UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Advanced Subsidiary Level and GCE Advanced Level

MARK SCHEME for the May/June 2011 question paper

for the guidance of teachers

9696 GEOGRAPHY

9696/12 Paper 1 (Core Geography), maximum raw mark 100

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

* Cambridge will not enter into discussions or correspondence in connection with these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2011 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

Section A

1 Photograph A shows part of a river channel and valley floor.

(a) Draw a labelled sketch to show the main features of the river channel shown in Photograph A. [4]

The sketch should show the features of the meanders and the braided nature of the channel. Some reference to areas that would be covered at higher discharge level should be included for maximum marks. 2 for sketch and 2 for labelling.

(b) Describe feature X and explain how it might have been formed. [6]

X is an eyot that is vegetated and surrounded by exposed sediment. Streams carrying coarse sediments develop sand and gravel bars. These types of bars seen often in braided streams which are common in elevated areas. Bars develop in braided streams because of reductions in discharge. Two conditions often cause the reduction in discharge: reduction in the gradient of the stream and/or the reduction of flow after a precipitation event or spring melting of snow and ice. Vegetation traps further sediment and increases height of eyot so vegetation is permanent and only covered briefly a very high discharge.

2 Fig. 1 shows temperature changes across an urban area at 3.00 am (03.00).

(a) (i) What is the difference in the temperature recorded at 0.9 km and 10 km? [1]

4.8 – 0.5 = 4.3 °C

(ii) What is the difference in the temperature recorded at 0 km and the river valley at 2 km? [1]

3.8 – 1.6 = 2.2 °C (accept tolerance of 0.1)

(b) Give reasons why the CBD is warmer than the river valley and rural area. [4]

Because of the heat island effect. During the day concrete tarmac and buildings absorb heat via swr more readily than either river water or vegetation in rural areas. This heat is released more slowly as lwr keeping the CBD warmer at night than the other two areas which cool more quickly.

(c) Briefly explain two differences other than temperature in the climates of urban and rural areas. [4]

A lot to chose from, but only limited amounts required as each is only worth 2 marks.
Reduced wind speed in urban – greater friction.
Increased urban ppt – more hygroscopic nuclei plus convection
Increased urban fogs and atmospheric pollution – more pollutants from anthropogenic, industrial sources.
Less urban frosts and snow due to higher temps and less surface condensation.
Lower relative humidity in urban due to less evapotranspiration and water bodies.

3   **Fig. 2 shows how climate affects different types of weathering.**

(a)   (i)   **From graph A, name a weathering process that you would expect where ther~~~ mean annual temperature of –10 °C and mean annual rainfall of 800 mm.**

Freeze thaw or frost shattering

(ii)   **From graph B, name a weathering process that you would expect at a mean annual temperature of 18 °C and mean annual rainfall of 1400mm.** [1]

Expect either hydrolysis or carbonation but accept any other appropriate chemical weathering process for that climate.

(b)   **Explain how vegetation may contribute to both chemical and mechanical weathering processes.** [3]

Break down of vegetation provides humic acids especially effective in adding to the sum total of chemical weathering in TRF areas. Mosses and lichens may initiate pitting on rock surfaces; later ideal areas for salt pan development. Tree roots can grow into joints and bedding planes where there may be moisture and washed in soil. Seedlings may grow in such areas. In both cases extreme pressure can be exerted leading to, or adding to, mechanical weathering break up.

Both processes must be covered for the 3 marks

(c)   **What is meant by the term *acid rain*? Explain how acid rain may affect the weathering of rocks.** [5]

Acid rain is water with an increased level of acidity, lower pH due to solution of gases in the rainwater. Rain is naturally slightly acidic due to solution of CO_2, typical pH of 5.6. Pollutants from fossil fuels such as sulfur dioxide and nitrogen oxides are released into the air. These substances can rise high into the atmosphere, where they mix and react with water, to form weak acids known as acid rain with pH as low as 4.0 which is more than 10 times as acidic as normal rain.

Acid rain can cause corrosion of certain rocks, including ancient and valuable statues. This is because the sulfurous and nitrous acids in the rain chemically reacts with calcium carbonate in rocks such as limestone, chalk and marble to create gypsum, which then flakes off. Acid rain also causes an increased rate of oxidation for iron affecting rocks such as granite, sandstones and clays. Thus weathering rate is increased.

4   Fig. 3 shows the percentage of population that experienced food shortage in 2009.

(a) Name **one** country shown in Fig. 3 where 5% or less of people were undernourished.

Accept any one valid country. USA, Australia, South Africa likely

(b) Describe the distribution of countries in Fig. 3 which experienced severe food shortages (over 35% of people undernourished). [3]

All in Africa (1). Names not needed (but may be known or attempted), description of where the countries are: some in central, west and east Africa, a continuous zone in southern Africa (from Angola to Mozambique) and island (Madagascar) (2). Central landlocked country (Congo, Dem. Rep. of) the most severe (over 50%) (1).

(c) Outline some of the causes of food shortages. [6]

The causes of food shortages are various. Candidates may explain food shortages theoretically in syllabus terms, as when demand exceeds supply, and link this to population change (growth from natural increase and/or immigration); resource development (e.g. lack of technological innovation) and constraints (e.g. war, climatic hazards such as drought or floods). A full answer would include exemplification.

An alternative approach would be case-based, for example, taking a context such as contemporary Zimbabwe, or Pakistan after the monsoon floods (2010). Candidates may legitimately explain a local food shortage rather than a national one. Any example is acceptable; the location does not have to appear in the >35% classes in Fig. 1.

Whilst many responses will outline multiple causes (environmental, social, economic, political), a full answer consists of at least two developed causes. For one cause, max. 3.

5   Figs 4A and 4B show the five largest foreign-born (immigrant) groups in USA and Australia in 2001.

(a) Using the information in Figs 4A and 4B, compare the pattern of immigration in Australia and USA. [3]

The key is to compare the two countries. The data for Australia indicates the majority are from the UK (25.2%)/New Zealand (8.7%) ie MEDCs. The data for the USA indicates that the majority are from Mexico (29.5%) and also Philippines, ie LEDCs. They could also notice that the overall numbers are much higher for USA. Any three relevant points, must be an element of comparison, must refer to the data. Max 2 if no comparison/data.

(b) Describe **one** way that governments of receiving countries can affect immigration? [2]

Basically governments can either encourage or discourage migration, through incentives or immigration control, for example the £10 Poms – assisted passage, USA border control. Either a reasonable explanation of one control or mention both for 2 marks.

(c) Describe and explain the possible impacts of immigration on the receiving cou~~~~

Candidates must *describe* and *explain* the impacts on the *receiving* countries. One exa~~~~ could be used to answer this. Credit detail and also recognising the positive and negat~~~~ impacts. Positive impacts could be new skills or filling a skills shortage, certain professions are often encouraged, cultural benefits (broaden experience of other cultures), workers generating income tax etc. Negative impacts could be resentment from locals, possible strain on services if large families, cultural divide etc. Credit use of examples, suggest 3 reasonable points which have been explained could get to 5 marks.
Needs both positive and negative for 5 marks.

6 **Fig. 5 shows the percentage of the population in each province of South Africa living in squatter settlements (informal housing) in 2007. The average for the whole of South Africa was 11.9%.**

(a) **Which province had the smallest percentage of its population living in squatter settlements?** **[1]**

Limpopo

(b) **Describe the pattern shown in Fig. 5.** **[4]**

Apart from Limpopo the highest percentages are in the North/Central area, particularly up against Botswana border. Around average in two areas, Western Cape in extreme SW and Mpumalanga in NE. Lowest in north, but fairly low in all coastal provinces except Western Cape.

(c) **Explain why residential segregation occurs in urban areas in LEDCs.** **[5]**

Residential segregation refers to the physical separation of cultural groups based on residence and housing. People are residentially segregated across a number of dimensions, including socio-economic status, religion and race & ethnicity. Q does not refer to S Africa, but some candidates will refer to racial segregation from apartheid days and its continuing effects.

Economic: as the rich pull away from the rest of society, they either relocate to areas where other affluent families live, or they tend to bid up the price of local housing. The spiraling costs of housing, in turn, displace families with lower incomes. Traditionally the wealthy are located close to the CBD in LEDCs.

Ethnic/social: different racial and ethnic groups are segregated. Social and ethnic differences are closely related to each other in American cities, and the vast majority of the most underprivileged social and occupational groups come from among African Americans. As the most underprivileged ethnic groups, besides their unfavourable social position, they are also afflicted by a whole series of ethnic prejudices and discrimination. Thus in North American cities low-status groups are segregated in similarly few, large, and spatially coherent areas as the high-status groups.

Examples are not required, but religious segregation e.g. Christian/Muslim, Northern Ireland (Catholic/Protestant), Iraq (Shi'a/Sunni), etc. can also be used.

Section B

7 (a) (i) **Define the terms *infiltration* and *percolation.***

Infiltration – the movement of water into the soil from the surface i.e. rainfall or snow melt. (2)

Percolation – the downward movement of water under gravity through the pores, joints etc. of a permeable rock. (2)

(ii) **Describe how and when *overland flow* may occur.** [3]

Hortonian overland flow occurs when rainfall exceeds the infiltration capacity of the soil. It occurs when there is excessive rainfall and likelihood will be increased on slopes.
Look for three separate positive points.
Saturation overland flow also acceptable

(b) **With the aid of a diagram or diagrams explain <u>three</u> channel landforms that occur along a meandering stretch of river.** [8]

From the syllabus we have; 'pool and river sequences, bluffs, river cliffs, point bars', but allow floodplains and levées (also listed) and ox bow lakes. Well annotated diagrams could score full credit, we need three landforms so maximum of 6 marks for only two and 3 max. marks for just one.

(c) **Outline the causes of floods in a catchment and explain how such floods may be prevented or ameliorated (reduced).** [10]

Causes may be many and varied but one essential is high levels of precipitation or snow melt! Sometimes ignored! Of course flooding from catastrophic dam collapses and rivers impounded behind landslips or lava flows do occur. Many may be limited on the physical causes and keen to stress the human effects of deforestation, urbanisation and so forth. Hence balance is needed. Again, prevention can be wide ranging from engineering (levée or dam construction, channel straightening, land drainage) to changing land use patterns (afforestation, terracing, planning restrictions on building to reduce run off and so on)

Candidates will probably:

Level 3
Balanced approaches to the two demands with the second a logical follow on from the first. Realistic understanding backed up with at least two good, detailed examples. Although evaluation has not been specifically asked for, good candidates will address this in answering 'How floods can be prevented or ameliorated'. [8–10]

Level 2
Less detailed or accurate but both demands covered although not so well balanced at the lower parts of this level. Examples will be less detailed and/or less apposite. [5–7]

Level 1
Weak answers with causes limited and with possible major omissions. Lack of examples and very generalised statements in addressing the second part of the question. [0–4]

8 (a) (i) Define the terms *environmental lapse rate* and *adiabatic lapse rate*.

Environmental lapse rate is the actual rate at which temperature decreases with a~~~~ at a given place and time.

Adiabatic lapse rate is the rate of temperature change with height of a parcel of air.

(ii) Briefly describe the difference between the dry adiabatic lapse rate and the saturated adiabatic lapse rate. [3]

DALR is the change in temperature with height of an unsaturated parcel of air (1c per 100m) whereas the SALR is the change in temperature with height of a saturated parcel of air and is slower (0.4–0.9c per 100m)

(b) Using diagrams, explain how stability and conditional instability occur in the atmosphere. [8]

Diagrams should show the correct positioning of the lapse rates. Explanation should be for conditional instability the forced ascent of air parcels and subsequent cooling to dew point temperatures and the further rise of air at the SALR causing condensation, cloud development and the possibility of precipitation. Stability occurs where a rising parcel of air is always cooler than the surrounding air (DALR and ELR) and hence displacement does not occur.

(c) Explain the more likely climatic and other effects of global warming. [10]

An opportunity for global warming sceptics, but most should explain how global warming is occurring through the enhanced greenhouse effect as a result of human activities. The most likely effects in terms of climate could be many and varied, but the increased warming could lead to a polewards shift of climatic belts with drought and other consequences (fires) extending over wider areas. Another possibility could be an increase in dynamism of climatic systems due to heating hence more extreme events (storms hurricanes etc). Other effects will feature sea level rise and the consequences for areas such as the Maldives, Bangladesh etc. A lot of possibilities so do not expect a global coverage.

Candidates will probably:

Level 3
Good explanation of global warming and its human component. Well selected examples of climatic and other effects with some attempt at justification. [8–10]

Level 2
Brief explanation and a tendency to launch into effects often somewhat sensationalised. Little attempt at justification. [5–7]

Level 1
Only stray effects with little/no attempt at explanation or justification. [0–4]

9   (a)   (i)   **Define the mass movement terms *heave* and *creep*.**

Heave is the displacement of soil particles due to insolation expansion or freeze-tha~~~

Creep is the slow, down slope movement of particles under gravity.

(ii)   **Briefly describe how these processes can affect the shape of slopes.**   **[3]**

As very slow movements they tend to round or smooth slopes, although many will see the result in terracettes, accumulation behind walls and trees /telegraph poles at angles.

(b)   **With the aid of diagrams, explain how flows and slides occur and describe their effects on slopes.**   **[8]**

Flows are sliding masses of material that occur at relatively fast rates when build up of groundwater loads the slope. This increases stress on the slope and reduces friction on slide planes. Pore water pressure forces the particles apart in the sliding mass. Slides occur along slide or failure planes that are often influenced by bedding and joint planes. Shear stress exceeds shear strength and allows material to slide particularly in tectonically unstable areas of high relief. Rotational slumping may occur in the case of mud and earth slides. Mud and earth flows can form prominent toes at the base of slopes. Slope impact could be shown by diagrams.

(c)   **Explain how the tectonic process of subduction occurs at a convergent plate boundary and describe <u>two</u> resultant landforms.**   **[10]**

Subduction occurs at convergent plate margins where one plate is taken into the mantle below another. This can occur between oceanic and continental plates where the less dense oceanic plate is subducted below the continental plate (e.g. Nazca plate below the South American plate). This could effectively be shown by annotated diagrams. The melting of the subducted plate can give rise to the upwelling of magma though faults and fissures to give volcanoes and island arcs at the surface. At the subduction zone a deep ocean trench may be formed or sediments folded and uplifted to give mountain ranges. Any two will be acceptable.

Candidates will probably:

Level 3
Show a clear understanding of subduction as a process and fully described landforms   [8–10]

Level 2
Subduction correctly associated with convergent margins although both process sand landforms only partially developed.   [5–7]

Level 1
Vague references to plate margins and little development of landforms.   [0–4]

Section C

10 (a) (i) Give the meaning of the term *life expectancy*.

the average (1) number of years (1) that a person is expected to live from birth (1)

(ii) Describe the characteristics of an <u>ageing</u> population. **[4]**

– a population where the average age is rising over time
– falling DR and increasing LE mean a high and growing proportion 60+
– the number of surviving females > males, noticeably over 75
– falling BR (maybe negative NIR) mean a small cohort <15 years
– may be associated with pro-natalist policy or encouraging immigration
– other

Credit simple points **1** and developed points **2** to the maximum.

(b) With the help of one or more examples, outline and explain changes in life expectancy over time. **[8]**

Life expectancy increases over time with development and improvements in diet, water supply, healthcare, education, etc.   This is as true for LEDCs in the 20th and 21st centuries as for MEDCs from the 18th.   However, there are some situations in which life expectancy falls, notably through the influence of HIV/AIDS, e.g. Zimbabwe, or during prolonged crises, such as war or famine, affecting whole societies.

Credit the life expectancy dynamic and detail of example(s).

(c) Briefly explain how managing an ageing population presents great challenges to the country or countries concerned. **[10]**

The challenges may be demographic (sustainability), so raising birth rate or encouraging immigration of workers, and economic/social/political in caring for a growing proportion of the elderly (3rd age, active retirement and 4th age, disease/disability/death).   This includes tax burden on workers, commitments for families to care for elderly relatives and the restructuring of society.

Candidates will probably:

Level 3
Make a response from detailed knowledge and strong conceptual understanding. Explain the great scale of the challenges well. **[8–10]**

Level 2
Make a reasonable attempt, which may contain good points, but which remains partial. Offer a valid, but limited, explanation. **[5–7]**

Level 1
Offer one or more basic ideas with little sense of management or precision about the challenges. Write in general subject area. **[0–4]**

11 (a) With the help of examples describe the different types of internal migration.

Candidates may try to group internal migration in terms of:
- Forced v voluntary
- Rural – urban; urban – rural; inter urban; intra urban
- Transmigration
- Stepped migration
- Education

Suggest that a full answer develops at least two types of internal migration supported with effective and appropriate examples or deals with more in less detail. For a general account with no effective examples, **max. 5.**

(b) Suggest reasons for an increase in internal migration in many countries. [8]

The chief reason has been the improvement in mobility and transport. Greater education, fewer social ties have made people more willing to move and improvements in private and public transport have enabled them to do so. It also reflects the separation of home, work and social lives. More people want to migrate and with rising incomes they can afford to do so. The media has also increased people's awareness of alternative destinations. Some candidates may structure it by looking at pushes and pulls increasing – whilst this is valid it is the reduction in the inertial factors that is key.
Credit attempts to support explanations using appropriate examples.
Answers may take a wide range of reasons or develop a few in depth.

(c) To what extent does internal migration bring only negative impacts for areas left by migrants? [10]

Most will agree with the concept of negative social, economic and environmental impacts on an area undergoing out migration and will link this to the type of migrant who leaves – young, better educated, more dynamic (often male). Migration is selective.
Higher scoring answers will suggest there could be some positives such as lower unemployment, cheaper housing, less pressure on resources e.g. food, less pressure on the environment. Some may suggest it depends on the nature of the area and the volume of migration.
An area may be at any scale, but credit attempts to support explanations using appropriate located examples.

Candidates will probably:

Level 3
Make a good balanced assessment of the extent to which internal migration only brings negative impacts – making the point it isn't a simple answer but it could vary over time, space etc. May point out areas/migrants are far from uniform in terms of population and resources. Well supported with effective examples. [8–10]

Level 2
Provide a sound response, but possibly limited in evaluation being one sided (agreeing or disagreeing) and limited in range/depth of exemplification. [5–7]

Level 1
Make an answer largely descriptive which offers little or no evaluation. Lack of knowledge, with few, if any, examples. [0–4]

12 (a) (i) Give the meaning of the term *spatial competition*.

An effective response addresses both words, e.g. that there are different / riva~~~~ (competition) for the use of space / locations (spatial).

(ii) Describe the effects of spatial competition within the Central Business District (CBD). **[5]**

The **effects** are several, including:
– dominance of users able to pay high prices
– other users forced out or seldom found
– maximising use of space by building up (and down)
– little unused land
– replacement of older buildings
– highly active property market, advertising, etc.
Suggest that a full response consists of two developed **effects** or more simple points.

(b) Suggest reasons for the location of retailing (markets, shops and stores) within urban areas. **[8]**

The heart of the question is the balance between space, profitability and access. Retailing may be within the CBD; at nodal points; in residential areas; on out-of-town developments, etc. Likely reasons may be economic and political, but also social, historical and environmental.
Better responses, 5–8 marks, consider more than one location, offer exemplar support and demonstrate understanding of the balance outlined above.

(c) With the help of examples, assess why urban areas are facing difficulties in the 21st century. **[12]**

Candidates may develop their own approach to the question, using the knowledge that they have (towns and/or cities, LEDC/MEDC, etc.)
The heart of the question is providing reasons, such as,
– population growth rates remain high (especially by migration)
– urbanisation (the concentration of population into urban areas) continues
– globalisation is increasing and is based in the world city network
– infrastructure is old, inadequate and prone to failure
– finance is lacking to fund projects
– governance lacks power and cohesion and may be corrupt
– major projects create their own pressures, e.g. Beijing 2008 and London 2012 Olympics; Johannesburg, World Cup 2010

Candidates will probably:

Level 3
Develop an effective explanation, offering a number of reasons and supporting this with contemporary evidence from urban areas. **[8–10]**

Level 2
Provide an account which is satisfactory and may contain good points, but which remains limited or partial. May be narrative in approach, with reasons identified in a subsidiary way. **[5–7]**

Level 1
Take a descriptive approach, provide loose or superficial reasons or answer in a basic manner. Lack supporting evidence. At the lower end, offer notes or fragments. **[0–4]**