CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Advanced Subsidiary Level and GCE Advanced Level

MARK SCHEME for the May/June 2013 series

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 should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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CAMBRIDGE
International Examinations

SECTION A

Hydrology and fluvial geomorphology

1 Fig. 1 shows some features of a meandering river channel.

(a) Identify the features on Fig.1 marked as

(i) A **[1]**

thalweg or line of fastest flow

(ii) B **[1]**

river cliff

(iii) C **[1]**

point bar or slip off slope

(b) Draw a simple cross section of the channel shape along the line marked X–Y. **[2]**

Simple asymmetric shaped channel with deepest part towards Y.

(c) Explain how rivers can produce a meandering channel. **[5]**

Meandering is caused by a river's attempts to achieve a uniform energy line. Weaker answers (up to 3 marks) will see this in simple terms of the deflection of the current onto banks causing erosion and deposition where the current slackens. Better answers will develop this in the context of pool and riffle sequences and helicoidal flow.

Climate and weather

2 Fig. 2 shows Hadley cells located either side of the equator.

(a) (i) State whether the pressure is high or low at A on Fig. 2. [1]

Low

(ii) State whether the pressure is high or low at B on Fig. 2. [1]

High

(b) Explain how the Hadley cells operate and describe the contribution they make to the circulation of heat and winds on the earth's surface. [6]

Insolation received at the equator is converted to long wave radiation heating the air so that it rises causing a convergence zone of low pressure. As the air ascends it cools producing cumulus clouds at the edge of the tropopause pressure is high and the air is diverted polewards until descending in the sub-tropical areas (30N and S) forming high pressure areas. On the earth's surface air is transported back to the equator forming the NE and SE trade winds. Heat is thus taken from areas of radiation excess and transported to areas of radiation deficiency by these cells (additionally Ferrel and Polar in the tri-cellular model).

(c) Briefly describe one other method by which heat is transferred around the earth's surface. [2]

By air blowing over ocean currents. Warm currents flow polewards from the equator whilst cold currents return from the poles towards the equator.

Rocks and weathering

3 Fig. 3 shows some landforms at a plate boundary.

(a) (i) Identify the type of plate boundary shown on Fig. 3. [1]

convergent (destructive)

(ii) Identify the type of tectonic plates shown on Fig. 3 [1]

continental plates

(b) (i) Draw a labelled cross section diagram showing this type of plate boundary and its associated landforms.

The diagram should show the convergence of continental plates with a limited subduction zone, mantle convection currents, the crushing of sediments to form fold mountain chains. It is not necessary to show the Tibetan plateau.

(ii) Briefly explain the formation of this type of plate boundary and its associated landforms.

The explanation should follow the diagram with convection currents in the mantle forcing the convergence of two continental plates. One may be subducted below the other less dense plate but sediments in between the two plates are crushed, folded and pushed upwards to form fold mountain chains. If continental/oceanic plates margins are described allow some credit for subduction, fold mountains and the upwelling of volcanic material.

Population

4 Tables 1A and 1B show the highest and lowest mortality rates, for ages 15–60 years, in the world in 2010.

(a) Using Table 1A, calculate the difference between the mortality rates for males and females in Lesotho.

203 per thousand (727 – 524 = 203) formula not needed for the mark. **[1]**

(b) Using Table 1B, compare the information about the lowest mortality rates for males with that for females.

A full response consists of two elements:

- the countries which appear

  Each list of 5 is completely different; all are MEDCs; Europe dominates but there are two countries in Asia for females; other valid comparative observation. **3/1**

- the mortality rates

  All are in two figures/1000; the top rate for females (Italy, 41) was significantly lower than the lowest rate of all for males (Iceland, 65); some other valid comparative observation. **1/3** **[4]**

(c) Explain why the mortality rate for males is higher than for females.

No knowledge of any of the countries shown is needed to achieve full marks.

As life expectancy for women is longer than for men, at all levels of economic development, the mortality rate between the ages of 15 and 60 is lower because a higher proportion of women survive beyond the age of 60 and die in old age or an older age group.

Credit reasons for lower life expectancy amongst males. Whilst more males are born, more die in infancy. Males will be seen as undertaking more dangerous jobs and more likely to be killed in warfare etc. Females will be seen as healthier and physically more likely to demonstrate greater longevity. **[5]**

Population/Migration

5 Fig. 4 shows population increase in a MEDC in Europe, 1997–2007.

(a) Using Fig. 4, state the year in which:

(i) the gain from migration was greatest,
2005 **[1]**

(ii) gains from migration overtook gains from natural increase.
1998 **[1]**

(b) Describe the trend in natural increase shown in Fig. 4.

Natural increase was steady (100 000) 97–98, **(1)**
decreased to a low fluctuating level (60/70 000) 2000–2, **(1)**
before increasing steadily to a high (190 000) in 2007. **(1)**

For a description without data support max. 2. **[3]**

(c) Explain the possible effects of immigration on birth rates in MEDCs.

Birth rates in MEDCs are low, often less than replacement level (2. 1) and natural increase rate can be negative (sometimes called a natural decrease)

Migrants are often young adults in the fertile age groups. Their age, culture and positive socio-economic gains of migration to an MEDC (jobs, income/welfare benefits, health services, a new more secure life, etc.) may mean that they decide to have children – or additional children – so raising the birth rate, e.g. North Africans to France, Polish to UK. Some migrants escape regimes where fertility is restricted e.g. the Chinese to USA.

A full answer integrates understanding of low fertility in MEDCs with that of higher fertility amongst immigrants, with some exemplar content ideally. **[5]**

Settlement dynamics

6 Fig. 5 shows a model of urban development based on some cities in Asia.

(a) Describe the location and extent of the areas of urban sprawl on Fig. 5.

Three areas of urban sprawl are shown; they are linear in shape, or corridors, along the main roads which connect the main city to three secondary cities. The sprawl is limited in extent either side of the roads. It is a little wider around two road junctions, on one of which has a smaller city or town has developed.

Mark on overall quality; a full response covers both **location** and **extent**. **[4]**

(b) Explain some of the pressures on the rural and frontier areas on Fig. 5 resulting from the growth of the urban settlements.

Candidates are free to develop their own approaches, using their knowledge and understanding of rural areas and the expansion of urban settlements.

Suggestions may include:

- for building land/cheap land/space for expansion
- for road construction
- for building materials, e.g. stone, aggregates
- for water supply
- for food supply
- for recreation
- pollution (land, air, water, noise)
- increased levels of traffic, congestion
- migration/loss of young adults
- change/loss of traditions.

Another possible approach would be:

- economic pressures e.g. bidding for land, higher rents
- social pressures e.g. modernisation
- environmental pressure e.g. degradation, on resources
- political pressure e.g. planning decisions, vote-winning.

Examples may be integrated into the response creditably, but are not required if the pressures are explained well. **[6]**

SECTION B: The Physical Core

Hydrology and fluvial geomorphology

7 (a) (i) Define the hydrological terms *interception* and *stemflow*. [4]

Interception is the catching of precipitation by leaves and branches of vegetation such that it does not directly fall to the ground.

Stemflow is the progression of intercepted precipitation down the stems and trunks of vegetation.

(ii) Briefly explain how throughflow occurs. [3]

Throughflow is the movement of infiltrated water under gravity downslope towards a stream channel. The water can move through soil by a form of piping.

(b) With the aid of a labelled diagram, explain the operation of the hydrological cycle within a drainage basin. [8]

A diagram could be in a flow diagram form or (more likely) block representation. It should show inputs in the form of ppt. and the progress of water through flows and stores to the point where evaporation and evapotranspiration returns it to the atmosphere where cooling and condensation allow the process to begin again. A straightforward task that requires a complete representation and explanation for the marks.

(c) Explain the extent of which changes in land-use can affect both flows and stores within a drainage basin.

Land-use is the means by which the speed and effectiveness of the entry of water into the catchment system is controlled. Thus wooded areas increase interception and reduce quickflow whilst urban and arable areas will allow for much faster flow to the channels. Thus any changes to land-use can have some impact upon the speed of flow but less impact upon the amount which is dependent more upon the scale and intensity of precipitation.
Stores may be referred to in terms of damming and changes to groundwater stores should be explained in better responses.

Level 3
Good understanding of the role of land-use in affecting flows and stores (exemplified) tempered by an awareness of the limits imposed by the input of precipitation into the system. (8–10)

Level 2
The impact of land-use changes (rural to urban, deforestation etc.) of lows in terms of overland flow and channel flow. Often seen as the cause of flooding rather than contributory. Little on stores and inputs. (5–7)

Level 1
Urbanisation is seen as causing flooding as does deforestation. Little explanation or development. (0–4)

Atmosphere and weather

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

Latent heat transfer is the heat transferred when a body changes state (e.g. condensation).
Heat that is transferred by convection or conduction.

(ii) Briefly explain how radiation cooling occurs. [3]

Radiation cooling occurs at night when the earth does not receive solar radiation and thus cools through the emission of long wave radiation.

(b) With the aid of a labelled diagram, explain how the earth's surface and atmosphere are heated during the daytime. [8]

A simple model of incoming solar radiation (short wave), it's scattering in the atmosphere and reflection by clouds and the earth surface. Received radiation at the earth's surface is reradiated as long wave radiation which is absorbed by greenhouse gases, clouds and reflected back to heat the atmosphere. The rest is lost back to space.

(c) Explain how the uplift of air can result in rainfall. [10]

Air can be uplifted by either convection heating or being forced to rise over hills and mountains. In both cases the air is cooled adiabatically but will continue to rise in the case of convection as long as it remains warmer than the surrounding air (ELR/DALR). With cooling the ability of air to hold moisture decreases and a point is reached with 100 per cent humidity (condensation level). Here clouds will form and with continued uplift and the presence of hygroscopic nuclei, raindrops will form, coalesce and fall as rain. Do not expect too much detail on raindrop formation.

Level 3
Display a good understanding of uplift, adiabatic cooling, condensation and raindrop formation. A well structured explanation. (8–10)

Level 2
An awareness of convectional and orographic uplift, but limited understanding of adiabatic cooling and humidity. condensation and rain described rather than explained. (5–7)

Level 1
Convection leading to the production of thunderstorms with little explanation. (0–4)

Rocks and weathering

9 (a) (i) Define the mass movement terms *earth flow* and *rock fall*. [4]

Earth flows most commonly occur in unconsolidated materials that have become saturated thus increasing pore pressure.
Rock falls occur when small blocks of rock become detached from the cliff face and fall freely to the cliff foot.

(ii) Briefly describe the process of heave.

Heave is a slow mass movement in unconsolidated materials where a particle is lifted at right angles to the slope and then comes to rest slightly down slope. Usually the result of freezing or saturation.

(b) With the aid of labelled diagrams, explain the physical and chemical weathering or limestone rocks. [8]

Freeze-thaw and the roots of vegetation will form the main physical processes and diagrams should emphasise the widening of the bedded and jointed nature of limestone. Carbonation also exploits the jointed structure but is also dependent upon the chemical composition of limestone. Landforms are not required but can clearly be used (e.g. clints and grykes) to illustrate chemical and physical weathering in diagrams.

(c) Explain the extent to which human activities can affect the weathering of rocks and the shape of slopes. [10]

Human activities can affect the weathering of rocks by exposing them to sub-aerial processes by removal of vegetation and top soil and by the action of acid rain (pollutants leading to increased acidulated rainwater). Slopes can be affected through destabilisation due to quarrying, mining, undercutting etc. The addition of burden, through reservoir construction or the dumping of material can also have localised but sometimes catastrophic impacts. The extent is limited, however, as most of the factors leading to rock weathering (climate, rock type and structure etc.) are only affected by humans in a very limited manner. Similarly in terms of slope stability, natural events (rainfall, tectonic activity) are likely to have more profound impacts upon slope shape.

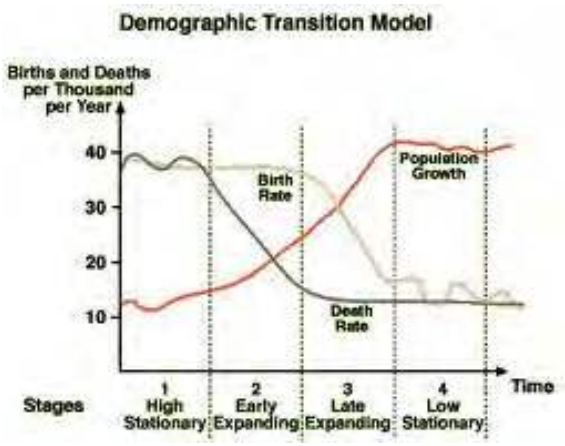
Level 3
Show an understating of the impact of acid rain and give exemplified accounts of human impact upon slope shape. There will be an awareness of the limited and localized nature of such activities compared to the global scale of natural processes. (8–10)

Level 2
A less well organised account that concentrates on human activities affecting slopes such as deforestation, quarrying etc. Little appreciation of the extent of such activities as compared to natural processes. (5–7)

Level 1
A disorganised selection of human activities in terms of quarrying, mining, road construction with little appreciation of any impact upon weathering. (0–4)

SECTION C: The Human Core

10 (a) With the help of a labelled diagram, compare Stages 2 and 3 of the demographic transition model.



Candidates may draw Stages 2 and 3 only. Comparison should comprise the rates' level and trend. For an annotated diagram only or two separate descriptions, max. 4. **[7]**

(b) How many decreasing death rates be explained?

Death rates respond to development in key sectors such as agriculture (quantity, quality, security of food supply) and key services, such as healthcare. This may be by innovation or transfer from MEDCs. Investment by government (e.g. immunisation), by local authorities (e.g. sanitation) and by NGOs (e.g. clean water) combine to increase standard of living and reduce mortality. DRs in MEDCs may be driven down by medical research, 'healthy' lifestyles, etc.
Mark on overall quality of understanding and integration of examples, bearing in mind three bands of marks, **0–3, 4–5** and **6–8**. **[8]**

(c) Assess how education helps to lower birth rates. [10]

The main way is by educating girls. This changes attitudes, behaviours and aspirations, and informs, e.g. about family planning. Educating boys is significant, but of secondary importance. An educated girl may delay marriage or use contraception when she becomes sexually active. Norms change, etc.

L3 Provide an effective assessment, identifying different ways that education helps lower birth rates. offer detailed exemplar support and structure the response well. Some answers may assess the role of education vis a vis other factors. (8–10)

L2 Make a reasonable attempt which may contain good points, but lack the knowledge and understanding to make a fuller response. Assessment may be limited or brief. (5–7)

L1 Offer only a few basic ideas, struggle to deal with the issue, make little or no assessment. Fragements and notes remain in this level. (0–4)

Migration/Settlement dynamics

11 (a) (i) Define the term *stepped migration*.

Migration is the movement of population for 1 year or more.
Stepped migration occurs in a sequence of stages. These 'steps' occur within the settlement hierarchy (usually upwards, moving from lower order to higher order settlements). **[3]**

(ii) Give <u>two</u> reasons why stepped migration occurs.

A number of valid reasons exist including risk minimisation, gaining confidence saving up money for the next step, promotion at work, etc.
Credit any **two** valid reasons, simple point **1**, developed point **2**. **[4]**

(b) With the help of one or more examples, describe and explain where migrants are likely to live in cities in LEDCs.

The majority of migrants come from rural areas, lack money, may have difficulty finding employment and are, therefore, of low ability to pay. They may have limited knowledge of the city. Likely residential locations include:

shanty towns/squatter settlement, slums, peripheral areas, vacant land, marginal land, e.g. marsh; along railway lines, pavements with family members or friends, in accommodation provided with a job, e.g. maid etc.

For a well-developed response without the example(s), max. 5. **[8]**

(c) 'Urbanisation is a past process, not a current one.' How far do you agree? [10]

Urbanisation is defined as the progressive concentration of population into urban settlements (towns and cities), from rural ones, largely by rural-urban migration. Most MEDCs are at or near 'saturation' level, (approx.. 75% plus) and may experience counterurbanisation and re-urbanisation. Levels are lowest in Africa (est. 45%) where urbanisation continues (est. 50% by 2025), as in many LEDCs.

L3 Provide a good assessment of the statement that is strong conceptually and uses examples to show its relevance to the past and present. (8–10)

L2 Make a sound response which may contain good ideas, but which is limited in exemplar support, scope or assessment. Content may not be fully relevant. (5–7)

L1 Offer one to more basic ideas which may not be robust conceptually. Take a descriptive approach or offer an unsupported opinion. Simplistic assessment, such as 'I agree' may achieve the top of the level. (0–4)

Settlement dynamics

12 (a) (i) Give the meaning of the term *functional zonation* as applied to urban settlements.

Functional zonation is where different land-uses and activities (functions) are found concentrated together in certain parts of the urban area, with other functions not found, under-represented or excluded, e.g. a zone of manufacturing industry, or lawyers' offices all near one another. **[3]**

(ii) Explain <u>one</u> advantage and <u>one</u> disadvantage of functional zonation.

Accept possible advantage/disadvantage for any person or group. Advantages include: time or cost saving for the function; aids the consumer, e.g. for comparison shipping; reduces pollution (zoning).
Disadvantages include increased competition for businesses; further to travel for consumers. Mark on merit, **2** and **2**. **[4]**

(b) Explain how planning has affected the location of activities within one or more named urban areas.

Some examples, such as new towns, or where there has been redevelopment (slums or in the inner city) may be easier to use than those where planners have had limited locational impact. Planning may affect location directly, e.g. through zoning or giving/withholding planning permission, or indirectly, e.g. through provision of a road network that attracts some uses and repels others.

For an effective general response without the named example(s), max. 5. **[8]**

(c) Why are problems in urban areas difficult to overcome? [10]

Any problems are valid here, such as pollution, housing shortage or residential segregation. Much depends on the problem(s) and the urban areas chosen, but candidates are likely to build up a picture of the scale and complexity of the challenges in terms of economic, social, political and environmental factors.

L3 Develop a good assessment of why problems in urban areas are difficult to overcome. Impress by dynamic and interactive perspective and integration of exemplar content. (8–10)

L2 Make a satisfactory but limited response, which may be quite general. The assessment may be suitable but partial ot 'tacked on' to a more narrative piece about urban areas. (5–7)

L1 Make one or more basic points, with little or no reference to actual urban areas. Struggle to address the ideas of difficulty (or write about success). Notes and fragments remain in this level.