



General Certificate of Education

Geography 6036

Specification B

GGB4

Mark Scheme

2005 examination – June series

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.

GGB4

Question 1

- (a) The **core** region - the focus of the national market and seedbed of new industry and innovations. Usually the centre of industrial activity, and in-migration.

The **periphery** - regions with unfavourable locations and resource bases, characterised by outward migration of people and investment. Living standards tend to be low. Decline may be irreversible, with the region locked into a downward spiral (or vicious circle)

2 marks per term.

0 - 4

- (b) For example: in the context of **Portugal** (an e.g.).

Manufacturing is concentrated in two major industrial regions:

The **core**, Lisbon-Setúbal in the South-central region and a **sub-core** Porto-Braga in the North. Together they account for about three-quarters of Portugal's net industrial output. The Lisbon area includes such major industries as iron and steel; ship building and repair; oil refining, machinery, chemicals, cement and electronics; and food and beverages. Setúbal, about 80km to the Southeast of Lisbon, also has a large shipyard and automobile assembly and machine industry plants, as well as cement, woodpulp, cork, and fish processing.

Sines, a **resource frontier**, located about 140km South of Lisbon, is the site of a major deepwater port and heavy industrial complex. It includes an oil refinery, petrochemical plants, and a 1200 megawatt coal-fired power plant.

Porto is primarily a centre of light industry, including textiles, footwear, furniture, wine, and food processing. Porto is also the location of the nation's largest petroleum refinery; the other is located at Lisbon. Portimão is a centre for fishing. Aveiro specialises in woodpulp and other wood products but also produces footwear and machinery. Braga specialises in textiles and clothing, cutlery, furniture, and electronics. Covilha is also an active textiles area. The two premier industrial regions offer the greatest concentrations of population, thereby stimulating market-oriented manufacturing operations. Furthermore, because of the dependence of modern industry on imports of raw materials, machinery, and fuel, the location of processing plants near the two major ports minimises their operating costs.

The rest of the country can be regarded as the periphery. The North is mountainous, with a rainy, moderately cool climate. This zone contains about two million hectares of cultivated land and is dominated by small-scale, intensive agriculture. High population density, particularly in the Northwest, has contributed to a pattern of tiny, fragmented farms that produce mainly for family consumption interspersed with larger and often mechanised farms that specialise in commercial production of a variety of crops. On average, Northern levels of technology and labour productivity are among the lowest in Western Europe. Extreme under-employment of agricultural workers accounts for the North being the principal source of Portuguese emigrant labour.

The centre is a diverse zone that includes rolling hills suitable primarily for tree crops, poor dry soils, and the fertile alluvial soils of the banks of the Rio Tagus. A variety of crops are grown on the productive areas under irrigation: grains, mainly wheat and corn, oil seeds (including sunflowers), and irrigated rice.

The South is dominated by the Alentejo, a vast rolling plain with a hot, arid climate. The Alentejo occupies an area of approximately 2.6 million hectares, about 30% of the total area of mainland Portugal, and produces about 75% of the country's wheat. Although much of the area is classified as arable land, poor soils dominate most of the area, and consequently yields of crops and pasture are low by West European standards. The Alentejo is also known for its large stands of cork oak and its olive groves. The Algarve, less than a third the area of the Alentejo, occupies the extreme Southern part of Portugal. This area is characterised by smallholdings where animal grazing, fishing and tourism are the principal occupations of the inhabitants.

Portugal's economic growth over the last decade has been accompanied by a heavy investment in infrastructure improvements, largely funded by the EU. Following accession to the EU, however, Portugal began dismantling its system of state ownership and the country has adopted an aggressive privatisation program. In 1988, the Portuguese public sector accounted for 19.7% of GDP and 5.5% of the country's total employment. By the end of 1997, these numbers had fallen to 8% and 2.6% respectively. From 1987 to 1999, Portugal received net financial flows from the EU of approximately \$27 billion. The greatest portion of these funds was disbursed through the European Regional Development Fund. As a result, the country has made a number of major infrastructure improvements, most notably the construction of 800km of main roads, modernisation of railroads and ports, improving environmental quality for 90-100% of the population (including the supply of water, solid waste and industrial waste disposal), aid to industry and agriculture, and plans for intensive promotion of regional integration. Additional infrastructure projects are expected over the next several years, including a new international airport (to be built at Ota, North of Lisbon), new metro systems in Porto and Lisbon, and upgrade of the country's rail system, a second phase of a natural gas pipeline system and additional highways, dams and port projects.

Portugal is scheduled to receive approximately \$25 billion from the EU for the period 2000-2006. Approximately \$20 billion of this total is earmarked for basic infrastructure.

- (i) **Level I** - simple statements of the core/periphery relationship in the identified country. **0 - 3**

Level II - more detailed description of the core-periphery relationship. Some use of named examples. **4 - 6**

- (ii) **Level I** - some description of effects, with correct identification of areas of development or underdevelopment. **0 - 3**

Level II - well-developed description of areas of development, and/or under-development. Recognition of changes in time, e.g. resource frontiers. **4 - 7**

- (iii) **Level I** - simple statements of the policies that have been put in place by national government. **0 - 3**

Level II - detailed statements of the policies that have been put in place by national government. Recognition of issues/changes through time. **4 - 8**

Question 2

- (a) A destructive plate margin occurs where two tectonic plates move towards each other. There are three such possibilities:

- Oceanic plate moves towards continental plate
- Oceanic plate move towards oceanic plate
- Continental plate moves towards continental plate.

A constructive plate margin occurs where two tectonic plates move away from each other. In such cases, mid-oceanic ridges and rift valleys are produced.

2 marks per term. **0 - 4**

- (b) The global pattern of tectonic activity:

The Theory of Plate Tectonics is that the earth's surface is divided into either major and several minor, internally rigid plates, mostly between 100 to 2000km thick. These are in motion with respect to each other and the underlying mantle. Where they meet, at the plate margins, their movement produces a range of tectonic activities and there is a balance in the world between areas where the earth's crust is being constructed and destroyed.

Fold mountains - areas of tectonic convergence with intervening sediments of geosyncline being pushed upwards to form mountains. Some vulcanicity present, e.g. Himalayas, Alps.

Rift Valleys - product of crustal tension (pulling apart). May be oceanic as in Atlantic, or continental as in East Africa. Again associated with vulcanicity.

Ocean plains (abyssal plains) - areas of ocean floor at 3/6000m deep. Occasionally interrupted by sea mounts, volcanic submarine cones rising steeply from the sea bed. These are linked to hot spot volcanic activity, and some are planed off to form guyots.

Mid Oceanic ridges - lines of underwater mountains up to 60,000km in length and 1000km wide. Central part may be up to 3km in height, but in some parts volcanoes may emerge from the sea. Central part consists of rift valley. Fracture zones at right-angles to ridges spread out East and West, e.g. Mid Atlantic Ridge, and Mid Pacific Ridge.

Ocean trenches / island arcs - around edge of Pacific - 100km wide and over 6000m deep. Trenches are located close to continental edge, e.g. Peru, Japan, Aleutian - with landward side marked by arc of narrow island, e.g. Japan, Kuril Islands. Volcanic activity also frequent.

Level I - simple statements of locations/pattern of activity. No detail. **0 - 3**

Level II - more detailed statements of activity, with correct identification of features. Detail of actual locations as exemplification would access this level. **4 - 6**

(c) In general terms - details to be provided by the candidate:

Destructive plate margins - collision, subduction, trenches, island arcs, volcanoes, earthquakes, fold mountains.

Constructive plate margins - divergence, sea floor spreading, mid oceanic ridge, volcanoes, rift valleys, transform faulting.

Level I - simple statements of the relationship between process and structure. **0 - 3**

Level II - detailed statements of the relationship between processes and structures, with some reference to identified features on the earth's surface. **4 - 7**

(d) **Evidence.**

Geological:

- The jigsaw fit of continents (S. America and Africa) although some areas of overlap
- The similarity of rock types/structures on opposite sides of Atlantic, e.g. the orogenic belts of N.W. Europe and N. America
- The formation of coal, oil, sandstone in areas with inconsistent climates
- Past glaciations in India and Southern continents
- Paleomagnetism - polar wandering as identified in basaltic lavas, and magnetic striping
- Sea floor spreading - dating of ages of rocks on either side of Mid Atlantic Ridge.

Biological:

- The fossil of mesosaurus (Permian reptile) only found in S. Africa and Brazil
- Uniqueness of Australian animals (marsupials) - indicating early break away
- Simian creatures in Africa and S. America, yet latter evolved prehensile tail.

Level I - simple statements of evidence. No depth of discussion. **0 - 3**

Level II - detailed statements of evidence. Some use of both forms of evidence - geological and biological - to access this level. Better responses may discuss the quality of the evidence. **4 - 8**

Question 3

Clearly the assessment of this question will be influenced by the material offered by the candidates. What follows is some specific detail of the Los Angeles area.

Los Angeles is affected by a number of hazards, some of which are directly concerned with the physical environment, others where man has modified the physical environment to his disadvantage, and finally those that occur entirely within the human environment. The major potential hazards are:

- Earthquakes and tsunamis
- Coastal flooding
- Fires
- Smog
- Gang warfare and racial violence
- heavy rainfall and river flooding
- drought
- mudslides and landslides
- crime (including burglary)
- AIDS.

Examples of Inter-relationships between hazards

- **A simple direct causal relationship:** one hazard is responsible for another, e.g. earthquakes → landslides; drought → fires; earthquakes → crime (looting, etc); earthquakes → tsunamis; heavy rainfall → mudslides.
 - **One hazard responsible for several others:** earthquakes lead to many other hazards
 - **More complex linear relationships:** drought → fires → heavy rain → flooding. Fires remove vegetation, thereby decreasing interception, leading to more run off and a great flood potential.
 - **Through a central factor:** in Los Angeles, over the last 40-50 years, there has been massive urban sprawl. This may have been a factor in several hazards:
1. **River Flooding.** As the city has sprawled, more and more land has gone under concrete and tarmac, particularly in the surrounding hills. With far less infiltration, every time that it rains, run off is much more rapid.

2. **Fires.** The low-density urban sprawl has left vast areas of shrubland and woodland between housing developments. With houses so close to the natural vegetation, there is a great risk in summer of widespread fires when the vegetation becomes very dry, particularly if strong winds are blowing.
3. **Smog.** Los Angeles is a city that covers a vast area and this has tended to encourage the use of private vehicles rather than the development of a comprehensive public transport system. Car exhaust fumes have been the major factor in the decline of air quality in the Los Angeles basin.
4. **Crime/Social division.** As the city has sprawled, very affluent suburbs have developed (such as Beverly Hills and Bel Air) which are white-dominated, and very impoverished inner areas (such as Watts) dominated by Afro-American and Latin American communities.

People's responses to the multi-hazard environment.

There are three main ways in which the people of Los Angeles tend to respond to living in this environment:

- Some people accept the fact that the hazards exist but are not prepared to do much about it - "it won't happen to me" syndrome. The advantages of living in Southern California greatly outweigh the disadvantages.
- Some people recognise the severity of some of the hazards and are prepared to do something to protect themselves. At an individual level they can fit burglar alarms, take out insurance, attend earthquake drills, install gas cut-offs, collect a comprehensive earthquake kit, move house to be above the smog. Such people tend to be the more affluent of the area as they can afford the precautions. They also expect the authorities to act by insisting on smog control, earthquake-proof buildings, emergency services, flood control, etc. They are willing to pay the increased taxes that result from implementing such measures.
- Living in such a multi-hazard environment may become too much of a strain, forcing some people to move away to a less hazard-prone environment. This always tends to happen after a major event, such as the Northridge earthquake of January 1994, and the riots and looting which followed the acquittal of the policemen in the Rodney King affair.

G	Level I (0-6)	Level II (7-12)	Level III (13-17)	Level IV (18-20)
	Simple statements of hazards affecting the chosen area.	More detailed description of one hazard affecting the chosen area. Case study material of one of origin, frequency and scale.	Well developed detail of more than one hazard affecting the chosen area. Most of o, f and s examined.	
	Simple statements of the effects of the hazard(s).	More detailed description of the effects of the hazards, including one inter-relationship. Case study material accesses this level.	Well developed detail of a variety of effects of the hazards, with additional credit for well developed inter-relationships.	
		Simple statements of response; or detailed response to one hazard.	Detailed statements of response to at least two hazards. Good use made of case study material in terms of response.	Overall link back to quotation, either in favour or against, but based on strength of the argument.
S	Level I (0-1)	Level II (2-3)	Level III (4-5)	
	Information is adequately organised, and presented with a reasonably accurate use of English.	Well organised and presented with an accurate use of English. Limited examples.	Well organised and presented in a clear and logical manner with a very accurate use of English. Range of examples.	

Question 4

Main features of the vegetation:

In wetter areas the vegetation consists of tall coarse grasses (elephant grass) with many trees which are usually deciduous - the tree savanna.

In drier areas towards the desert margins, shorter tussock grass appears with bare soil in between the tufts of grass. This is often accompanied by drought resistant trees such as the acacia and the baobab - the grassland and shrub savannas.

Human activity has two main effects on the vegetation:

- Grass is burnt off to ensure better growth of young grass in subsequent seasons. When fire sweeps through vegetation at frequent intervals, it is very difficult for young trees and bushes to become established. Their place is taken by herbaceous plants and by the few indigenous woody plants whose bark permits them to survive. As the acacia and baobab can survive fires, they are common in the savanna.
- Where numerous cattle graze, woody plants are killed by the removal of their foliage. Thorny, animal repellent trees and shrubs, such as acacia, therefore become numerous.

Main features of the climate:

This climate is essentially transitional between Equatorial rain forests and hot deserts. Therefore, variations occur with increasing latitude, but within any location, relief and altitude produce local variations.

Rain forest margins - ppt. over 1000mm, one dry month, temp. ranges from 22C to 28C.

Semi-arid margin - ppt. under 500mm, 9/10 dry months, temp. ranges from 18C to 34C.

Seasonality and unreliability of ppt. increases polewards.

Adaptations to climate:

Trees are deciduous losing leaves in the dry season, although evergreens are also found. Their hard leathery leaves reduce transpiration losses; trees may be microphyllous (small leaved) to reduce transpiration.

Tree savanna - parkland isolated trees with low umbrella shaped crowns, shading root areas, thus reducing soil moisture evaporation. Trees show xerophytic characteristics - dense cell fluids, hard waxy leaves, thorns, adjusted and protected stomata which all reduce water loss.

Grassland savanna - the grasses between the trees become shorter and sparser. Grass is perennial - dies back in the dry season and regrows from root nodules in the wet season. They are tussocky enabling some retention of moisture. Natural straw dies down and protects roots. Acacias lose leaves in dry season. Baobab - very thick fleshy spongy trunk; insulative bark, bears leaves for only a few weeks.

Shrub/scrub savanna - mainly acacia or thorn bush, many short stems from a single stock, deep branched roots spread and compete for water - stems may be capable of photosynthesis. Short tufted grasses and thorn bushes - grasses feathery and wiry reduces water loss. Thorns reduce transpiration.

G	Level I (0-6)	Level II (7-12)	Level III (13-17)	Level IV (18-20)
	Simple statements of vegetation characteristics.	More detailed on characteristics - e.g. names of species, and description of plants.	Well developed detail, e.g. latitudinal variations, or other local variations.	
	Analysis of the ways in which one human activity has influenced the vegetation.	Development of the effects of more than one human activity.	Recognition and argument that human activity may have had a significant impact on the vegetation type over time.	
		Limited account of adaptations - simple statements of facts, e.g. long roots, thick barks.	More detailed analysis of adaptations, usually linked to individual species, and to specific aspects of the climate.	Good evaluative comments re: opening statement given in question, i.e. human v climatic influences.
S	Level I (0-1)	Level II (2-3)	Level III (4-5)	
	Information is adequately organised, and presented with a reasonably accurate use of English.	Well organised and presented with an accurate use of English. Limited examples.	Well organised and presented in a clear and logical manner with a very accurate use of English. Range of examples.	