CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International Advanced Subsidiary and Advanced Level

MARK SCHEME for the May/June 2015 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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Section A

Answer five questions from this section. All questions carry 10 marks.

Hydrology and fluvial geomorphology

1 Photograph A shows a river channel.

(a) Name the type of river channel shown in Photograph A. [1]

A meandering channel (a meander), sinuous is acceptable

(b) Draw a labelled diagram of the river channel in Photograph A showing the line of the fastest flow (thalweg). [3]

Diagram should show meander bend (1) and the thalweg swinging to the outer bank of the bend (1) as a continuous labelled line (1). The diagram should be that of the meander shown in the photograph. No marks for the diagram if stylised and does not represent the photograph.

(c) Explain how the river channel shown in Photograph A developed and describe how it might change in the future. [6]

Meandering can be explained in terms of pool and riffle sequences leading to the swinging of the thalweg and differential erosion on the banks as well as the cross channel operation of helicoidal flow. Followed by a description of future changes to the channel: narrowing of the meander neck to allow channel straightening and the residual feature of an oxbow lake. Other possible changes include: meander migration downstream and laterally extending the floodplain; development of levees. There are two elements and suggest mark 3/3 or 4/2 and 2/4.

There are two distinct commands: explain and describe – consider explanation of located processes for either or both aspects. A characteristic of a higher band response might be to follow the order of these two commands – with more explanation for the first part. Diagrams might be used and could be credited highly if well annotated and sequential in approach.

Atmosphere and weather

2 Fig. 1 shows the concentration of carbon dioxide (CO_2) and the average annual surface temperature of the Earth, 1880–2005.

(a) Compare the trend in carbon dioxide concentration with the trend in the average annual surface temperature of the Earth shown in Fig. 1. [4]

Credit could be awarded in the following way:

both rise over the period (1)
although the CO_2 does so more smoothly from 290 parts per million to 370 ppm (1)
surface temps rise more erratically from 13.8 to c.14.5 (1)
both show a greater rate of increase after 1980 (1)
reward use of figures and a genuine comparison of trends

If two separate accounts – max 2 marks.

(b) Describe the causes of the increase of carbon dioxide in the atmosphere and explain how this increase could bring about changes in the surface temperature of the Earth. [6]

The causes are an increase in deforestation and the burning of fossil fuels and possible natural occurrence such as from volcanic eruptions.

Explanation of global warming should be couched in terms of the enhanced greenhouse effect. Greenhouse gases, of which CO_2 is one, allow the ingress of solar radiation (SWR), but absorb a high proportion of outgoing terrestrial radiation (LWR). This is a normal process but it is argued that increases in greenhouse gases – the enhanced greenhouse effect – will lead to a progressive warming of the earth's atmosphere and particularly the lower layers.

A characteristic of a higher band response would have a balance between the description of the causes and the explanation of how the enhanced greenhouse effect could increase temperatures of the earth's surface/lower layers of the atmosphere.

There are two elements – suggest 3/3, 4/2 or 2/4.

Rocks and weathering

3 Fig. 2 shows some types of mass movement.

(a) (i) Name the type of mass movement shown in Fig. 2 that has the slower movement and the highest water content. [1]

Solifluction

(ii) Name the type of mass movement shown in Fig. 2 that has the faster movement and the lowest water content. [1]

Rockfall

(b) Explain how heave might contribute to soil creep. [3]

Heave is the lifting of soil particles perpendicular to the slope, due to wetting/drying or freezing/melting. When dry or unfrozen, the particle falls back vertically under the influence of gravity leading to a slow downslope movement that is known as soil creep. Suggest two marks for the process and one mark for the movement downslope.

(c) Explain how a rotational slide, such as in Fig. 2, occurs and describe its effect upon slope shape. [5]

Mark as 3/2

A rotational slide occurs along a curved slip plane (1) due to the shear strength being overcome by some sort of shear stress (1). Rotational slides frequently occur in homogeneous clay and in slope material which is unconsolidated (1). Failure is the result of increased shear stress due to undercutting (1) (natural or human-induced), loading, shocks and vibrations, water drawdown, changes in water regime (rainfall, increase in weight, increase in pore pressure). Vibrations mobilise the water content leading to increased pore pressure (1).

Explanation could be any three of the ones noted above.

The regolith rotates backwards leaving a scar/scarp at the top of the slope and a toe at its foot. A continuous surface slope is transformed into blocks/steps, separated by near vertical faces/minor scarps, with transverse cracking to the blocks, leaving a crown at the top – in the material which has not moved.

Population/Migration

4 Fig. 3 shows projected population growth for countries in South-east Asia, 2010–30.

(a) Name the country shown in Fig. 3 which has:

(i) the lowest projected rate of population growth, [1]

Thailand (data not needed)

(ii) the highest projected increase in total population. [1]

Indonesia (shown by area of bar), can accept Philippines

(b) Suggest <u>two</u> reasons why it is difficult to predict population growth accurately. [3]

Credit any valid **reason** relating to any of the areas below:

- difficulties in collecting data
- difficulties in making assumptions/choosing variant of forecast (high, mid, low)
- intervening circumstances in time period, e.g. economic, political, natural disasters
- specific natural increase-related difficulties (uncertainty over birth/death rates)
- specific migration-related difficulties

Credit simple points 1 and a developed and/or illustrated point 2 to the maximum.

(c) Using one or more examples, explain why life expectancy is increasing in many <u>LEDCs</u>. [5]

Any relevant explanatory factors may be credited, including:

- economic, e.g. decrease in poverty means improved diet and housing; employment in secondary and tertiary sector brings higher standard of living
- social/cultural, e.g. increased literacy, improved education
- political, e.g. investment in health care, improved food supply, investment in provision of clean water and sanitation; pursuit of Millennium Development Goals (MDGs)

The example or examples may be of a country, scheme, initiative or project.
Mark holistically, for a high quality response without example(s), max 4.

Migration

5 Table 1 gives information about immigration to Germany from selected countries of the European Union (EU) in 2011–12.

(a) With the help of data from Table 1, compare immigration to Germany from Greece with immigration from Portugal. [2]

Immigration from both countries recorded the same percentage increase (43%). (1) However, the number of immigrants differed greatly: from Greece 10 000 and from Portugal 4 000. (1) No explanation needed.

(b) Describe <u>two main</u> features of the immigration shown, supporting your answer with evidence from Table 1. [2]

A full answer uses country names and data and may refer to both percentage increase and total number of migrants. Main is highlighted and so implies a general statement rather than highlighting one particular country. Credit two of the following kinds of points:

- immigration increased from all nine countries (1)
- percentage increase varied from 8% (Poland) to 62% (Slovenia), i.e. 7+ times (1)
- total number of migrants varied from 2000 (Slovenia) to 21 000 (Romania) (1)

(c) Briefly explain the role of <u>pull</u> factors in economic migration. [6]

Credit the definition of pull factors as those things (real or perceived) in a destination that attract migrants. In economic migration, the pull factors are primarily economic, e.g. more and better job opportunities, higher or more secure wages, a stronger economy at a time of recession, etc. Other pull factors are, however, important such as the existence of social networks (family members, friends, colleagues) to help migrants on arrival; or government promotion of opportunities (e.g. Germany, Singapore) to attract the labour and skills needed.

An alternative acceptable approach is to examine the role of pull factors with respect to other factors such as push factors. This would be a conceptual approach that is valid.

Push factors should not be credited, given the wording of the question.

Maximum 4 if just a list of factors.

Settlement dynamics

6 Photograph B shows part of a shanty town (squatter settlement) in a city in Africa in 2011.

(a) Describe the buildings shown in Photograph B. [3]

Description is likely to be about the materials from which the buildings are made: mud/bricks, branches, wood/wooden frames, corrugated metal sheets for the roof, other spare materials and scrap, breeze blocks (this is likely a latrine or toilet block but do not require this for credit) up to 2

And other descriptive details, such as that they are houses, latrines or a toilet block, may be workshops; different shapes and sizes; appear permanent, seem unplanned up to 2

Clearly no comment is possible about the interiors; do not credit speculation.

(b) With reference to Photograph B, outline <u>two</u> ways in which quality of life could be improved for the residents. [2]

Credit any valid **way** to the maximum, as long as there is reference to the photograph, such as:

- provide a waste collection service so that people do not need to leave their rubbish out on the river bank
- provide better services such as electricity, piped water, sewage pipelines
- an upgrading scheme, so that residents can obtain building materials to improve their own houses, e.g. replacing mud with brick walls
- provide hard standing or paving; in wet weather/the wet season it would be very muddy to walk around

Credit two incompletely developed **ways** (1).

(c) Suggest reasons why solving the problems of shanty towns (squatter settlement) can be difficult. [5]

A full answer might consist of two reasons fully developed or more than two reasons treated in less depth.

Approaches may include issues of scale, constant change, dynamics of growth; funding, finance, poverty and debt; vested interests, corruption, conflicts of interest; lack of space; resistance to change, fear, unwillingness to move; the existence of multiple interconnected needs; cities having other priorities; governance issues; economic and/or political instability, etc.

Section B: The Physical Core

Answer <u>one</u> question from this section. All questions carry 25 marks.

Hydrology and fluvial geomorphology

7 (a) (i) Define the terms *lag time* and *peak discharge*. [4]

Lag time is the length of time (1) between the peak rainfall and peak discharge (1). Peak discharge is the time when the river (1) has its maximum amount of flow/ volume of water (1).

A labelled diagram showing lag time and peak discharge – max 3 marks.

(ii) Briefly explain how overland flow occurs. [3]

Overland flow occurs when infiltration capacity is exceeded (1); this can be due to intensity of rainfall/snow melt/antecedent moisture/impermeability of the surface (1) and it leads to the flow of water on the surface direct to the channel (1).

For full marks, there needs to be a mention of precipitation input.

(b) Using diagrams, explain how <u>(i)</u> rock type and <u>(ii)</u> vegetation can affect the storm hydrographs of a drainage basin. [8]

Many will see rock type, in simple terms, of impermeable rocks leading to a flashier response due to run off on impermeable rocks. Better answers will explain how variations in permeability lead to contrasts in rates and amounts of percolation, throughflow and baseflow movements.

Similarly, vegetation will be seen by many as only affecting interception (trees v pasture) but consideration of vegetation cover or lack of it is also relevant leading possibly to a flashier response of the latter. Impact upon infiltration will be in better answers.

If no diagrams used: max. 6 marks. For higher marks, there should be contrasts within both rock type and vegetation parts of the response, though there may be some imbalance between rock type and vegetation coverage.

Most candidates will use diagrams of a storm hydrograph, but if a slope hydrological system is used, as long as the information in the diagram is related to the effects on the storm hydrograph, this is acceptable.

Mark as 4/4.

(c) Explain why rivers flood. To what extent is it possible to predict floods and to prevent rivers from flooding? [10]

Rivers flood due to an excess of input into the catchment system due almost entirely to intense rainfall that is beyond the system's capacity. Rapid snow melt is another possibility. This produces overbankful conditions leading to inundation of surrounding areas such as flood plains. Other causes might be related to human activities, such as deforestation or urbanisation, which increase the risk of flooding, but there needs to be reference to inputs.

Prediction can be undertaken by the calculation of recurrence intervals predicting 10 to 100-year floods. This is not very successful nor is catchment modelling as it is the unpredictable nature of rainfall input that is the problem. Discussion of weather forecasting is acceptable.

Prevention methods might include dams, levees, straightening, dredging, etc. Changing catchment land use, e.g. afforestation and land use patterns are also relevant and might indicate a higher grade answer.

The use of dams is the most successful preventative measure as it allows the control of discharge. Even here total prevention is not possible as reservoir capacity can be exceeded requiring the release of excess water into the channels below the dam. Overall, the other methods are less effective, but candidates might refer to transference of flood risk to downstream areas as a form of evaluation.

Maximum Level 2 if only two elements covered.

Level 3
Good appreciation of the cause and nature of flooding. Prediction and prevention methods are appropriately described and are evaluated clearly. Candidates are able to link the ideas together and demonstrate an understanding of the complexity of flooding and flood management. **[8–10]**

Level 2
There may be a very basic explanation as to the cause of flooding, but prediction methods will be vague with little assessment, and methods of flood control will be sensibly described but with limited assessment. **[5–7]**

Level 1
Flood definition or focus upon the effects rather than causes. Little or no predictive methods and a description of some methods of flood prevention. **[1–4]**

No response or no creditable response, 0.

Atmosphere and weather

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

A temperature inversion is when temperature rises (1) rather than falls with altitude (1).
Dew is water in the form of droplets (1), caused by condensation or cooling on exposed surfaces (1).

Mark 2/2

(ii) Briefly explain how fog is formed. [3]

Fog is formed by cooling of warm moist air (1), leading to condensation of the water vapour (1).
The cooling may be the result of either radiation from the ground surface at night time/the movement of warm, moist air over a cold surface (advection) (1).

Any three valid points, from the above breakdown could score full marks.

(b) Using diagrams, explain why the amount of incoming solar radiation received at the Earth's surface changes with latitude. [8]

This is because of the Earth's tilt and its seasonal passage around the sun. This can be shown effectively by diagrams. It leads to variations in the angle of incidence for solar radiation at the earth's surface and variations in the amount of atmosphere passed through. Within the tropics, uplift associated with the movement of the ITCZ can give increasing cloudiness to equatorial areas compared to sub-tropical areas.
If no diagrams used: max. 5 marks. Only one diagram is acceptable.
A higher level response has relevant diagrams and quite clearly considers spatial variations in radiation received at the earth's surface.

Use three bands of marks: **1–3**, **4–6** and **7–8**.

No response or no creditable response, 0.

(c) Explain how atmospheric stability and atmospheric instability occur. How can these conditions produce different weather? [10]

Atmospheric stability occurs when the rate of temperature change as represented by the ELR is always warmer than that of a rising parcel of air. Thus the parcel will sink back down to the surface resulting in little uplift or adiabatic cooling.

In the case of instability, the DALR of the air parcel makes it warmer than the environmental air so that the parcel will expand, becoming less dense and thus rise until adiabatic cooling reaches dew point. If it continues to rise at the SALR, clouds may form, giving rise to the possibility of rainfall. In the case of stability, the lack of uplift and adiabatic cooling limits any cloud or rainfall development. Much can be achieved with accurate labelled diagrams of lapse rates.

Candidates might offer explanation as to the conditions which promote stability or instability, such as cooling from below for stability or heating from below for instability. They might also refer to diurnal variations in heating and cooling. They might outline the link between cyclonic or anticyclonic conditions and variations in stability or select factors such as the moisture content of air as important variables.

Level 3
Good understanding of the role of lapse rates and/or an appreciation of why stability might vary, probably represented by good diagrams. A clear contrast and understanding of weather associated with variations in stability. **[8–10]**

Level 2
Some grasp of adiabatic cooling and its importance in instability or the causes of variations in stability. Lapse rates less clearly developed. Weather contrasts described briefly. **[5–7]**

Level 1
Little understanding of atmospheric stability. Simple weather contrasts. **[1–4]**

No response or no creditable response, 0.

Rocks and weathering

9 (a) (i) Define *sea floor spreading* and *ocean ridge*. [4]

Sea floor spreading is the extension of ocean floors laterally, as oceanic plates move apart (1) and magma is added to the ocean floor (1).

An ocean ridge is a (large scale) mid-ocean elevation/mountain range, (1) typically with a rift along the spine/central ridge/where magma escapes (1).

(ii) Describe an island arc. [3]

A chain of islands/archipelago (1), generally in a curved line (1), usually volcanic close to or parallel to a destructive plate margin/convergent oceanic plates (1).

(b) Draw a labelled diagram showing the convergence of an oceanic plate and a continental plate. Explain the processes occurring and the types of landforms produced. [8]

The diagram should show an oceanic plate being subducted beneath a continental plate with attendant volcanic, ocean trench and fold mountains. Explanation should involve the role of convection currents, crustal melting in the Benioff zone and the upwelling of magma through fissures and faults in the continental plate and folding of marine sediments/continental plate to form fold mountains. The ocean trench represents the dragging downward of crust at the subduction zone.

If no diagram: max 5 marks.
A higher band response could be characterised by a well labelled diagram and will link processes to a variety of specific landforms.

Use three bands of marks: **1–3**, **4–6** and **7–8**.

No response or no creditable response, 0.

(c) Explain the factors and processes that are most effective in the weathering of granite and limestone. **[10]**

The most effective processes are those that operate with the properties of the rocks and the climate. Thus chemical weathering can be seen as most effective with carbonation in the case of limestone and hydrolysis in the case of granite. These processes should be explained with reference to the role of water supply, temperature and rock structure. Physical weathering will be seen as effective under some climatic conditions (e.g. freeze thaw) where rock structure aids the process. A case may be made for pressure release and the formation of joints in the rock.

If only one rock type max 6 marks.

Level 3
A detailed explanation of the relevant factors with attention given to the effectiveness of weathering and the conditions required. Good grasp of both physical and chemical processes as they apply to the physical and chemical properties of both granite and limestone. **[8–10]**

Level 2
Outline of factors and weathering processes with some application to granite and limestone. Little attention to their effectiveness. Imbalanced towards one rock type and/or lacking in factors. **[5–7]**

Level 1
Little understanding of either weathering processes or the nature of the rock types. **[1–4]**

No response or no creditable response, 0.

Section C: The Human Core

Answer <u>one</u> question from this section. All questions carry 25 marks.

Population

10 (a) (i) Explain the meaning of the term *infant mortality rate.* [3]

Number of deaths of babies/children who die/under the age of 1 year/ per 1000 live births or % /per year or annum
For one correct element 0, for two 1, for three 2, all four 3.

(ii) Give <u>two</u> reasons why infant mortality rates are very low in <u>MEDCs</u>. [4]

Credit **two** developed reasons; these may include quality and access to healthcare, nutrition, maternal health, information, immunisation/ eradication of diseases, relative affluence, etc.

(b) Explain why improving the education of women helps to reduce their fertility rate. [8]

A number of links may be developed. Two key reasons are: education means that women's literacy and awareness improve, so that they understand themselves and contraception better and can make informed choices. Being empowered in this way, many choose to space their children and have fewer in total, so the fertility rate decreases. Education also increases aspiration and opportunity for women. This may lead to further study and or employment/a career. Both limit the time women can give to child raising and help some see the advantages of having a small family of one or two children, so fertility rate is reduced.

Use three bands of marks: **1–3**, **4–6** and **7–8**.

(c) With the help of an example, assess the success of <u>one</u> attempt to manage natural increase. [10]

Attempts will probably be in terms of either anti-natalist or pro-natalist schemes but attempts to manage death rates are acceptable. China and Singapore will probably be popular but there are other creditable schemes. Success may be differentiated by group, over time, between locations, etc., considered in terms of aims realised, use of finance, views of different stakeholders, etc.

Candidates will probably:

Level 3
Provide an effective assessment of success. Offer detailed exemplar support and structure the response well. **[8–10]**

Level 2
Show satisfactory knowledge and understanding of the chosen attempt and in a reasonable response which may be good in parts. Assessment is present, but limited in depth and/or detail. **[5–7]**

Level 1
Make only a few basic descriptive points. Offer little or no assessment of success. Fragments and notes could occur at this level. **[1–4]**

No response or no creditable response, 0.

Migration/Settlement dynamics

11 (a) (i) With the help of a diagram, explain the term *stepped migration*. [4]

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. Stepped migration may also happen in reverse.

If no diagram: max 2 marks.

(ii) Give <u>two</u> reasons why stepped migration occurs. [3]

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.
No credit for simple explanation of migration.

Credit reasons 1 or 2 to the maximum.

(b) Outline the impacts of rural-urban migration on the rural areas which the migrants leave. [8]

Much depends on context; better answers may either give detail using examples or convey some sense of diversity of outcomes.

For example, rural-urban migration may relieve population pressure and pressure on resources, and provide a flow of remittance income, so improving quality of life in the rural areas. On the other hand, it may involve many young able-bodied people, especially males, leaving children without fathers, and a small agricultural workforce consisting of women and the elderly. This may lead to insecurity, family breakdown, food shortage, etc.

In MEDCs, rural-urban migration may lead to reduction or closure of rural services such as shops, schools and transport and change in the character of villages with an older age profile, a greater proportion of second homes, etc.

Use three bands of marks: **1–3**, **4–6** and **7–8**.

(c) 'The effects of counterurbanisation in MEDCs are positive.' How far do you agree? [10]

Counterurbanisation is the movement of people out from urban areas to villages and hamlets (allow market towns) in the rural fringe. A simple assessment is invited. Any view may be taken and evidence offered. For example, it may be seen as positive for family life, but negative for the environment (house building and the effects of commuting – congestion, pollution, new roads, etc.). May consider both ends of the process; for example, that it is positive for the urban area, but negative for the rural one.

Candidates will probably:

Level 3
Make an effective assessment of the statement, covering positive and negative explicitly. Combine exemplar content with conceptual understanding of counterurbanisation. **[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 counterurbanisation or partial assessment. **[5–7]**

Level 1
Give an answer which is largely descriptive and may be general. May offer a simple or unsupported assessment. Have the knowledge or time to make only a basic or note-form response. **[1–4]**

No response or no creditable response, 0.

Settlement dynamics

12 (a) Describe what functional zonation is and explain why it occurs in urban areas. [7]

Functional zonation is seen in urban areas where some functions cluster in certain parts of the town or city. Zonation can also occur in a vertical sense.
Examples in CBDs in MEDCs are high class retail, shoe shops, solicitors, etc.
Zones may also be industrial, transport, entertainment, etc. 2/3

Creditable reasons could include:

- attraction of like functions to increase custom
- the operation of bid-rent and spatial competition
- comparison behaviour, such as comparison shopping
- linkages, e.g. efficiency of doing business with each other
- planning decisions
- accessibility
- social factors
- physical factors
- other/local reasons 5/4

A full response to this element could consist of two well developed points.

(b) With the help of examples, explain why retailing and other services may move out from the CBD to locations near the edge of the urban area. [8]

A full explanation combines examples with the disadvantages of central locations and the advantages of peripheral ones. Balance is not needed.

disadvantages — high costs, inconvenience, congestion, poor access, lack of (CBD) room to expand, lack of parking for customers, crime, etc.

advantages — lower bid-rent, savings on journey times, route nodes and (edge) junctions give good access, available space (expansion, car parking, storage, etc.), greener site, relative quiet, purpose-built retail park or estate, attracts custom from wider area, etc.

The question could be answered by considering enabling factors such as changes in planning, transport, communications.

If no examples: max 5 marks.

Use three bands of marks: **1–3**, **4–6** and **7–8**. Beware double crediting 'opposites'.

(c) Assess the success of <u>one</u> attempt to provide infrastructure (power, water, sanitation, transport) for a city. [10]

The question can be answered in a number of ways, such as an attempt by one city to provide all four elements, provision of one element in a city, or one element in a number of cities. Success criteria include efficiency, cost/benefit, unforeseen effects and problems, outcomes for different stakeholders and/or for different parts of the city, etc.

Candidates will probably:

Level 3
Develop a perceptive assessment of what was (and was not) achieved, with strong understanding of the context and exemplar detail. **[8–10]**

Level 2
Make a satisfactory but limited response, which may be quite general and explanatory. The assessment may be appropriate but partial or broad. **[5–7]**

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

No response or no creditable response, 0.