

MARK SCHEME for the October/November 2012 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.

Cambridge will not enter into discussions about these mark schemes.

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Section A

Hydrology and fluvial geomorphology

- 1 (a) **Photograph A shows a meandering river. Draw a labelled diagram of the river naming its main features and landforms.**

The main features will be the meanders, river cliffs, point bars and perhaps floodplains. Marks can be split equally between the diagram and the accuracy of the labelled features. **[4]**

- (b) **Explain how the landforms you have identified are produced and how they might develop in the future.**

Meandering channels are produced when the thalweg follows a sinuous path through a sequence of pools and riffles. The riffles are important in interrupting the smooth flow of the river. As the meanders develop, erosion occurs on the outer bank with deposition at the next inner bank downstream. The role of helicoidal flow is important in this process. As the meanders develop, the meander neck becomes narrower and eventually the river cuts through to produce an oxbow lake. Helicoidal flow is needed for full marks. **[6]**

Atmosphere and weather

- 2 **Fig. 1 shows the trend in night time temperatures across an urban area.**

- (a) **Describe the trend in night time temperature shown, supporting your answer with data from Fig. 1**

The general trend of a decrease in temperature from the centre of the city should be noted. The more rapid drop in temperature to the right should also be noted as well as the fact that the trend is not smooth. If no data support maximum 3. **[4]**

- (b) **Explain why the night time temperatures vary across an urban area such as that shown in Fig. 1.**

This is the classic urban heat island. Better answers will relate the temperature trends to the land use, with the CBD being the warmest. But, there are interruptions to the decrease over the large housing estates and industry. Explanations will be in terms of radiation absorption at day and release at night, depending on the albedo of the surfaces. Pollution, heat from cars and buildings and protection against wind might all be considered. **[6]**

Rocks and weathering

3. **Fig. 2 shows the relationship between weathering processes and mean annual temperature and rainfall.**

- (a) (i) **Identify the main type of weathering occurring at A.**

(Strong) chemical weathering

[1]

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(ii) Identify the main type of weathering occurring at B.

(Strong) physical weathering [1]

(iii) Name a process occurring at C

Insolation weathering [1]

(iv) Name a process occurring at D

Frost weathering [1]

(b) With reference to two different weathering processes explain how they are affected by temperature and precipitation.

Explanations in terms of heat and moisture needed for strong chemical weathering, whereas physical weathering becomes more dominant in drier and colder conditions. Specific weathering processes will need to be discussed. The question does not ask for one chemical and one physical process so an answer using two physical processes e.g. frost weathering and insolation will be acceptable. The marks will be divided equally between the two processes. [6]

Population

4 Tables 1A and 1B show countries with population aged over 65 years in 2004.

(a) Name the country which appears in both Table 1A and in Table 1B.

Japan [1]

(b) Compare the data given for the countries ranked 1 in Tables 1A and 1B.

Italy has 11.07 million people and 19.3% over 65 years of age; whereas China has 97.15 million (much larger/8.8 times/almost 9 times the number/another comparative observation), but only 7.4% over 65 (a far smaller proportion/less than half/38% the proportion of Italy's/some other comparative observation).

A full answer includes the comparison (contrast) of both statistics in terms of language and expression and data accuracy. [3]

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- (c) Use your knowledge of the demographic transition to help explain the differences in the percentages shown in Table 1B.

Candidates may supply a quick sketch of the demographic transition model or of its later stages and could annotate it to locate one or more of the countries, but this is not required.

Candidates are not expected to have studied the demography of any of the countries, so interpretations may vary. The most likely placings are:

- | | | |
|---|--------------|--|
| 1 | China | Stage 4? A special case because of government population policy. |
| 2 | India | Stage 3 |
| 3 | USA | Stage 4 |
| 4 | Japan | Stage 5 |
| 5 | Russian Fed. | Stage 4 |

None of these countries were in Stages 1 or 2 in 2004. Reference should be made to at least two countries in different stages of the DTM, in order to address the differences in the question.

It is likely that candidates will describe the changes in the death rate which make Stages 3, 4 and 5 distinctive; accompanying low (and sometimes fluctuating) birth rates. For a response which is only about death rates, max. 4. A full response makes reference to death rates relative to birth rates and to the significance of population structure. **[6]**

Migration

- 5 Fig. 3 shows remittances received from international migrants as a percentage of the country's GDP in 2006. Remittances are money sent back home to families.

- (a) Describe the global distribution of remittances received shown in Fig. 3.

It is uneven and varies greatly, e.g. within Africa.

Most are likely to identify the 'highs' (or some of the highs) of the 20–30% size, such as in the Caribbean, South Africa, Eastern Europe, the Middle East and S and SE Asia; and the 'lows' (or some of them) to illustrate the generalisation, e.g. USA, Brazil, named countries in Africa, China, Australia, NZ, etc. Some may observe that the high values are associated with LEDCs largely, but the picture is more complex in relation to the low values (MEDCs, LEDCs and NICs). Credit well candidates who describe a range, spectrum or continuum of values, rather than simply seeing high/low.

Credit 1 the candidate who makes the point that this is relative, not absolute data, in relation to the countries' GDP, so the actual flows of remittances may be significantly different in scale, as this shows an appreciation of the data. However, this is not required for full marks.

[4]

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- (b) Suggest reasons why receiving remittance money sent back by relatives working in other countries may be significant for the migrants' families left at home.**

International migration is complex and comprehensive answers are not required.

Reasons may include:

- the migrant is the breadwinner/head of the family (adult male)
- migration may be a brain or brawn drain, of the highest potential earner
- savings may have been used up/debt incurred in paying for the migration
- remittance may be hard currency, so can achieve a lot
- money may be used to foster chain migration, e.g. wife and children
- money may simply pay for survival
- money may improve life, e.g. education, housing, diet, healthcare
- remittance money may allow the purchase of some luxuries

Credit candidate's awareness of international migration, its impacts on source areas (the areas the migrants leave) and their ability to apply their knowledge and understanding to provide some explanatory ideas.

A full answer consists of two or more well-developed reasons. Examples may be credited when used to support and develop the argument. **[6]**

Settlement dynamics / Population / Migration

- 6 Fig. 4 shows the percentage urban population in 1950, 1975 and 2000 and the predicted percentage urban population in 2025.**

- (a) In which year did the urban population in LEDCs reach 40%?**

2000

[1]

- (b) Compare the trends in percentage urban population in LEDCs and MEDCs between 1975 and 2025. Support your response with data from Fig. 4.**

Both LEDCs and MEDCs show an increasing trend (1); with LEDCs increasing at a fast and steady rate, from approx. 28% in 1975 to 53/54% in 2025 (almost double), but MEDCs increasing at a lower rate, yet at a much higher level, 68% to 80%, (i.e. small incremental percentage over 50 years).

For a good comparative description with dates, but without percentage data.

[4]

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(c) Give reasons for the increase in urbanisation in LEDCs over time.

This is an opportunity for candidates to integrate their knowledge and understanding of the three topics in the Human Core, to produce a full explanation. Urbanisation is the progressive concentration of population into urban settlements (towns and cities), which increases areal extent and results from:

- settlement change linked to economic development and government priorities investing in urban areas
- internal migration from rural areas to urban areas (rural-urban migration)
- change in population structure of urban areas, increasing the reproductive cohort and adding population at a time of relatively high but decreasing fertility and decreasing mortality.

[5]

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Section B: The Physical Core

Hydrology and fluvial geomorphology

- 7 (a) (i) Define the terms *interception* and *throughflow* as they apply to water in a drainage basin

Interception is the capture of precipitation by leaves, branches, etc of trees and vegetation. The water may then be evaporated or reach the ground as drip or stem flow. Basic statement for 1 mark, elaboration gets 2.

Throughflow is the lateral downslope movement of water within soils after it has been infiltrated into the soil. Basic statement for 1 mark, elaboration gets 2. [4]

- (ii) Briefly explain how the shape of a storm hydrograph can be affected by drainage basin shape.

It is usually assumed that the lag time is reduced and the rising limb steepened in a circular drainage basin as opposed to an elongated basin. Candidates will need to mention the shape of the basin, its influence on the speed of water reaching the river and the affect on the storm hydrograph. [3]

- (b) With the help of a diagram, explain how drainage basins operate as a system of inputs, outputs, stores and flows.

The ideal response is a systems diagram showing the various inputs, outputs, stores and flows. Mark on level of detail, i.e. a basic diagram showing just a few components will get only a few marks. A more traditional slope profile diagram is also acceptable but the stores, flows, etc will need careful annotation. Explanation should be straightforward. If no diagram max 6, but difficult to envisage a good answer that does not use a diagram. [8]

- (c) Explain how human activities might affect the flows and stores within a drainage basin.

This leads on from Part (b) and the better answers will use it as a starting point. Human activities will be those that affect processes such as interception, evapotranspiration, infiltration, overland flow and water abstraction. Better candidates might even discuss precipitation changes as a result of global warming. Mark on level of detail and understanding [10]

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Level 3

For Level 3 answers one should expect a good coverage of the ways human activities affect most of the inputs and flows. Also, one would expect that the effects would be linked together in a systems framework. Thus, deforestation will not simply affect interception but will affect infiltration, overland flow and groundwater flow; also evapotranspiration. [8-10]

Level 2

A sensible appreciation of the effects but somewhat partial and with the effects being treated singly and not integrated into a coherent whole. Many answers will simply describe opposites such as afforestation/deforestation. [5-7]

Level 1

Will probably provide a very limited range of effects with limited explanation. Limited understanding of the processes involved [0-4]

Atmosphere and weather

8 (a) (i) Define the terms *condensation* and *convection*

Condensation is the change of a gas, usually water vapour into a liquid on cooling. Both change of state and cooling are required for two marks.

Convection is the process whereby (usually) air is heated at the ground surface and then rises because it is warmer and lighter. Both heating and rising are need for two marks.

[4]

(ii) Briefly explain the conditions needed for atmospheric stability

Basically occurs when the dry adiabatic lapse rate is greater than the environmental adiabatic lapse rate which means that air does not reach saturation level. Discussion of both lapse rates is needed for 3 marks.

[3]

(b) With the help of diagrams, explain how the daytime and night time energy budgets are different.

This is the comparison of the classic 6 factor day time model (incoming solar radiation, reflected solar radiation, surface absorption, sensible heat transfer, long wave earth radiation, latent heat transfer) and the 4 factor night time model (long wave earth radiation, latent heat transfer, sensible heat transfer, absorbed energy returned to earth). If no diagrams maximum 6. Good, annotated diagrams can get marks approaching the maximum.

[8]

(c) Describe the greenhouse effect. Explain how human activities may affect its operation.

The greenhouse effect is the absorption of reflected and re-radiated heat energy in the atmosphere leading to an increase in temperature. The main greenhouse gases are water vapour, carbon dioxide, methane and ozone. However, destruction of the ozone layer is not relevant. Human activities include production of carbon dioxide by industrial processes and internal combustion engines, deforestation, forest fires and perhaps methane production by farm animals.

[10]

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Level 3

A thorough understanding of the greenhouse effect with knowledge of more gases than just carbon dioxide. Should expect more from human influence than just industrial processes and pollution. There should be no confusion with the ozone layer. [8-10]

Level 2

Less knowledge of the nature of greenhouse gases, perhaps restricted to carbon dioxide. There will be some uncertainty of the nature of the radiation and how it is trapped. Will probably write about a blanket of greenhouse gases. The human effect will be limited to industry and pollution. [5-7]

Level 1

There will probably be great uncertainty about what is a greenhouse gas. Destruction of the ozone layer will probably be dominant. [0-4]

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Rocks and weathering

9 (a) (i) Define the terms *ocean ridges* and *island arcs*.

Ocean ridges, are ridges of magma at divergent plate boundaries under oceans. For both marks, answers will need the plate boundary and lava.

Island arcs are chains of volcanoes where two oceanic plates meet. For both marks answers will need volcanic chains where two oceanic plates meet. **[4]**

(ii) Briefly describe the process of subduction.

When two tectonic plates of different densities meet, the heavier is forced under the lighter and melts to form magma. The best example is where a heavier oceanic plate is forced under a lighter continental plate, although subduction can occur when two oceanic plates meet. Credit forcing mechanism but for full marks, answers will need, densities of plates and melting to form magma. **[3]**

(b) With the help of diagrams, explain how fold mountains are formed at tectonic plate margins.

Fold mountains are formed at convergent plate boundaries, either continental-continental or oceanic-continental. Unconsolidated sediments are trapped between the two plates and are forced upwards, usually folding in the process. For high marks (6 and above) answers will need both types of plate boundaries. If no diagrams, maximum 6. **[8]**

(c) Explain how mass movements can affect the development of slopes.

This is quite a broad question and a variety of mass movements can be considered. Steeply angled slopes will develop with rock falls, producing screes at the base. Landsliding (rotational or planar) will lead to a decrease in slope angle with scars and toe slopes. Mudflows and solifluction will produce lobes and toe slopes. **[10]**

Candidates will probably:

Level 3

For a Level 3 answer one should expect a range of mass movements with accurate explanation for changes in slope form and angle. Good marks can be obtained by informative annotated diagrams **[8-10]**

Level 2

The range of mass movements will be limited and their effects on slopes will be somewhat vague. There will be a lack of clarity in the operation of the mass movement processes. **[5-7]**

Level 1

Answers will struggle to write much that is meaningful about mass movements and especially their effects on slopes. Landsliding will probably be used as a simple term with little indication given about the nature of the process. **[0-4]**

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Section C: The Human Core

Population / Migration

10 (a) (i) Give the meaning of the term *fertility rate*.

This may be expressed as an individual rate,

the average (1) number of children (1) each woman in a population bears (1)
or as a general rate,

the number of births in a year (1) per 1000 women (or as a percentage) (1)
of childbearing age, 15–49 (or similar ages) (1)

[3]

(ii) Explain how two factors influence levels of fertility.

Accept any two factors in any context (LEDC or MEDC). Some decrease fertility, e.g. education, availability or affordability of contraception, empowering women; others maintain higher levels of fertility, e.g. traditional attitudes, early marriages, improved diets, abortion being illegal, etc. Credit 2 and 2.

[4]

(b) Outline the two components of population change and explain how they affect the size of the population.

- natural increase births – deaths = net natural gain/loss
- migration immigration – emigration = net migration

The two components are combined overall so that gains (births / immigrants) are offset by losses (deaths / emigrants), usually for one calendar year. Credit a diagram and/or examples which assist the explanation.

[8]

(c) How far do you agree with the view that population change is unpredictable?

Candidates may argue that both natural increase and migration are to an extent predictable, (e.g. natural increase as described by the demographic transition model), but have unpredictable elements (e.g. impact of HIV/AIDS, addition of a Stage 5, migration streams such as refugee flows).

Candidates will probably:

Level 3

Make a response from detailed knowledge and strong conceptual understanding. Provide an effective assessment. [8–10]

Level 2

Make a reasonable attempt, which may contain good points, but which remains partial. Offer a valid, but limited, assessment, e.g. of only one component of population change. [5–7]

Level 1

Offer one or more basic ideas and struggle to deal with the issue. Take a descriptive approach, making little or no assessment. [0–4]

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Migration / Settlement dynamics

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

the movement of people (0) for a period of one year or more (1)

from rural settlements or rural areas (farms, hamlets, villages) (1)

to urban settlements or urban areas (towns and cities) (1) [3]

(ii) Suggest two ways of reducing rates of rural-urban migration.

Accept any two different, robust, ways. These may increase opportunities in rural areas, e.g. Zimbabwe's growth points, growth of tourism, agricultural development; or act as disincentives to migrating to urban areas, e.g. need for permits (China), media reports of hardships experienced by migrants, etc. Credit 2 and 2 [4]

(b) With the help of examples, explain some of the circumstances in which urban-urban migration occurs.

The term covers all movements from one urban area to another of more than one year's duration. Some may see this in the context of stepped migration within the settlement hierarchy (both up and down). Others may consider changes in personal circumstances, e.g. through education and employment, including retirement; and the role of factors which inform the complexity of migration decision-making (social, economic, environmental, political). Accept international urban-urban migration and intra-urban movements. If only intra urban is offered- max of 3 marks. [8]

(c) How far do you agree that pull factors are more powerful than push factors in migration decision-making?

Any migratory movements may be used as the context for developing an assessment. Most candidates handle push factors and pull factors effectively so it is likely to be the evaluation that differentiates outcomes. Most are likely to write that it depends on the nature of the migration (voluntary or involuntary (forced)) and the individual(s) concerned.

Candidates will probably:

Level 3

Make a response from detailed knowledge and strong conceptual understanding of migration. Provide an effective assessment. [8–10]

Level 2

Provide a sound response which may be good in parts, but which is limited through lack of detailed knowledge or overall evaluation. [5–7]

Level 1

Lack the knowledge, time or skills to make more than a basic response. Offer little or no effective assessment. [0–4]

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Settlement dynamics

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

This is where rival potential land-uses or land-users compete or bid for, or try to obtain the use of, space (land or buildings). Although the words competition or compete, and spatial or space may need to be used, the sentence(s) of explanation should bring out the meaning of both. [3]

(ii) Outline two reasons why spatial competition occurs in urban areas.

The main reasons, classically, are:

- urban locations are highly desirable, e.g. for accessibility, convenience, potential profitability, prestige
- the land area available is relatively small in extent, especially in the centre
- how urban land markets function, e.g. promotion
- effects of planning decisions restrict the availability of space [4]

(b) With the help of one or more examples, describe how the locations chosen for manufacturing industry in urban areas change over time and explain why this occurs.

Although much depends on the example(s), it is likely that older locations will be central, riverside, port area or linked to a resource, e.g. mineral. Newer locations may be nodal, peripheral, in a planned industrial zone, on an industrial estate or in an EPZ, etc. The reasons are largely economic, (scale, profitability, accessibility, cost-saving, time-saving, subsidies, etc.), but also social, environmental and political. A labelled or annotated sketch map is creditable in support of the response. Some balance between description and explanation is needed, from 3/5 to 5/3. [8]

(c) To what extent has providing infrastructure for a named city created more problems than it solved?

One of the management issues under syllabus 3.4. Here **infrastructure** may be interpreted to mean the hard skeleton of the city (e.g. any transport system, or utilities – water, power). Services of education or health are not acceptable.

Candidates will probably:

Level 3

Develop a good assessment of the chosen attempt(s), with exemplar detail. May differentiate outcomes by location or groups of people. [8–10]

Level 2

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

Level 1

Make one or more basic points in a response which is a description rather than an assessment. Write generally about the attempt(s) or use an example in name only. Offer notes or fragments. [0–4]