CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Advanced Subsidiary Level and GCE Advanced Level

MARK SCHEME for the May/June 2014 series

9696 GEOGRAPHY

9696/11 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 river valley.

(a) Identify the features marked:

(i) A, [1]

(ii) B, [1]

(iii) C, [1]

(iv) D. [1]

A – floodplain/marsh
B – bluff/terrace/valley side
C – levee/embankment
D – channel cut off/straightened channel/channel

(b) Describe <u>three</u> features you have identified in (a) and explain how each was formed. [6]

A floodplain is composed of alluvium that is deposited when the channel has reached over bank full conditions. The slowing of the floodwaters produced deposition. The bluff marks the extent of the floodplain and is produced by the erosion of valley sides by the swinging of the channel in a series of meanders.

Levees are depositional features composed of gravel that has been deposited first when the channel banks are exceeded during flooding. The channel cut off is produced by erosion of the meander neck to naturally straighten the river channel.

Some credit for incorrect feature correctly explained.

3 × 2 marks

Atmosphere and weather

2 Fig. 2 shows the summer and winter temperatures for the central business district (CBD) and rural areas of Melbourne, Australia.

(a) State the highest temperature recorded in Melbourne's CBD. [1]

25 °C

(b) Using Fig. 2, describe the pattern of the temperatures in summer and in winter for the CBD and the rural areas. [4]

Both summer and winter shows the same basic pattern with urban temperatures always higher than the rural ones. The differences in both summer and winter are most marked during night-time. The summer temperatures being close at around 1500 hours. In winter the rural temps are always 2/3 degrees lower than the urban. Candidates may produce data (i.e. ranges etc.) but it is the pattern that is most important.

Direct comparison of CBD and Rural is not required.

Answers simply describing the data can be credited, equally simple use of data.

(c) Explain why temperatures are different between the CBD and the surrounding rural areas. [5]

Clearly due to the urban heat island effect. This should be explained in terms of the specific heat capacity of urban building materials, which absorb more heat during the day and release it at night. This compares with the surrounding rural areas which will be characterised by vegetation that absorbs less short wave radiation and will release long wave radiation more quickly. Hence the urban areas display higher night-time temperatures as the buildings release stored heat. Anthropogenic heat generation. The heat island effect is more apparent in the winter as there is less difference between day and night time temps in the winter season as there is less solar radiation.

Rocks and weathering

3 Fig. 3 shows the relationships between weathering, climate and depth of weathered material.

(a) (i) State the difference in metres between the greatest depth of weathered material in the area of strong physical weathering and in the area of strong chemical weathering. [1]

40 (+/– 2)

(ii) State the range of mean annual precipitation shown in the area of strong chemical weathering. [1]

1000 mm – 2000 mm (i.e. 1000 mm)

(b) Briefly describe <u>one</u> type of weathering process that might occur in the area of strong physical weathering. [3]

Despite the mean annual temp being above freezing, the most obvious choice is freeze thaw cycles. Frequent temp change above and below freezing induces the freezing and expansion of water in the interstices and cracks within rocks. The expansion of the frozen water produces stress leading to weathering.

Insolation and Carbonation can gain some credit.

(c) Explain why the greatest depth of weathered material is found in the area of strong chemical weathering. [5]

High temperatures and plentiful rainfall (above 20 °C and 1000 mm) enhances the rate of chemical weathering as suggested by Van't Hoff's rule. Thus carbonation, hydrolysis and oxidation will be active in producing deep regoliths through the various actions of chemical weathering. In addition vegetation will allow the production of humic acids which will add to these processes.

Population

4 Fig. 4 shows the percentage of married women using modern contraception and the total fertility rate, by country, in 2012.

(a) State the total fertility rate for India shown in Fig. 4. [1]

2.9 (accept 2.8 to 3.0)

(b) Describe the relationship between the two variables, using data from Fig. 4. [4]

There is a close or strong relationship between the two, that the greater the percentage of married women using modern contraception, the lower the total fertility rate + data support or reference to the 'best fit' regression line, **3/2**.

However, the relationship is not perfect/there is a broad scatter of points/many anomalies exist, **1** or with data support **2**.

(c) Explain <u>three</u> other factors, apart from contraception, which influence fertility rates. [5]

Any relevant factors may be credited, including:

- demographic, e.g. infant mortality rate and a need to compensate for deaths
- social/cultural, e.g. tradition, literacy, the education of women, religion
- economic, e.g. children as asset or as burden, female employment, financial incentives linked to population policy
- political, e.g. population policy pro-natalist or anti-natalist, empowerment of women.

Credit three factors, a simple point **1** or developed point **2**, to the maximum. These may be expressed positively or negatively in terms of the influence each has on fertility.

Population/Migration

5 Fig. 5 shows an age/sex pyramid of immigrants to an MEDC in one year.

(a) Describe the main features of the population structure shown in Fig. 5, supporting your answer with data from the figure. [5]

Here **main features** may include,

Gender: quite balanced, slightly more females overall, more females in some age groups/ cohorts e.g. 0–4 and 20–24.

Shape: moderate base/widest in the middle/stepped taper from 30–34/narrow and top age some unevenness, e.g. a gap or indent in males age 20–24 and a bulge or exceptionally longer bar for females aged 25–29. Low numbers 60 onwards.

Scale: large numbers involved (total approx. 820 000 as it is the USA).

Credit each feature **1** or **2** if developed and supported with some data, to the maximum. Comprehensive answers are not required. For a response without data, **max. 3**.

(b) Suggest reasons for the features you described in (a). [5]

Only a brief explanation can be expected for this modest mark allocation. Content depends on what were described as main features in **(a)** and credited.

For example, the age structure reflects the dominance of the migration of the economically active to this MEDC. This may reflect immigration policy, for example attracting workers to fill a skills gap or migrants needing to satisfy entry criteria. Those under 15 are dependents; they migrate because one or both parents do. The elderly are reluctant to migrate, and may have problems with visas etc.

Few children because single people migrating.

The dominance of single women aged 25–29 could reflect targeted recruitment for specific sectors including healthcare (doctors and nurses) and education (teachers), career moves, aspiration and the empowerment of women.

The gap or indent in males aged 20–24 may not be significant, as immigration fluctuates from year to year.

Population/Migration/Settlement dynamics

6 Fig. 6 is a diagram of the development of Seoul urban region, South Korea, between 1970 and 2000. South Korea is an NIC in East Asia.

(a) Using Figs 6A and 6B, identify <u>two</u> changes to Seoul between 1970 and 1980. [2]

- expansion of the built-up area
- increase in number/doubling of expanded towns from 3 to 6
- introduction of greenbelt
- growth of expanded towns south of river
- Expansion of built up area south of river

Credit **1** and **1**.

(b) Describe Seoul urban region as shown in Fig. 6C. [3]

A congested urban area, fully built-up within the greenbelt; grown outwards beyond the greenbelt; noticeably heavier development south of the Han River; new towns (4); urban renewal inside the greenbelt, with more locations (3) to the north than to the south (1).

Comprehensive answers are not needed, credit three points **1**.

(c) The population of Seoul decreased from 10.4 million in 2000 to 9.8 million in 2010.

Suggest reasons why the total population of some cities is decreasing. [5]

The centrifugal forces include counterurbanisation and the attraction of living environments which are perceived as better outside the city (new town, expanded town, rural settlements, surrounding rural areas).

The decline in fertility/drop in natural increase rate accompanies economic development and the demographic transition (Stage 3 and later). In some MEDCs and NICs, including South Korea, fertility is below replacement level (2.2), so over time, population declines.

(Allow **1** for the observation that city boundaries change and/or that the way that data is gathered may not be comparable, so shows a decrease, if offered.)

Section B: The Physical Core

Hydrology and fluvial geomorphology

7 (a) (i) Define the hydrological terms *surface storage* and *groundwater storage.* [4]

Surface storage is water that has not infiltrated the surface and is stored on the surface in the form of puddles, lakes etc. (2)

Groundwater storage is percolated water that is held within the aquifers below the water table. (2)

No marks for simply repeating the terms.

(ii) Describe how saturated overland flow occurs. [3]

Water is not infiltrated on a slope due to the saturated nature of the soil, and flows across the surface. This most frequently occurs on the lower parts of slopes that have been saturated by water from above.

(b) For a similar rainfall event, draw a storm hydrograph for an urbanised catchment area and a storm hydrograph for a forested catchment area. Explain the differences between the two hydrographs. [8]

The urbanised hydrograph should have steep rising and falling limbs, high peak discharge and short lag times. The forested catchment should have gentle limbs, lower peak discharge and a longer lag time. The explanation for the flashier urban response is the greater amount of run off (quick flow) in the urban area, because of increased permeability. The forested area will allow greater interception of ppt by trees and the slower progress of water to the surface (stem flow, drip etc.) where it will be infiltrated. Percolation will allow through flow and hence a greater proportion of the water will arrive at the channel as the slower base flow. Suggest 4 for diagrams and 4 for explanation.

(c) To what extent does flooding in a catchment area only result from storm rainfall? [10]

Flooding is essentially a natural phenomenon as a result of a sudden excess of input, usually in the form of precipitation events. Rivers naturally develop flood plains to cope with such conditions. Sudden storms produce large amounts of overland flow which can produce a rapid rise in channel discharge and over bank full conditions. Most recent floods have been due to such causes as excessive monsoons or intense storm events. Spring snow melt can produce flooding. Flood conditions can be exacerbated by human activities such as land use changes, but these are rarely the prime causes. Some answers will see flooding as a response to catchment conditions.

Level 3
Good appreciation of flooding as part of the catchment system (inputs–outputs). Some debate as to the impact of human and other catchment conditions, (such as land use, geology, etc.). **[8–10]**

Level 2
Some appreciation of the role of ppt, but mainly a description of the catchment area conditions (such as urban, vegetation, geology, etc.), that can induce flashy responses in rivers. **[5–7]**

Level 1
Scant reference to catchment conditions and virtually no reference to the role of precipitation input. **[1–4]**

Atmosphere and weather

8 (a) (i) Define the terms *fog* and *dew.* [4]

Fog is the suspended water droplets producing Fog of visibility less than 1 km. (2)
Dew is water droplets that have condensed on vegetation and objects on the surface. (2)

(ii) Briefly describe the albedo effect at the earth's surface. [3]

Albedo is an index of the ability of a surface to reflect incoming solar radiation. Thus snow has a high albedo, whilst black objects (e.g. tarmac) have a low albedo.

(b) With the aid of a diagram, explain why some parts of the earth have an excess of radiation energy and other areas have a deficit of radiation energy. [8]

The energy excess/deficit represents the balance between solar (swr) received and long wave radiation. Tropical and equatorial areas receive the most solar radiation due to the overhead sun and the earth's tilt. The greater amount of atmosphere to heat at the poles plus the seasonal tilt away from the sun produces less solar radiation and hence an energy deficit. The most effective diagrams are those showing energy receipt with latitude and thus the energy balance, but many will use earth tilt diagrams.

Max. 5 if no ref. to areas of deficit.
Max. 6 if no diagram.

(c) Explain how clouds and rainfall are produced. Suggest reasons why not all clouds produce rainfall. [10]

Clouds are produced due to the uplift of air and its adiabatic cooling to dew point. Condensation occurs around hygroscopic nuclei. Further uplift at the SALR will produce a sufficient thickness of cloud to allow for the development of water particles and ice crystals that can coalesce within the up and down drafts. Clouds need some vertical development to allow this process to develop. Thin stratiform clouds will not allow for such processes to develop.

Accept discussion of Hail and Snow.

Level 3
Good understanding of the effects of uplift and adiabatic cooling. The processes of raindrop production will be understood as well as its limitations. Some discussion of why not all clouds lead to rainfall needed for Level 3. **[8–10]**

Level 2
Uplift and cooling to dew point although limited understanding of lapse rates and of raindrop production. **[5–7]**

Level 1
Orographic and convection producing rain and clouds. No real understanding of adiabatic processes. **[1–4]**

Rocks and weathering

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

Heave is the movement of soil particles by water or freezing, such that they fall back.
Slide is the down slope movement of material en masse along a slide plane.
Both could be shown by annotated diagrams.

(ii) Describe how a mud flow occurs. [3]

A mud flow is caused by high water content of the regolith, such that internal cohesion is reduced, and movement under gravity occurs downslope.

(b) With the aid of diagrams, explain how ocean ridges and ocean trenches are formed. [8]

Ocean ridges are formed at divergent plate margins. Diagrams should show sea floor spreading and the formation of a ridge through the rising of magma. Ocean trenches are formed at convergent margins and are produced as the crust is dragged down with the subducting plate. Explanation can be sought in the operation of convection currents.

Max. 6 if no diagrams.

(c) To what extent do rock type, vegetation and human activities affect the shape of slopes? [10]

Rock type, in terms of its resistance and its structure, will affect slope shape. Hence resistant, blocky, rocks may produce free faces where rock fall has occurred. Less resistant rocks such as clays will not maintain such steep slopes.

Vegetation has the effect of binding together soil and hence protecting the slope from weathering and erosion. Thus the slope is more stable.

Human activities, such as undercutting, mining, waste dumping all will affect slope shape. The removal of vegetation can also destabilise slopes. The extent to which these factors affect slopes are influenced by climate. Natural processes, however, are generally more significant than human activities. Human activities can be positive as well as negative.

Level 3
Good appreciation of the influence of each of the factors impact upon slope shape. A realistic assessment of all factors is required. **[8–10]**

Level 2
A generalised cover of the factors with most emphasis on vegetation and human activities. Some idea of slope shape. **[5–7]**

Level 1
Mostly human activities with little development of slope shape apart from quarrying and dumping of slag heaps. **[1–4]**

Section C: The Human Core

Population

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

Number of deaths or people who die/per 1000 or %/per year or annum.

For one element **0**, for two elements **1**, for all three elements **2**.

(ii) Describe how the death rate changes in the demographic transition model. [5]

Stage 1 death rate is high and fluctuating (approx. 40/1000); falls steeply throughout Stage 2 (to approx. 15/1000); falls slightly in Stage 3 (to approx. 10/1000); stays low throughout Stage 4, fluctuating slightly. Stage 5, death rate rises slightly. No credit for explanation.

Max. 3 if no written description.

(b) Suggest reasons for the recent increases in mortality rates in some LEDCs and MEDCs. [8]

Comprehensive answers are not needed. Reference may be made to Stage 5 again, but the DTM is descriptive and does not, itself, give reasons.

The main creditable reasons are:
- the implications of an ageing population/regressive age structure
- smoking (links to cardiovascular problems and cancers – the big killers)
- obesity (wide health implications)
- HIV/AIDS/and other diseases.
- catastrophic events, e.g. famine, war, earthquakes, often combined.

(c) Explain why it is easier for government action to decrease the death rate rather than decrease the birth rate. [10]

This is largely because of governments' direct influence and investment, e.g. in sanitation, water supply, healthcare, etc. rather than indirect work to influence people's choices, values, attitudes to family size, etc. which takes more time.

Candidates will probably:

Level 3
Provide an effective explanation addressing both elements. Offer detailed exemplar support and structure the response well. **[8–10]**

Level 2
Show satisfactory knowledge and understanding in a reasonable attempt which may contain good points. Explanation is valid, but limited. **[5–7]**

Level 1
Give only a few basic ideas, struggle to deal with the issue, offer little or no explanation. Fragmentary responses and notes remain in this level. **[1–4]**

Migration

11 (a) (i) Give the meaning of the term *rural-urban migration*. [2]

Movement of population/people, from the countryside/villages, to the town and/or city, for one year or more.

For two elements **1**, three or four elements **2**.

(ii) Describe <u>two</u> circumstances in which rural-urban migration may occur. [5]

Any relevant **circumstances** are valid, either simple, or complex/multi-factor, with or without the use of an example, MEDC or LEDC context, e.g. population pressure in rural area; or to seek a job and better living conditions in town.

Credit **3/2** or **2/3**.

(b) With the help of one or more examples, describe what stepped migration is and explain why it occurs. [8]

Stepped (or step) migration is when a rural migrant heads first for a familiar small town which is relatively close by, and makes one or more later moves up the settlement hierarchy, e.g. to a regional centre and then on to the capital city.

It occurs to reduce the risks involved and to help the migrant on his/her way, by offering smaller steps which may be easier to achieve. It allows money to be saved up and information to be gathered for the next step, etc.

(c) 'International migration causes more problems than it solves.' How far do you agree? [10]

An open question allowing candidates to use the material they have. Much depends on the type of international migration, e.g. economic, refugee, etc. The problems may be located in source areas and/or receiving areas.

Candidates will probably:

Level 3
Make an effective assessment of the statement, covering problems caused and problems solved explicitly. Combine exemplar content with conceptual understanding well. **[8–10]**

Level 2
Provide a sound response which may be good in parts, but which is limited through lack of detailed knowledge, restricted understanding of international migration or partial assessment. **[5–7]**

Level 1
Make an answer which is more descriptive than evaluative. Lack the knowledge or time to make more than a basic or note-form response. **[1–4]**

Settlement dynamics

12 With the help of a case study of one or more shanty towns (squatter settlements) in an LEDC:

(a) outline reasons why people live in the chosen shanty town(s) (squatter settlement(s)); [7]

These may be expressed negatively, e.g. unable to find or afford formal housing, or positively, e.g. the social network of family, friends and other migrants of the same language and culture. The **reasons** may be social/cultural, economic, environmental/physical and political.

Credit well conceptual understanding of migration, the housing market, employment, etc, and an outline which is dynamic, interactive and realistic.

No case study detail **max. 4.**

(b) describe one or more attempts to improve living conditions in your chosen shanty town(s) (squatter settlement(s)); [8]

Some form of upgrading or replacement of housing is likely, although infrastructure may be seen (mains water, sanitation, electricity, tarmac roads, waste disposal, etc.) Healthcare and education are acceptable if **living conditions** is interpreted broadly.

Better descriptions may be distinguished by detailed knowledge, e.g. the use of names, dates, locations; stakeholders; finance and management and some sense of variation over space and/or time.

No case study detail **max. 4.**

(c) evaluate the success of the attempt(s) you described in (b). [10]

Success is in the terms of **(b)**, an improvement in living conditions, but may be more specific than that (who, what, where, relative success/failure), etc.

Candidates will probably:

Level 3
Develop a perceptive evaluation of what was and was not achieved, with strong conceptual understanding of the context and case detail. **[8–10]**

Level 2
Make a satisfactory but limited response, which may be quite general or broad. The evaluation may be appropriate, but partial, or attached to an explanatory piece. **[5–7]**

Level 1
Make a few basic points about the chosen attempt(s). Struggle to make an evaluation or offer a simple unsupported opinion. Notes and fragments remain in this level. **[1–4]**