

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Advanced Level

MARK SCHEME for the November 2005 question paper

9696 GEOGRPAHY		
9696/01	Paper 1	maximum raw mark 100

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which Examiners were initially instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began. Any substantial changes to the mark scheme that arose from these discussions will be recorded in the published *Report on the Examination*.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the *Report on the Examination*.

The minimum marks in these components needed for various grades were previously published with these mark schemes, but are now instead included in the Report on the Examination for this session.

- CIE will not enter into discussion or correspondence in connection with these mark schemes.

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Section A

Atmosphere and weather

1 Fig. 1 shows the variation in night-time temperatures across rural and urban areas.

(a) Describe the change in temperature shown in Fig 1. [2]

The temperature rises some 6° from the lower lying rural area to the centre of the urban area. The temperature then declines less steeply from the town centre to reach about 1 degree in the rural area.

(b) Explain why there are differences in temperature between rural and urban areas. [4]

The temperatures are specified as night-time temperatures. Hence buildings in urban areas absorb more radiation than vegetation. This is then reradiated back to the atmosphere at night giving the urban heat island effect. Some heat is also released by denser populations and their activities.

(c) Describe and explain one difference in climate (other than temperatures) that occurs between rural and urban areas. [4]

Plenty to choose from:
Decreased wind speeds through greater friction but some tunnel effects giving locally increased speeds;
More hygroscopic nuclei and uplift from heating giving rise to precipitation;
Lower RH but greater cloudiness;
Pollution and photochemical fogs.

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Rocks and weathering

2 Fig. 2 shows the average depth of regolith (weathered rock) for areas with different climate and vegetation.

- (a) Which vegetation area has both the greatest depth of regolith (weathered rock) and the highest precipitation?** [1]

Tropical Forest

- (b) What is meant by the term basal surface of weathering?** [3]

The maximum depth to which weathering penetrates (usually in the context of deep chemical weathering). It thus marks the boundary between weathered and unweathered rock.

- (c) Explain how temperatures and precipitation can influence the types of weathering processes that produce the depth of weathered material shown in Fig. 2.** [6]

Temperature and precipitation control the type and speed of weathering processes. Thus water is required for freeze thaw as well as temperatures that fluctuate around freezing. Chemical weathering is most effective in areas of high ppt and temperatures which speed up the process. Areas shown on the diagram with little ppt (Tundra and deserts) have processes that are slow and ineffective. It is not necessary for candidates to develop all weathering processes nor are deep weathering and inselbergs etc. necessary. They can, however, be utilised to illustrate the role of temperature and ppt as can deep regoliths in the tropics.

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3 Table 1 shows average death rates for the world and for world regions in 2001.

- (a) (i) Give the meaning of the term *death rate*.** [2]

[crude] *death rate is*: the number of deaths, in a year, per 1000 (people).

Credit 1 element 0, 2 elements 1, all 3 elements 2

- (ii) Suggest reasons why the average death rate for MEDCs is surprisingly higher than the death rate for LEDCs in Table 1.** [2]

Apparently surprising but crude death rate takes no account of the age structure of the populations. The ageing of the populations of MEDCs is a demographic characteristic of which candidates should be aware, with its implications for 'Stage 5' countries in terms of the demographic transition model.

Whilst an explanation of age structure alone could achieve full marks, credit can be given for an awareness of factors affecting MEDC mortality rates such as the prevalence of cancers and cardiovascular diseases, or the implications of stress, diet, lack of exercise and obesity on health. If only these factors are considered, max. 2.

- (b) Explain why the average death rate for Africa was so high (14 per 1000).** [5]

An explanation may include factors by their presence e.g. widespread poverty or the prevalence of HIV/AIDS and by their absence e.g. lack of a clean water supply or inadequate delivery of health systems.

Good marks (4-5) for explanations which build up a broader picture of interactive factors in at least two dimensions (social, economic, environmental, political). Other indicators of quality may be the use of named countries or the recognition of specific elements within DR e.g. IMR.

Credit two data issues if raised: DR is an average figure, obscuring that in some African nations DR is better controlled and that some DR values were far higher than 14 per 1000; the potential contribution of data inaccuracy and problems of data collection.

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4 Fig. 3 shows international migration to the United States of America (USA) by source area, 1800-1995.

(a) (i) In which decade (ten year period) was total immigration the highest? [1]

1900-1910

(ii) Which source area dominated the USA's immigration in 1980? [1]

Latin America

(b) What two other items of information would you require for a fuller understanding of migration to the USA in Phase 5? Give brief reasons for your choices. [3]

Credit any item of information with a reason, for example,

- more recent data as figure ends in 1995 (did trends continue?);
- breakdown by source country as data is at continental scale/lacks detail;
- destination information of states or cities as USA is macro scale;
- information about who the migrants were as streams vary by age, gender, individuals/groups etc;
- information on motive as time period covers Atlantic slave trade, world wars and much economic migration.

Credit each 1 or 2 if well developed, to the maximum.

(c) Describe the character of one example of international migration you have studied and suggest reasons why it happened. [5]

Clearly much depends on the example used as candidates will be able to do different amounts of description and explanation.

Suggest credit reasons 2/3 (push and pull factors) and character 3/2 (who, when, where from, where to, how many, how? etc.)

The syllabus has a post 1960 dateline but in this context historical examples are acceptable e.g. Atlantic slave trade, Turkish labour to Germany postwar.

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5 Fig. 4 shows the layout of the two ancient cities within Hohhot in Inner Mongolia, an autonomous region of northern China.

(a) Compare the layout of the Chinese city with the layout of the Mongol city. [5]

A full comparison should recognise both similarities 1/2 and differences 4/3.

There are two main similarities: that both cities have walls and gates and are of comparable scale/number of buildings.

There are two main differences: the walls of the Chinese city contain the buildings whereas the Mongol city has grown outside the walls, mainly to the south. The layout of the Chinese city appears more regular/planned or on a grid pattern but the Mongol city is more free/haphazard and shows the signs of spontaneous growth. For one aspect only max.2.

(b) Suggest reasons why the residential segregation of ethnic groups develops within many urban areas. [5]

The use of the term **ethnic groups** is to try to avoid responses primarily on bid-rent and income differentiation. Accept tribe, family, community, village, people and language groups as well as religion.

Within urban areas **residential segregation** is the outworking of forces of attraction and forces of repulsion (whether the candidate calls them this or not).

Like attracts like so new arrivals have natural bonds with and links to others from the same ethnic group through shared language, tradition, religion, family or friendship ties. They also may have similar needs both social: for interaction, marriage partners, schooling, worship etc; and economic, e.g. to shop for food items or clothing specific to their ethnic needs or working for each other. Beyond this residential segregation enhances well-being through feelings of security and security in numbers, the maintenance of traditions and identification with "home".

Unlike ethnic groups may repel, keeping others out. At worst this relates to ethnic distrust, rivalry, disputes and violence some of which may be long-standing. It may be an expression of the needs of minorities to survive in urban areas and to "defend" themselves socially. It may be fostered by the working of the property market e.g. landlords, by discriminatory behaviour and by planning decisions.

Any examples may be used and may distinguish better answers.

Suggest credit elements of attraction 3/2 and of repulsion 2/3.

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Section B: The Physical Core

Hydrology and fluvial geomorphology

- 6 (a) (i) Define the terms *evaporation* and *evapotranspiration*. [4]

Evaporation is the transformation of a liquid (water) to a vapour (water vapour) by application of heat.

Evapotranspiration is as above but with the addition of transpiration from plants (i.e. vapour loss from stomata etc.)

- (ii) Describe the difference between infiltration and percolation. [3]

Infiltration is the entry of water into the soil by means of pores or small openings. Percolation is the flow of water through soil. Both usually in downward directions.

- (b) Draw a labelled diagram to show how water flows through a drainage basin system. [8]

Either a cross section or flow diagrams are acceptable. Diagrams should show interception, stemflow, overland flow, infiltration, through flow, percolation, groundwater flow, channel flow.

- (c) Explain how three different drainage basin characteristics can affect river discharge as shown on a storm hydrograph. [10]

Can chose from:
 Drainage basin shape
 Drainage basin density
 Drainage basin slopes
 Drainage basin geology
 Drainage basin land use

Any three should be explained in terms of impact upon flows and speed of flows thus affecting lag time and shape and scale of discharge curve on the hydrograph.

Candidates will probably

- L3 Provide a thorough, balanced explanation of the influence of three drainage basic characteristics on both river discharge and the nature of the hydrographs with, at least, implicit mention of lag times. (8-10)
- L2 Provide a reasonably full assessment of two characteristics and a limited, or no assessment of the third characteristics OR a limited assessment of three characteristics with somewhat vague reference to hydrographs. (5-7)
- L1 Not be able to relate characteristics to discharge and/or hydrographs in a meaningful way and will confine answers to very general statements of water movement. (0-4)

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Atmosphere and weather

- 7 (a) (i) Define the terms atmospheric stability and atmospheric instability. [4]

Instability is the condition by which a body of air rises and expands because it is warmer than surrounding air. The air will cool adiabatically.

Stability is where the air is cooler than surrounding air and will subside or not rise.

- (ii) Briefly describe the weather that is associated with atmospheric stability. [3]

Stability is usually associated with anticyclones hence calm weather, lack of ppt, often clear skies, maybe dews and fogs.

- (b) (i) Draw a labelled diagram to show the 'night- model' of energy exchange that occurs at the earth's surface. [4]

Should include heat radiated from earth's surface (LWR), cooling of air near ground, reflected (counter) radiation, loss of heat energy from ground.

- (ii) Explain how dew is produced. [4]

The loss of heat from the earth's surface during nocturnal terrestrial radiation cools the lowest layer of the atmosphere below dew point leading to condensation on vegetation and objects close to the ground.

- (c) Explain the term *greenhouse effect*. How might global warming affect the earth's climate? [10]

The greenhouse effect is produced by the entrapment of outgoing terrestrial radiation within the earth's atmosphere. This is vital for life on earth. Particularly effective in absorbing LW are the so called greenhouse gases of carbon dioxide, methane and to a lesser extent CFCs. It is the over production of these gases that has produced global warming. Climatic effects are increased in global temperatures (2-4° C) although not uniformly distributed. Temperature ranges will decline. Increased dynamism will produce greater storminess. Rising sea levels will increase humidity which in turn may affect ppt levels and incidence of tropical storms. Reward any sensible climatic implications.

Candidates will probably

L3 Produce a well balanced and authoritative account of both elements of the question, and demonstrate an accurate understanding of some possible climatic effects and the uncertainties of these predictions. (8-10)

L2 Provide an unbalanced account of both elements and/or a limited understanding. Answers might introduce relevant aspects, such as the effects of sea level rise, with no reference to climatic effects. (5-7)

L1 Offer a seriously limited understanding of both elements with limited reference to types of greenhouse gases and vague statements about global warming. (0-4)

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Rocks and weathering

- 8 (a) (i) Define the terms *flow* and *heave* as they apply to mass movements. [4]

Flow is the movement of materials downslope under the influence of gravity. Heave involves the raising of particles at right angles to the slope followed by vertical settling.

- (ii) Describe a rock slide. [3]

Rock slides occur on unstable slopes of high relief. The effects of bedding planes and joint planes are important. This allows rocks to fragment and provide a slippage plane.

- (b) Using a diagram show how volcanic activity can be associated with a plate margin. [8]

Constructive or destructive margins could be used to illustrate volcanic activities or both. Thus on sea floor spreading and the up-welling of magma allows the development of island volcanoes such as Surtsea, the Azores, Ascension Island etc. Destructive margins produce rising magma from the melted margins to produce island arcs or volcanic activity associated with fold mountains. Marks could be earned by well annotated diagrams

- (c) Outline and explain the factors that can influence the shape of a slope. [10]

The factors that influence slope development are:
 rock type – relative coherence and shear strength;
 structure – dip and bedding planes;
 earth movements – fault scarps, uplift;
 climate – type and rate of weathering and transportation processes; vegetation-protection and binding of root systems.

A fair bit to cover so do not expect detailed coverage of each point.

Candidates will probably

- L3 Demonstrate a good understanding of several factors, assess how these factors influence processes and how those processes affect slope forms. There will be some specific reference to slopes in terms of form, shape or general geometry. (8-10)
- L2 Provide a sound but limited assessment of several factors, but may be a little vague in processes and may only assess slope form in a very generalised way. There may be some attempt at explanation. (5-7)
- L1 Be unable to get beyond very general statements of factors and processes with no reference to slope form. Explanation will be seriously limited or absent. (0-4)

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Section C

- 9 (a) Give the meaning of the term *underpopulation* and describe one located example of underpopulation. [7]

For the term 4, underpopulation is the situation where there are,

- too few/not enough people 1;
- to make full use of the resources 1;
- at a given level of technology 1 (discriminator);
- some expression of the dynamic relationship e.g. the potential for immigration, or that more people would produce a rise in living standards 1.

For the description of an example 3, these are classically large areas such as Canada or Australia. A simple description links some population and resource detail, for instance the Stage 4 dynamic and encouragement of immigration for those with skills/professions; vast mineral resources etc. Local examples may be used e.g. of depopulated rural areas in LEDCs where agricultural output has fallen, land has been abandoned etc. due to rural-urban migration, the impact of catastrophe or AIDs.

- (b) Explain why countries may want to reach optimum population.

This is the theoretical ideal relationship between population and resources. It is the balanced or equilibrium position where optimum population achieves optimal resource usage and economic return and the highest GDP per person and living standards for everyone in a society.

A simple diagram may help.

It also overcomes the difficulties of underpopulation and unfulfilled potential whilst avoiding the problems and suffering of overpopulation. As such migration may be encouraged to underpopulated areas whilst anti-natalist policies may be pursued in overpopulated countries.

However there is legitimate debate as to whether optimum population exists in the classic manner as a point in time/absolute number of people. It is also seen as subjective as a government's view of what is optimum may not be that of the people's.

Examples are not expressly asked for but may assist the explanation and are therefore creditable, Singapore? the UK?

Suggest credit basic understanding of the term 3 and explanation 5.

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(c) **In the relationship between population and resources to what extent should a resource base be seen as changeable rather than fixed?**

To a large extent as mineral resources may be discovered, energy generated in new ways and food supplies increased by innovation (Boserup). That said there are certain aspects of a resource base which are effectively fixed e.g. thin or stony soils, mountainous terrain or lack of land area. Even Malthus allowed for theoretical arithmetic increase in food supplies in his *Essay*.

Candidates will probably:

- L3 Make a perceptive assessment of resource base, recognising elements of dynamism and relative fixedness, drawing on both theory and examples in a clear consideration of extent. **[8-10]**
- L2 Provide a limited assessment, which, while showing understanding of some aspects of a resource base lacks development or detailed exemplar support. **[5-7]**
- L1 Be unable to develop this convincingly, lacking the understanding, the skills in assessment (or time?) Show some knowledge of resources. **[0-4]**

Total: 25

10 (a) Describe how urban *pull* factors may encourage rural-urban migration in LEDCs. Support your answer with examples.

The action of **pull factors** is considerable, increases a person's *migrability* (how likely they are to migrate) and weakens attachment to source area.

In voluntary migration the strongest pull factors operate in the area of betterment or aspiration (e.g. a job, a better paid job, higher living standard, access to higher order education and medical services) although others may be social (e.g. presence of spouse, family or friends in the urban area).

In forced (involuntary) migration urban areas offer survival (water, food), security (from war or hazards) or simply represent the unknown as a last resort.

Pull factors may be actual e.g. TNC investment and recruitment programme or perceived e.g. dreams of fame and fortune, free housing. The quantity and quality of information about urban areas available to rural dwellers varies.

Credit is for **pull factors** only (many push factors being simple opposites).

Better answers should have some specific located example(s). For general or generic examples max. 4.

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(b) Using examples, explain where rural migrants are likely to settle in urban areas of LEDCs.

A number of approaches are possible here. An annotated diagram or map would serve well but may be unlikely. A theoretical approach could be taken using one of the models of LEDC urban land-use or the concept of bid-rent. Most candidates are likely to take a narrative approach. This could be in relation to one or two urban areas they've studied such as Nairobi or Rio or in more general terms identifying locations such as,

- slums and degraded older buildings often centrally or near dock zones
- shanty towns (many now decades old) the illegal occupation of marginal land e.g. hilly, marshy, along railway lines
- spontaneous settlement, building temporary shelters where there is opportunity or available material
- joining the massive homeless populations sleeping on the streets or in disused buildings.

Another approach is to identify factors which would attract new arrivals such as areas where friends, family or the same language group already live; areas where there is work available (can not afford transport costs/live near job); or areas where there is help available e.g. housing schemes, NGO activity.

(c) To what extent is the existence of shanty towns a problem that urban authorities cannot solve?

Most candidates will appreciate that shanty towns are an enduring part of the urban fabric and not temporary. Measures to destroy them e.g. by bulldozing have been controversial, confrontational and short-lived as the areas are swiftly rebuilt. Authorities in most LED cities now look to upgrade or improve shanty towns in a number of ways and no longer see their existence simply as a problem. There have been some recent studies of the function of shanty towns which emphasise the positive aspects of their existence within the urban system as home (and work?) to millions of people.

Another possible aspect would be that curbing rural-urban migration is difficult and encouraging urban-rural migration has had limited success where it has been attempted e.g. Brazil.

Candidates will probably:

- | | | |
|----|--|---------------|
| L3 | Produce a high quality assessment distinguished by its overall perspective and detailed exemplar support. | [8-10] |
| L2 | Present a sound but limited assessment of the shanty town issue which shows some knowledge and understanding of a few key issues but which either remains general or is not developed. | [5-7] |
| L1 | Offer a simple piece about shanty towns with little or no assessment of extent. May consider "success" of improvement schemes rather than address the question set. | [0-4] |

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11 (a) Outline the characteristic functions of the Central Business District (CBD). [7]

Functions may be expressed in sector terms (retail) or in terms of the land-use that results (shops and stores).

Coverage should include retail, offices, banks and administration, no matter what scale of urban settlement is addressed. Other functions may include professional services such as lawyers; transport such as the bus or railway station; public buildings such as courts, library, museum; education, such as a college.

There may be still more functions depending on the places studied - some green space or parks; a little manufacturing of a certain kind; residential, usually apartments; parliament, if it's the capital; religious e.g. temples or cathedral; the informal sector e.g. vending, snacks?

Indicators of quality may be a little descriptive detail so, rather than 'shops' something on high threshold/high order, comparison goods or a mall, but we should not expect much for the modest mark allocation.

(b) How would you collect and record information about land-use in the CBD, when doing fieldwork in an urban area? [8]

Ideally from direct observation backed up by secondary sources e.g. local plans, newspaper material.

Suggest credit collection 6, mark on merit as a number of approaches are possible,

- where transect, main roads, PLVI outwards, sample or whole area study - when weekday or weekend, day or evening
- who using a team, size of team, paired with a recorder
- how using a map, on foot, by direct observation, carefully, asking questions to clarify etc.

Credit recording 2, most suitably done on a map, plan or recording sheets or in a field notebook, perhaps using a predetermined classification or colouring system.

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(c) Assess the possible advantages and disadvantages for shops (retail outlets) of locating near the edges of urban areas rather than centrally.

Peripheral locations are increasingly popular in many urban areas, offering space, access, parking, cheap(er) land, linkages for deliveries, a better shopping environment, agglomeration potential etc. Disadvantages are where there is limited private transport, poor road links, edges are perceived as remote, unknown and inaccessible and where other users are remaining and consolidating in the CBD.

The direction of the argument may depend on the candidate's home country and personal experience and their ability to reflect geographically on it, as much as on what they have studied.

Candidates will probably:

- L3 Develop a reasonably balanced assessment of the advantages and disadvantages of urban edge locations, showing an awareness of cost/benefit and both retailers' and customers' needs, supported by examples. **[8-10]**
- L2 Make a sound but limited assessment of advantage and disadvantage, which may be unbalanced and/or quite general but show some satisfactory understanding of urban areas. **[5-7]**
- L1 Struggle to deal with the question effectively, through lack of knowledge, understanding or skills of assessment. Descriptive and fragmentary responses remain in this level. **[0-4]**

Total: 25