

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
GCE Advanced Subsidiary Level and GCE Advanced Level

**MARK SCHEME for the October/November 2010 question paper
for the guidance of teachers**

9696 GEOGRAPHY

9696/13

Paper 1 (Core Geography),
maximum raw mark 100

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Section A

Hydrology and fluvial geomorphology

1 Fig. 1 shows a meandering river channel.

(a) On Fig.1 :

(i) Mark and name a pool; [1]

Areas marked with diagonal lines

(ii) Mark and name a riffle; [1]

Areas marked with small circles

(iii) Draw and label a line representing the thalweg (line of maximum channel depth/velocity). [2]

Line should swing along channel from left to right joining the pools and riffles.

(b) Explain how a meandering channel and its landforms are produced. [6]

Meandering channels are produced when the thalweg follows a sinuous path through pool and riffles to cause erosion on the outer bank. This imparts a secondary flow called helical (helicoidal) flow which is a spiral flow elevating the water on the outside of the meander with a return current at the inside of the meander. This produced the river cliff and point bar shown in Fig. 1. Oxbow lakes can be credited.

[Total: 10]

Atmosphere and weather

2 Fig. 2 shows some possible consequences of global warming in North and South America.

(a) Describe the nature and distribution of the possible consequences of global warming that are shown on Fig. 2. [4]

Higher temperatures are most prominent in continental interiors although in the polewards areas they appear as ice melt. This has the effect of raising sea levels which the low lying eastern coastal areas are mostly at risk. In the interior, fires and droughts are found whilst large river catchments are prone to floods.

(b) Explain how these consequences can be linked to changes in the composition of the earth's atmosphere. [6]

Through greenhouse gases. Human activities have produced more carbon dioxide and methane which has enhanced the greenhouse effect. The greenhouse effect should be explained. This gives higher global temperatures which can result in the heating of continental interiors and the melting of polar caps and glaciers which could bring about floods in catchments and rises in sea level.

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Rocks and weathering

3 Figs 3A and 3B show two types of mass movement.

(a) (i) Identify the type of mass movement occurring in Fig. 3A. [1]

Mud or earth flow

(ii) Identify the type of mass movement occurring in Fig. 3B. [1]

Landslide or slump, rotational slide

(b) Explain how each of the mass movements in Fig. 3A and Fig. 3B occur and describe their effects on slopes. [8]

Mud flows occur due to the saturation of the soils on slopes that exceed 10 degrees. The pore pressure increases such that the material lacks cohesion and is changed in definition. The material moves away from the slope in a relatively rapid movement and produces a pronounced toe at the foot of the slope.

Land slumps occur where the shear strength is exceeded by the shear stress. This often occurs (as here) where there is a geological unconformity. Often the trigger is produced by earthquakes or very heavy rain causing the slope to become unstable. The slump occurs in segments along a concave sliding surface causing some backward rotation

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Population

4 Fig. 4 shows a family planning poster from Bolivia, an LEDC in South America.

- (a) Describe how the poster conveys the message about family planning. Support your response with evidence from Fig. 4. [5]

The caption states clearly that it is a human right to have access to family planning.

The couple and child are smiling and this suggests that planning your family is a good thing and makes you happy. They are also well-dressed, and modern in appearance, suggesting that wise, prosperous up-to-date people seek to plan their families. There is also a smiling approachable doctor, suitably equipped, offering a range of contraceptive options, which suggests choice and options. The couple are seeking his advice together, so it is not left to the woman to organise. And they already have a son, so after one child, family planning is being promoted as a good idea, suggesting that the spacing between children can be lengthened. The poster within a poster (of contraceptive methods) and pictorial representation may be an attempt to reach the sizeable illiterate population within this LEDC.

Suggest an aggregate marking approach on overall quality of skills of observation and interpretation. Comprehensive responses are not required.

- (b) Explain briefly why family planning services may not be available to everyone in LEDCs. [5]

The question widens from Bolivia, of which no specific knowledge is expected.

There are many possible reasons:

social	e.g. traditional societies, cultural constraints, the influence of the Roman Catholic church
economic	e.g. lack of funding, programmes limited in coverage to larger centres, costs / inability of the poor to afford what is on offer
environmental	e.g. remoteness and isolation, migratory groups, rural/urban divide
political	e.g. government have other priorities, war and instability, restriction on NGOs, nature of regime

Suggest that a response developed in two dimensions, showing a grasp of the realities and difficulties some people and some LEDCs face, may achieve full marks.

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Migration

5 Fig. 5 shows the relationship between age and the rate of migration, based on census data from the USA, an MEDC, in 2000.

(a) Identify the age group in which it was recorded that:

(i) the highest percentage of females migrated; [1]

20–24

(ii) the rate of migration of both males and females was 10%. [1]

45–49

(b) Describe the overall relationship between age and the rate of migration, supporting your response with data from Fig. 5. [4]

High rates for children (up to 24%) falling with age to 15–17 (13%), before increasing fast to the peaks for females and males, 20–24 (38%) and 25–29 (34%). Then fall sharply, but at a decreasing rate until 80s (approx. 5%), giving a fairly smooth concave curve.

(c) Suggest two reasons why a small percentage of people aged over 60 years migrates. [4]

This broadens to the age group generally and assumes no knowledge of USA.

Possible reasons include both “positives” and “negatives”:

- retirement is a settled phase of life when people have made their choices and live with them
- much migration relates to employment and in this age group most are retired
- many older people have limited means (pensions) and moving can be costly
- older people may want to avoid the hassle and hard work of moving
- older people have less energy and may be in poorer health
- seniors may have less appetite for change so ignore push/pull factors
- the familiar may be more appealing to them than the new
- habit patterns and networks of family and friends are established
- other

[Total: 10]

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Settlement dynamics

6 Fig. 6 shows land-use in central Vancouver, a city on the west coast of Canada, an MEDC.

(a) Describe the location and shape of Vancouver's CBD core. [3]

Credit 1 three observations, (reserve 1 for either location or shape), such as:

- to the north of the extract
- just inland, to the south of Burrard Inlet
- in a block, around several roads (gridiron)
- main axes Hastings Street and Georgia Street,
- extending east along Hastings St. and SW along road to Granville Bridge
- surrounded by area of mixed offices and shops
- other

(b) Using evidence from Fig. 6, suggest two reasons why newer apartments were built south of the road Broadway. [4]

A number of possible reasons may be suggested, such as:

- lack of space: area north of Broadway developed first, so was already built-up, evidence includes CBD core and older houses
- proximity to both CBD and a main axis (Broadway)
- land was further from PLVI in CBD, so cheaper to purchase
- planning authorities' decision, permission or land allocation (E-W zone)
- other

Credit 2 any two developed reasons that combine observation with understanding of urban dynamics.

(c) With the help of Fig. 6, explain how proximity to water (the Pacific Ocean, False Creek and Burrard Inlet) has influenced land-use. [3]

In three different ways, seen in the development of:

- parks and recreational areas fringing the Pacific Ocean, suggesting amenity value, views, etc.
- docks and industry (around the creek and the inlet), so economic activity linked to shipping
- (minor) shops and offices on Burrard Inlet and at the Main Street end of False Creek, possibly for related commercial activities (or the views?)

Credit each land-use 1.

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Section B: The Physical Core

Answer *one* question from this section. All questions carry 25 marks.

Hydrology and fluvial geomorphology

- 7 (a) (i) Define the terms *water table* and *groundwater recharge*. [4]

The water table is the upper surface of the zone of groundwater saturation. Groundwater recharge is the action by which water is added to the water table (aquifer) after losses to channel, etc.

- (ii) Explain how evapotranspiration occurs. [3]

Evapotranspiration represents the combination of evaporation from the earth's surface due to heat and the transpiration from vegetation.

- (b) Explain the causes of river floods and droughts. Describe the effects these conditions have upon the channel and landforms of river valleys. [8]

The causes of floods and droughts are excess and insufficiency of rainfall input. Thus storms and hurricane, etc can produce sudden rainfall amounts which the channel cannot cope with. Nival floods in glaciated areas also have this effect. Droughts occur in times of rainfall deficit reducing channel discharge. They will be found in semi-arid areas. The effects on the channel are overbankful discharge which can form levées and flood plains. Droughts will reduce channel flow and competence leading to braiding and the silting up of channels.

- (c) Explain how human activities might affect the shape of a river's hydrograph. [10]

Human activities can affect the catchment area and thus the flows represented on the hydrograph. Changes in land use (clearance, urbanisation) can increase overland flow and thus shorten lag times, increase peak discharge, steepen the rising limb. Afforestation will have the opposite effects. In both cases the balance between baseflow and quickflow will alter. The construction of storm drains, channel diversions, etc may allow the more rapid decline in discharge represented by the recession curve.

Level 3

Human activities directly linked to the hydrograph and what the hydrograph represents in terms of discharge. [8–10]

Level 2

Concentration on human activities in catchments with impact upon flows. Hydrographs appear more as an afterthought. [5–7]

Level 1

Urbanisation and woodland clearance with little relationship to hydrographs. [0–4]

[Total: 25]

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Atmosphere and weather

- 8 (a) (i) Define the terms *sensible heat transfer* and *latent heat transfer*. [4]

Sensible heat transfer is heat energy that is transferred by convection or by direct conduction.

Latent heat transfer is that heat which is transferred during a change in state e.g. water to water vapour by evaporation or water vapour to water by condensation.

- (ii) Briefly explain the formation of fog. [3]

Fog is formed due to cooling of air and subsequent condensation around hygroscopic nuclei close to the earth's surface. Can be radiation or advection cooling.

- (b) With the help of a diagram, describe what happens when solar radiation enters the earth's atmosphere. [8]

Solar radiation enters the earth's atmosphere as short wave radiation. Of this about 27% is absorbed or reflected by clouds, 24 % absorbed by the atmosphere (scattering) and 4% reflected by the earth's surface leaving c 45 % absorbed by the earth's surface where it is converted to long wave radiation and released by conduction and convection to heat the atmosphere. Simple annotated diagram could account for most marks.

- (c) Describe the global pattern of atmospheric pressure. Explain how this pattern is produced and why it varies seasonally. [10]

The global distribution of pressure exists in broad belts. Lower pressure at the equator is followed by sub tropical highs low pressures in mid latitudes and polar highs. This is disturbed by the seasonal movement of the thermal equator and the seasonal effects over continental areas and oceans. Thus continental interiors have high pressure during the N hemisphere winter and low pressure during the summers. Some may describe it in terms of junctions between the cells on the tricellular model, which is acceptable. Rising air produces lower pressure due to surface heating, whilst radiation cooling will produce sinking air and high pressure (e.g. over oceans and polar areas).

Level 3

Good description of the distribution of pressure belts and the reasons for high and low pressures and seasonal effects due to the input of solar radiation. [8–10]

Level 2

A general grasp of the distribution of pressure and some idea of its causes due to heating. Only a vague appreciation of seasonal change. [5–7]

Level 1

Little beyond a vague appreciation of high and low pressure with poor description of distribution and little attempt at explanation. [0–4]

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Rocks and weathering

- 9 (a) (i) Define the terms *transverse (tear) fault* and *ocean ridge*. [4]

Transverse are large scale tear faults that occur along the mid-Atlantic ridge. Ocean ridge comprise massive extrusions of volcanic lava along the centres of constructive plate boundaries.

- (ii) Briefly explain what occurs at a conservative plate margin (e.g. San Andreas fault). [3]

Where plates slide past each other. Thus the Pacific plate is moving NE past the North American plate giving rise to earthquakes.

- (b) With the help of diagrams, explain how fold mountains and island arcs are formed at tectonic plate margins. [8]

Fold mountains are the result of either two continental plates meeting or an oceanic plate and a continental plate meeting. In the former case the sediments are squeezed upwards between the two plates (e.g. Australian plate and Eurasian plate giving rise to the intensely folded Himalayas). In the latter ocean floor sediments are folded upwards on the margin of the continental plate (e.g. SE Pacific). Island arcs are the result of the meeting of two oceanic plates and the rising of magma from the melted plate margin.

- (c) Explain how human activities may influence the weathering of rocks and the development of slopes. [10]

Human activities have influenced rock weathering through pollution producing sulphur dioxide, increased carbon dioxide, etc to increase the amount and strength of acidulated water available for chemical weathering. The results are evident in the chemical weathering of limestone buildings, statues, etc. Also vegetation clearance has exposed rocks to rain and heat which has aided weathering processes. Change in slopes has been affected by the destabilisation of slopes by under cutting (road building, mining, etc), quarrying as well as the dumping of material on slopes (e.g. waste tips). The diversion of streams and damming can also lead to slope instability. The end result is to produce mass movements some of which can prove catastrophic.

Level 3

Attention to both weathering and to slopes with good explanation and exemplification. [8–10]

Level 2

Acid rain, but little else on weathering. Some attention to mining, quarrying, etc, but only partial explanation in terms of slope impact. [5–7]

Level 1

Vague references to weathering, but no explanation as to which processes are involved. Mining and quarrying mentioned, but no explanation as to how they might affect slopes. No mention of mass movements. [0–4]

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Section C: The Human Core

Population

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

number of deaths/people who die, per thousand (or %), per year

Credit two elements 1 and the full definition 2

- (ii) With the help of examples, outline *two* circumstances under which death rates may increase. [5]

A number of situations increase, such as war and epidemic disease. Astute candidates may observe that in an aged population DR rises because of the changing age structure, even though people are long-living.

- (b) Describe and explain the differences in the death rate between countries in *two* different stages of the demographic transition. [8]

Any of the five stages may be taken. A simple sketch diagram could assist the description and be annotated with explanatory notes. Explanation may cover both the level of the death rate and the trend.

For a response which is descriptive but not explanatory, **max. 4**.

- (c) According to a government projection, 1 in 4 children born in the UK, an MEDC, in 2009, will live to over 100 years of age.

To what extent is this kind of projection useful? [10]

Ageing populations present challenges in terms of provision and care, e.g. tax burden, pensions, healthcare. Projections are used to plan for such a future and so may be useful to government departments, local authorities, providers of services, etc. Candidates may be aware that different population projections exist (variants) and depend on the quality of the data collected, and assumptions about trends and other circumstances, which may not hold.

Candidates will probably:

Level 3

Provide an effective assessment based on good conceptual understanding of population projections, with some examples. [8–10]

Level 2

Make a reasonable attempt, which may contain good points, but which lacks detail or development. Offer a valid, but limited, assessment. [5–7]

Level 1

Offer one or more basic ideas and struggle to deal with the issue. Take a descriptive approach, perhaps asserting rather than assessing. [0–4]

[Total: 25]

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Population / Migration

11 (a) (i) Identify X and Y in the following equation:

$$\text{population change} = (X + \text{gains from migration}) - (\text{deaths} + Y) \quad [2]$$

X is births, or number of births 1

Y is losses from migration or total number of emigrants 1

(ii) Use examples to outline two situations in which populations may decrease (record a negative rate of population growth). [5]

A number of possibilities exist, but simply, where $DR > BR$, and immigration and emigration are balanced, as in some MEDCs. Or where NIR is moderate, immigration is negligible and emigration is high(er). Disasters, war, famine acceptable but needs long term effects.

Reward understanding of the balance between the two components (natural increase, migration) and examples. Credit situations 2 and 3 or 3 and 2.

(b) For one of the situations you outlined in (a)(ii), suggest what governments may do to increase the population and the difficulties the governments may face. [8]

Much depends on the response to (a)(ii). Simply expressed, the main strategies are to increase the birth rate with some populationist policy as in France or Singapore, or to encourage immigration (especially of those who are economically active). Any difficulties are creditable, e.g. resistance to change, lifestyle choices for BR; or, for immigration, integration, perception of immigrant groups, language issues, etc.

(c) How useful is the demographic transition model in the early 21st century?

Candidates may observe that Stage 1 is of historical interest only, but that countries may be located in all 3 or 4 other stages. Stage 5 may receive special attention. The model remains a generalisation, descriptive rather than explanatory and Eurocentric. No particular position is anticipated or acceptable.

Candidates will probably:

Level 3

Provide a high quality assessment which links strong conceptual understanding of the DTM with contemporary detail. [8–10]

Level 2

Make a sound response which may be good in parts, but which is limited through lack of scope or 21st century context. [5–7]

Level 1

Lack the knowledge, understanding and/or skills to make more than a basic response. May describe rather than consider usefulness. [0–4]

[Total: 25]

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Settlement dynamics

- 12 (a) (i) Describe briefly the character of retailing (shops) in the Central Business District (CBD) of large urban areas. [3]

Character may include number, type, scale, layout, dynamic, etc.

- (ii) Give two reasons why there may be little residential population in central areas of cities. [4]

A number of **reasons** may be credited, including:

- bid-rent, residential land-use is uncompetitive in areas of high demand
- accommodation may only be high-class apartments for elite groups
- noise, congestion, pollution, etc. can make central areas unsuitable or less desirable than suburbs
- planning decisions / land allocation in favour of other users
- clearance of the homeless, street dwellers, etc.
- other

Suggest credit each reason 2 to the maximum.

- (b) Describe one or more developments in a large urban area you have studied and suggest reasons why they occurred. [8]

An open question allowing candidates to use the example(s) of settlement dynamics which they have. Any **developments** are acceptable, in location (CBD, inner areas, suburbs, fringe) and function (retail, services, manufacturing, residential, etc.)

The **reasons** may combine need, opportunity, finance /profitability, planning, etc.

For a response which remains descriptive, **max. 4**.

- (c) Assess the success of one or more attempts to provide infrastructure (such as transport, power supply and water supply) for a city you have studied. [10]

The syllabus requires a case study of city infrastructure, so expect a range of examples and locations. Accept existing provision, new projects and upgrading. Success may be considered as who it reaches, if it works, cost/benefit, outcomes, unforeseen difficulties, etc.

Candidates will probably:

Level 3

Develop an effective assessment of the success of the chosen attempt(s), with good exemplar detail. [8–10]

Level 2

Make a satisfactory but limited response, which may be rather general. The assessment may be broad, partial or lack support. [5–7]

Level 1

Make one or more basic points in a response which offers little or no assessment. May write generally of attempts or use a city in name only. Offer notes or fragments. [0–4]

[Total: 25]