibly malaria mosquitoes - possibility of disease. Any other sensible factor 1 mark each Iraq has little control over the rivers as they flow through Turkey, 	(3 marks)
		however they depend on the water. 1 basic mark	
		 River levels in the Tigris and Euphrates might decrease by the time they reach Iraq. The Iraqi population depend on this water for agriculture in a very dry climate, agricultural yields might decline in Iraq. up to 2 marks Water might be saline or polluted by agricultural chemicals by the time it reaches Iraq, particularly if excess irrigation water is returned 	
		to the Tigris/Euphrates up to 2 marks	(3 marks)
		1	```

(b)		agement means using the river, without damaging it in the at the resource will still be available for future generations.				
	•	ent schemes aim to:				
	• reduce the include rest	mpact of floods/sustainable flood management techniques riction of building on flood plains, floodplain zoning, hard , eg reservoirs can damage the environment;				
	÷ •	er to local populations - it is important that levels of water				
	taken out do					
		ies to control demand and energy efficient use of water eg				
	· · · · · ·	ter quality and control pollution. Strict controls of the				
		industrial waste/sewerage/farm slurry. (In recent years				
	· · ·	e been noted further upstream in major UK rivers than				
	previously);	1 0				
	1 577	, ortunities for recreation, eg fishing;				
		es to allow the river to be used to transport goods and				
		dredging. Widening schemes could damage wildlife				
		vant case study, such as the Severn-Thames Water				
	2 ·	Transfer Scheme, the Colorado or the Tees.				
	Level One	Does not really appreciate the meaning of sustainable				
		management, describes the management of a river and				
		concentrates on one type of management such as flood control.	(1-3 marks)			
	Level Two	An appropriate basin is used and understands the term				
		sustainable development but still concentrates on one				
		aspect such as flood prevention. Refers to one type of	(4-5 marks)			
		management and a sustainable aspect of this.				
	Level Three	More than one type of management is covered and the				
		candidate uses a case study with some precise detail.				
		Links are clearly made between management and				
		sustainable development.	(6-7 marks)			

(a)	(i)	as energy from th Outputs Water is lost from	ers the drainage basin/system/accept a named input such e sun and precipitation falling mainly as rain and snow. In the drainage basin /accept description such as rivers sea or a lake, water percolating deep underground and n 1 mark each	(2 marks)
	(ii)	• Y; infiltration	er flow/baseflow	
			1 mark each	(3 marks)
	(iii)	limited vegetation Run-off is lower i (or) flooding is m Reasons : Vegetat and evaporated di input from precip	n a drainage basin with dense vegetation ore likely to occur in deforested areas. (1 mark) ion intercepts rainfall, and some is stored on its leaves rectly back into the atmosphere. Much (approx. 30%) itation is evaporated back from trees. (up to 2 marks) akes up water through its roots and so reduces to 2 marks)	(3 marks)
(b)		 requirement to ref 3 without doing s changes in lar either perman land manager increases the new settlemen climatic changer 	be answered at a global or small scale. There is no fer to a case study, so very good answers can reach level o. Ind use, eg deforestation to agricultural use increases risk ently or seasonally; ment techniques, eg ploughing up and down a slope risk of flooding. Int, particularly on floodplains; ge due to global warming; anagement schemes have increased the risk of flooding Only one human activity covered, this may be outlined in a very general way. There will be no use of examples. Don't accept dams or levees above this level.	(1-3 marks)
		Level Two	One human activity is outlined comprehensively.	(4-5 marks)
		Level Three	At least two human activities will be outlined well. It is likely that candidates will refer to examples.	(6-7 marks)

SECTION B

Question 3

(a)	(i)	 Winds in excess of 160km/hr very rare in UK. Ferry sailings to Ireland cancelled, this happens infrequently. Airports are seldom closed due to weather, as Cardiff was during this storm. National Trust Marathon has never had to be cancelled before - wouldn't arrange a marathon if there was a risk of weather of this nature. (Any 2 relevant facts with some explanation, 2 x 1) 	(2 marks)
	(ii)	Depression. (1) Rapidly rising air in the centre of the low. (1) Creates a steep pressure gradient on the surface. (1) This causes strong winds as air rushes in to replace rising air. (1)	(3 marks)
	(iii)	 Diagrams can be credited up to 3 marks if well annotated. Wales is close to the west coast and weather systems tend to move from west to east across the British Isles. As winds cross the oceans they pick up energy from the oceans and there is less friction to slow them down. Heavier rain might be expected nearer to the west side of the UK. The winds have crossed the ocean from their long sea journey. As the weather system moves inland air will rise, cool and condense, leading to relief rainfall on the western side of the UK, where upland areas are found. As a storm crosses over warm water, this acts as an energy source, as it travels over land it tends to weaken because evaporation is reduced and greater surface friction causes the winds to slow down, allowing pressure to rise a little. 	(3 marks)
(b)		 Human responses in the MEDW People have the ability to prepare better in advance. Warnings are given out on Radio/TV. However, it is easier to prepare for hurricanes than for tornadoes because hurricanes can be tracked by satellite. People can be evacuated inland and people can board-up and prepare. In LEDCs Communication and information networks are less developed, the authorities often find it difficult to pass information on to their populations. Mop-up operations are easier to implement in MEDCs, rescue teams are well organised and have good equipment. Damage is quickly repaired as many have insurance cover. In LEDCs people may have to totally rebuild their homes and the area may be dependent on foreign aid. Human tragedy is more a feature in LEDCs. 	

To sum up - in MEDCs the human response to strong winds is well organised and efficient because communication networks and information is there to deal with the event. This is because MEDCs have the money and means to warn people (about hurricanes) and to deal with the aftermath.

• The question does not stipulate use of case studies but the use of such would raise the quality of an answer.

Level One	Predominately describes the effects of strong winds and why the consequences of winds vary in MEDCs and LEDCs so is poorly focused on the question set.	(1-3 marks)
Level Two	Focuses on why the response to strong winds differs but concentrates on either the LEDW or the MEDW.	(4-5 marks)
Level Three	A balanced answer, which covers both LEDCs and MEDCs equally well and concentrates on the responses to the threat and the aftermath of strong winds.	(6-7 marks)



starve

Level 1	The answer will probably be poorly focused and may perhaps describe the effects of flooding in SE Asia, without linking this directly to the wet season and human activity. Basically the season will be referred to and either a question or negative effect on human	
	activity.	(1-3 marks)
Level 2	More focus will be evident, however the response will be typically one sided, probably concentrating on the negative effects of the wet season, but also mentioning the benefits of the wet season to human activity.	(4-5 marks)
Level 3	Both the wet and dry seasons will be considered, and there will be an attempt to explain both constraints and benefits to human activity.	(6-7 marks)

SECTION C

Question 5

(a)	(i)	<pre>input = (either) precipitation (Or) input from weathered rock</pre>	
		Output = (either) leaching	2 x 1 mark
		(or) surface run-off	(2 marks)
	(ii)	(x) Biomass to Litter;leaf fall out (1)(y) Soil to Biomass:uptake by plant/tree roots (1)(z) Litter to soil;decomposition or decay of litter (1)Wording does not have to be exactly as above.	(3 marks)
	(iii)	 In late autumn the litter store is larger than in the spring because leaves have recently fallen from the trees because the temperature is too cold for them to continue to live. By Spring the litter has decomposed. The Biomass store is larger in late spring because the growing season has started and leaves have developed due to rising temperatures. The soil store is larger in spring because the previous year's litter has been incorporated into the A horizon partly due to decomposition and through mixing agents, such as worms. The spring season has only recently started so nutrients have not yet been fully taken up by the vegetation. 	
		There must be some explanation here. Up to 2 marks are available for each bullet point.	(3 marks)
(b)		Any small scale ecosystem is valid, expect to see a	
		hydrosere/lithosere/psammosere or halosere, but also accept a hedge, pond, lake or sand dune.	

Level One	Describes the plant and animal life within a small-scale ecosystem such as a hedge or pond. Does not separate the living from the non-living, and says little about the different species of plant/animal that might exist.	(1-3 marks)
Level Two	Understands the difference between the Biotic and Abiotic components of an ecosystem and provides a useful description of the living components of the ecosystem, mentioning examples of producers/herbivores and consumers. A labelled diagram only can score up to 5 marks.	(4-5 marks)
Level Three	A good balance between the Biotic and Abiotic components of a relevant example. Describes the abiotic elements in more detail, for example, naming soil type, or providing details about the climate. Reference to human activity might also be relevant here.	(6-7 marks)

(a)	(i)	 Tropical rainforests/ dense forest on the upper slopes Cereal crop/rice/grass growing on the valley sides Some (palm) trees interspersed with the terraced slopes. Emergent trees visible above canopy layer in the forest 	1 mark 1 mark 1 mark 1 mark (2 marks)
	(ii)	Identify: The productivity of the forest will be greater than the fields/grass Many different species of tree in the forest, little variety in the fields.	1 mark 1 mark
		Use of values; Forest npp=2000-2200g/m²/yr Agricultural land within the TRF=1500-1700g/ m²/yr	Up to 2 marks
	(iii)	Reasons: When the crop is harvested some of the available energy is taken out of the system.	(3 marks) 1 mark
		• Less variation in species in the fields – one main crop therefore reduced bio-diversity in the field, hence lower net primary productivity. Field crops have a smaller height/mass.	Up to 2 marks
		• Less decomposition of biomass, adding nutrients to the soil in the fields/ means that agricultural yields may decline a few years after the forest is cut down.	Up to 2 marks
		 Unless the fields are multi-cropped, they may be bare for some of the time/ and thus open to the effect of erosion by running water. Accept anything sensible along these lines. 	Up to 2 marks
(b)		 Social Impacts: (mainly negative but accept relevant positive impacts too) Loss of traditional life style for indigenous inhabitants/loss of land Threat of disease from incomers into forest to indigenous population Migrants moving into the forest to farm often face a very low standard of living Pollution as trees are burned affects the health of the population Some locals have been killed trying to defend their land from development 	(3 marks)
		 Economic Impacts: (mainly positive but accept relevant negative impacts too) Employment - in many countries with TRF there is rapid population growth and a need for employment. In Indonesia logging employs 700,000 directly. Economic Development - Wood and wood products produce export earnings and support other industries, such as furniture manufacture. Hardwoods such as mahogany and teak are highly valued. Export earnings help to pay off large international debts. 	
		Level One A poorly focused answer, which may digress into causes	

A poorly focused answer, which may digress into causes	
of deforestation between different groups of people.	

(1-3 marks)

Level Two	A better-focused answer, one type of impact of deforestation is dealt with convincingly and an example is named, probably the Amazon, however, there is nothing	<i></i>
	to tie the answer to the example.	(4-5 marks)
Level Three	Both social and economic impacts are covered equally. The example of the forest is used more pertinently.	(6-7 marks)

With reference to an area you have studied, examine the international issues that can arise as a result of river management.

Cross border issues, which arise as a result of river management are the main focus here. The most relevant case studies are the Ganges, the Rhine, the Colorado and the Tigris and Euphrates Management schemes. The Tigris and Euphrates scheme appears in Question 1, where the main emphasis is not on international issues. Candidates can use information from Figure 1, but if this the case study used do not credit above lower level 2 if the information given is taken only from the source map. The information given in Figure 1 does not relate specifically to international issues.

Issues might include reference to:

- Dams and irrigation schemes, which store and use water upstream, thus depriving those countries downstream. Additionally, water quality may be impaired; irrigation schemes can add nitrates, salts, etc to rivers. Sediment may be trapped behind the dam, this might have formerly helped to fertilise fields during floods, and also fishing industries at the river mouth may be negatively affected.
- Pollution from domestic and industrial sources may also affect places downstream. The Rhine is a good example.
- Straightening of channels upstream, allows faster transport of water downstream, consequently, flooding downstream might be increased.
- Political rows may develop between countries, regarding the unfair distribution of water; in semi-arid climates tension between countries could cause wars.
- The Farraka dam in India holds back water from the Ganges for use during the dry season. The dam has also protected India during times of extremely heavy rainfall, letting water out of the dam and subsequently adding to floods downstream in Bangladesh.
- Ecosystems downstream may be affected, detail re species might be offered.

Level One Level Two	At the bottom of the level, for 1-4 marks, the answer will be poorly focused, river management issues will be described but the international emphasis will be ignored. For 5-8 marks, one international issue, without support, will be included, but most of the answer will be of marginal relevance. It is likely that more than one basin will be referred to if examples are mentioned The answer will have more focus and the candidate will show an understanding of the international issues resulting from management. A relevant example will be offered but the case study will not be used with great precision. At the bottom of the level there will probably still be some irrelevant detail, and more than one case study may be used.	(1-8 marks)
Level Three	For 13-15 marks, expect a better-focused response, with at least one international issue covered well. The answer will only refer to one river basin, but detail, related to the chosen river will not be particularly precise. The case study will be used confidently and with more precision, and will concentrate on international issues, elaborating on at least two different issues for 16-18 marks. At the top of the level, for 19-20 marks, the quality of the language and the use of geographical terminology will enhance the response.	(9-15 marks) (16-20 marks)

Examine the view that 'the severe impact of drought in the Sahara is a result of human inefficiency'.

Candidates might start by briefly outlining both physical and human causes of drought in the Sahara. Whilst this is not necessary, it sets the scene, however, do not credit causes alone beyond level one. It is expected that the impacts of drought will be described in some detail. They are expected to come to the conclusion that the impact of drought is a result of both human and physical factors. Only the very best, level three, answers will attempt to present the argument that human beings cause the impact to be more severe than might be expected in the Sahel, and link this to the level of economic development.

Impacts of drought in this area include

- Wells and water holes drying up as groundwater levels fall due to over-extraction. This may partly be as a result of human inefficiency, in that people do not realise the importance of conservation.
- Population being forced to migrate to wetter areas or towards refugee camps, where food and water are available.
- Cattle die and crops fail. Bush fires can occur spontaneously, caused by lightning, so are not directly linked to man.
- Huge numbers of people die of starvation and children suffer from malnutrition. Many countries are dependent on emergency relief aid.

The following impacts might be made worse by human inefficiency

- Desertification; Human activity has cleared the land of trees for firewood, shelter and farming. People have made the drought situation worse, accelerating the effects of desertification.
- Desertification; Extensive cattle farming, where nomadic herders wander with their cattle in search of pasture has also been a factor in this region. Overgrazing on marginal land leads to soil erosion and desertification.
- Salinisation; In some cases irrigation has caused salinisation, where salts from either groundwater or irrigation water itself are left in the top layers of the soil, due to capillary action or rapid evaporation in the searing heat.
- Desertification; Human demand on the landscape exceeds its carrying capacity. Rapid rates of population growth have resulted in more mouths to feed, so more marginal land is cultivated, and so the cycle continues until disaster occurs.
- In many Sahelian countries, communications are poorly developed and populations have little transport and other means of communication, such as telephone and computer links. It is difficult for help to reach isolated and harsh places.

- People are not trained to use soil and water conservation methods and dry farming techniques.
- These countries are amongst the poorest in the world, few people are educated and most rely on subsistence agriculture. Governments are often corrupt and what little tax revenue is collected is usually spent in the core area.
- On a positive note, researchers in Guinea in the 1990s found photographs of the Savannah in the 1950s and discovered that there is more vegetation cover today than there was then. Local people are farming the land sustainably here.

Factors linked to physical geography:

- Drought is a normal occurrence in the Sahel and occurs when the short rainy season is delayed or postponed. This happens when the ITCZ does not follow its normal migratory pattern. Southwesterly winds are then prevented from bringing rain from the Atlantic. Higher sea temperatures since the 1960s are thought to be partly responsible. The impact of drought is greater during these years.
- There has been shown to be a long-term trend of decreasing precipitation in the Sahel, particularly over the last 20 years, as rainfall totals have decreased and the pattern has been more varied, the rainy season has been shorter than expected. It could be argued that the impact of drought is made worse by such climate trends, and is not linked to human inefficiency.
- How do we know that drought has not affected this area in the past to the same extent? These days information technology allows us to have a global understanding about events in remote areas of the world that at one time we would have known nothing about.

Level One	At the bottom of the level for 1-4 marks the answer will be poorly focused and a mixture of the causes and consequences of drought. Otherwise, an area outside of the Sahel might be referred to but the impact of drought in this named area will be covered. For 5-8 marks, the answer will describe at least one impact of drought, linked to human misuse of the Sahel, but this will be in amongst less relevant material.	(1-8 marks)
Level Two	For 9-12 marks, the answer will be better focused on the way that human inefficiency exaggerates the effects of drought in this area, but a limited range of points will be covered, including desertification. At the top of the level a greater range of points will be made but there will be no overall view put forward by the candidate. (13-15)	(9-15 marks)
Level Three	For 16-18 marks the candidate will show an appreciation that human inefficiency has been a major contributor to the impact of drought, but cannot be totally blamed for the effects in recent years. At the top of the level for 19-20 marks, the quality of the language and the use of geographical terminology will enhance the response.	(16-20 marks)

Examine the factors influencing the formation of one zonal soil you have studied.

Zonal soils are mature soils and have characteristics that predominately reflect climatic conditions. They usually occur in regions where the landscape and climate have been stable for a very long time. The climate controls the balance between precipitation and evaporation, and so may be linked to leaching or capillary action within a soil. The nature and degree of weathering are also linked to the climate; for example, rapid rates of chemical weathering are likely in warm, wet climates. Rapid chemical weathering will result in deep soil.

Soils are created over a long period of time. Azonal soils, which are immature, have undefined horizons. Zonal soils tend to have welldeveloped and easily recognisable horizons.

Natural vegetation has an effect on zonal soils, particularly on the A/O horizon, but the type of natural vegetation found in an area is also linked closely to the climate of the area chosen. Similarly, the fauna present in the soil are also partly linked to the climatic conditions.

Due to the maturity of zonal soils, and the time factor involved, parent rock has very little influence over the soil. We are looking at soils on a large scale here, probably whole countries. Small-scale variations in climate, drainage, relief and rock type are of very limited, if any use in this question. However, zonal soils tend to develop where the relief is low and gently undulating.

It is expected that candidates will choose either podsols or brown earths, which are included in the specification. You must also credit any other relevant soil, such as a latosol, a tundra gley soil, chernozerm or other similar soil. Expect to see an accurate labelled sketch of a soil profile in a good answer.

Brown Earth soils develop in regions with humid temperate climates, such as north western Europe and, where rainfall totals are moderate, (below 800mm per year), and temperatures range from about 4 degrees C to 20 degrees C during the summer. The natural vegetation of deciduous woodland provides a regular source or organic material when leaves fall from the trees during the autumn. The soil has a pH value of around 5.0 to 6.5; the Ao horizon is composed of a thick litter of leaves with dark brown, slightly acid and very rich mull humus beneath. The soil fauna are active during the warmer months and help to mix up to A and B-horizons. Precipitation exceeds evapotranspiration during the winter months, so leaching moves soluble bases down through the soil. However, leaching is not a dominant process in determining the nature of this soil and the horizons are not clearly differentiated because of the mixing agents.

Level One

(1-4 marks) The candidate will show little understanding of the term zonal soil. A couple of factors influencing the development of an unnamed soil might be mentioned, including, in this case irrelevant factors, such as parent material.

(5-8 marks) Although the term 'zonal' may still not be fully understood it is likely that one factor e.g. climate influencing the development of a relevant, (but probably un-named), soil will be covered reasonably well. There will be much irrelevant material and although a zonal soil might be named, this will probably only be in passing.

Level Two

(9-12 marks) The answer will concentrate on one appropriate soil and one factor probably climate, will be covered well but will lack specific detail. (13-15 marks) An appreciation of at least one other factor will be shown, this is most likely to be vegetation. The answer relates well to the chosen soil and a reasonable sketch of a profile is likely to be given.

Level Three

(16-18 marks) An appreciation is shown of more subtle factors, such as low or gently undulating relief, and the time factor is also covered well. A more detailed knowledge and understanding of the chosen soil is exhibited. At this level there is an accurate sketch profile, with labelled horizons and processes. The candidate might explain why factors such as relief and drainage and parent rock are less important

(19-20 marks) At the top of the level the answer will be well organised and good use will be made of appropriate terminology. Expect terms such as eluvation to be used confidently.