

MARK SCHEME for the October/November 2012 series

9696 GEOGRAPHY

9696/13

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.

Cambridge is publishing the mark schemes for the October/November 2012 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

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Section A

Hydrology and fluvial geomorphology

1 Fig. 1 shows the flows and stores in a drainage basin.

(a) (i) Identify the component labelled A.

Interception or vegetation storage [1]

(ii) Identify the component labelled B.

Infiltration [1]

(iii) Identify the component labelled C.

Throughflow [1]

(iv) Identify the component labelled D.

Groundwater flow, base flow [1]

(b) Examine the factors that influence the amount of water reaching the groundwater store and the time it takes.

The factors influencing the amount of water are precipitation amount and intensity, evapotranspiration, surface flow and throughflow. The way these affect the amount of water need to be examined. The timing is governed mostly by the speed of infiltration and percolation as governed by porosity and permeability of both the soil and bedrock. The best way of answering the question is to use the flow diagram and examine the areas where water movement can be split, such as the relation between throughflow and downward percolation. Suggest 4/2 split for amount and timing. [6]

Atmosphere and weather

2 Fig. 2 shows the recent trends in global mean surface temperature and snow cover in the northern hemisphere.

(a) Compare the two trends for the period 1920 to 2000.

Global mean temperatures show a steady rise whereas snow cover starts decreasing at a later date. For full marks there should be some data extracted from the graphs with general trends and fluctuations noted. There also needs to be some comparison words, such as 'however', 'whereas' for full marks. [4]

(b) Explain the trend in global mean surface temperature.

Explanation will be in terms of the greenhouse effect and the increase in greenhouse gases as a result of human activities. For reasonable marks (i.e. 4 – 6) the main greenhouse gases should be described, not just carbon dioxide, and the enhanced greenhouse effect discussed. The increase in production of these gases should be related to the trend. Destruction of the ozone gains no credit. [6]

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Rocks and weathering

3 Fig. 3 shows some of the features associated with plate tectonics.

(a) (i) Identify the feature shown at A.

Mid-ocean ridge [1]

(ii) Identify the feature shown at B.

Ocean trench [1]

(iii) Identify the process occurring at C.

Subduction [1]

(iv) Identify the type of plate shown at D.

Oceanic [1]

(b) Explain how volcanoes might be formed at different plate margins.

Volcanoes can be formed at either divergent or convergent plate margins. At divergent margins, upwelling of magma will produce volcanic landforms. There needs to be some mention of convection currents. Where oceanic plates meet a continental plate or two oceanic plates meet, subduction will occur with melting in the Benioff zone to produce magma which then may force its way to the surface. Hotspot volcanoes, such as Hawaii, are not acceptable. Suggest 3/3 or 4/2 depending on quality of detail. [6]

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Population

4 Fig. 4 shows the predicted age/sex pyramids for selected world regions in 2025.

(a) Name the world region shown in Fig. 4 which is predicted to have:

(i) the largest population under 15 years of age

Sub-Saharan Africa (1)

(ii) a regressive age/sex structure.

Europe (1)

[2]

(b) Describe the differences between the predicted population over 70 years of age in Figs 4A and 4B, using data to support your response.

Numbers: Europe's pyramid, in Fig. 4A, is top-heavy, with a large number of people over 70; whereas Western Asia's pyramid is narrow and tapers evenly, with a small number of people surviving over age 70. (2)

Age at death: People in Europe live longer and die at higher ages; e.g. cf. 95 – 99 and 100+ age groups, which do not appear on Fig. 4B for Western Asia. (1)

Gender: In Europe, females live longer than males (bars are longer on the right side in all age groups over 70). This is not seen/barely noticeable for Western Asia. (1)

A full answer involves some data support (but not for all three observations).

[4]

(c) Choose one of the three world regions shown and suggest the demographic issues it is likely to face in 2025.

Europe (Fig. 4A): an ageing population; welfare burden; lack of labour; need for immigrant labour and/or pro-natalist population policies.

Western Asia (Fig. 4B): less obvious; perhaps the need to reduce birth rates and to increase life expectancy.

Sub-Saharan Africa (Fig. 4C): a youthful population; burden on working adults to support those under 15; population resource-relationships, e.g. growing food demand from population increase; credit links to mortality from AIDS, if offered, which may be inferred from narrowed pyramid; need to reduce fertility rate; loss of adults by emigration (brain drain and brawn drain).

A full response comprises the brief explanation of at least two different valid demographic issues. For one issue, **max. 3**. Comprehensive answers are not required for the modest mark allocation.

[4]

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Migration

5 Fig. 5 shows an extract from a news website about asylum seekers who arrived in Australia by boat in 2010. Asylum seekers who receive official permission to stay in their country are called refugees.

(a) According to Fig. 5, which country was the origin of the greatest number of asylum seekers?

Afghanistan

[1]

(b) Describe the distribution of source areas of asylum-seekers shown in Fig. 5.

The source areas were LEDCs in Asia and the Middle East, (but not every country). The largest numbers came from a cluster of three countries: Afghanistan, Iran, Iraq, and also from Sri Lanka. Distance appears to make no difference to the flows.

Credit 1 but not essential, the idea that the distribution could be more complex as there are 650 asylum seekers shown as 'Other', whose origins may be different, or not known or unverifiable. [4]

(c) Suggest reasons why Australia, an MEDC, may be an attractive destination for refugees.

Candidates are free to develop their own reasoning, which may include such key ideas about international migration as:

- a betterment motive
- perception
- reports and news received from other migrants
- relative proximity, compared to distance to NZ, USA, etc.
- accessible by boat, rather than air (fewer documents, identity can be concealed)
- established route of people traffickers

In addition Australia offers:

- help and support to refugees
- political stability, a place of safety
- better prospects, e.g. employment, education, healthcare
- other

Push factors are relevant in relation to pull factors of Australia. Comprehensive answers are not required

[5]

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Settlement dynamics/Migration

6 Table 1 shows information about urban populations and the percentage population living in slums in selected countries in Africa, 1990 – 2010.

(a) Name the country in Table 1 predicted to have the lowest percentage of urban population living in slums in 2010.

Morocco

[1]

(b) Compare the growth in urban population in Egypt with the growth in urban population in Nigeria, using data from Table 1 to support your response.

There are at least four comparisons that could be made:

Absolute increase: in Egypt the urban population grew by approx. 10 million in 20 years, but in Nigeria it grew by very much more, 45 million+.

Relative increase: for Egypt this represented an increase of 30%, however for Nigeria it was a massive 140%.

Level of urban population: in 2010 Egypt was predicted to reach and just pass (34.04 millions) the total urban population in Nigeria in 1990 (33.33 millions) 20 years previously.

10-year periods: both countries' urban populations grew more absolutely between 2000 and 2010, than between 1990 and 2000.

Credit each of the above points 1 or with data 2 to the maximum.

[4]

(c) Suggest two reasons why the percentage of people living in slums in many LEDCs is decreasing.

A number of reasons may be credited, including:

- increase in the provision of permanent housing/houses with amenities
- schemes to improve and upgrade shanty towns and squatter settlements, e.g. clean water, mains power, waste disposal, means areas are reclassified
- slum clearance/forced removal
- encouraging return migration to source areas
- decrease in rate of rural-urban migration (?), so housing supply more able to meet demand
- relocation and resettlement, e.g. new towns, agricultural land
- other such as general development of the country

Credit reasons 2 or 3 to maximum, depending on development and detail.

[5]

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Section B

Hydrology and fluvial geomorphology

7 (a) (i) Define the terms *abrasion* and *hydraulic action* as they apply to river channels.

Abrasion is erosion by means of particles carried in the river flow hitting the beds and banks, which are used as a tool for grinding the beds and banks.

Hydraulic action is the sheer force of water hitting the beds and banks of a river channel.

[4]

(ii) Briefly explain what is meant by helicoidal flow.

Helicoidal flow is the movement of water in a meander from the inner to outer bank and back again in a downstream direction. For full marks movement across the river as well as downstream will be needed.

[3]

(b) With the help of diagrams describe the nature and explain the formation of levées and deltas.

Both are straightforward river features. A diagram of a levée should show the position of the feature, its relationship to the channel and floodplain and some indication of sediment layering. Explanation will be in terms of high discharge and overbank flows with the coarse material being dropped first, followed by silts and clays.

A diagram of a delta should show the river entering a lake or the sea with distributaries or branching channels. The specific shape will be determined by which type of delta is being described. Formation will be in terms of a lessening in velocity on entering the water body leading to a reduced competence. For good marks, there will need to be some mention of flocculation to enable clay sized particles to be deposited. The very best answers might mention topset, forest and bottom set beds, but this is unlikely.

The marks should be split equally between the two landforms. If no diagrams, maximum 3 for a very good description of each feature.

[8]

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(c) Explain how human activity might lessen the impacts of river floods.

There are two possible components to this question. Human activity can modify drainage basin characteristics to limit the speed and amount of runoff. Changing land use, such as afforestation and changing farming practices, are the obvious points that might be raised. The other way of lessening the impact is by managing the river channel so it can accommodate increased flows. These include the building of artificial levées, straightening and deepening of channels and channel diversion. Moderating of flows using dams and reservoirs can also be expected. Prediction and warning techniques are acceptable. **[10]**

Level 3

Covers both management of the catchment and management of the river channel aspects in a detailed and convincing way. The reasons for river flooding should be outlined followed by a reasoned argument of the scope for human modification. Should demonstrate a clear understanding of the hydrology of modified river channels. **[8 – 10]**

Level 2

Will be aware of some of the ways of lessening the impact but will lack detail and the understanding will be limited in some respect. Will tend to be unbalanced between the two main elements and will probably demonstrate some confusion over velocity/discharge relationships in modified river channels. **[5 – 7]**

Level 1

Will have a limited understanding of the causes of floods and therefore of the measures to lessen their impact. Will probably cover only one of the components, probably the building of levées and perhaps channel deepening. Will exhibit a lack of understanding of river discharge and velocity and how it is affected by river changes. **[0 – 4]**

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Atmosphere and weather

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

Temperature inversion is the state of the atmosphere where temperature increases with altitude rather than decreasing.

Environmental lapse rate is the rate of decrease of temperature with height in the atmosphere at a given location. [4]

(ii) Explain how radiation cooling occurs.

Radiation cooling is the cooling of air above the earth's surface as a result of radiation under clear skies at night. For full marks there should be a mention of night time and clear skies. [3]

(b) With the help of a diagram or diagrams explain how a mountain front can lead to the development of precipitation.

An air mass, approaching a mountain barrier, will be cooled as it is forced to rise over the barrier. Diagrams may show mountain profile with air rising over it, or a lapse rate diagram showing conditional instability. A full explanation of air rising, even though the adiabatic lapse rate is greater than the environmental lapse, and then continuing to rise at the saturated adiabatic rate is needed for marks in the range 6 – 8. A brief description of air being forced to rise and produce rainfall without the explanation of adiabatic rates will rarely reach 4 marks. If no diagram, maximum mark 6. [8]

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- (c) Describe the global pattern of wind systems. Explain how this pattern is produced and why it varies seasonally.

The three main patterns are the trade winds, westerlies and polar easterlies. The trade winds occur between the equatorial lows and the sub-tropical highs and blow from the south east in the southern hemisphere and from the north east in the northern hemisphere. The westerlies occur north and south of the trade winds. The monsoon winds might be described but these are merely an extension into the northern Indian Ocean and Bay of Bengal. There is a slight movement of the trade winds north and south with the heat equator but the movement is much less than the pressure systems because of the different thermal properties of the oceans. It is only the monsoons that show a distinct seasonal pattern. The use of the tri-cellular model is appropriate. Much of the information may be shown by means of a diagram but a diagram is not essential. [10]

Level 3

A good description of the trade winds and the westerlies will be provided with the better answers including the polar easterlies. Explanation at this level should be in terms of the global pattern of pressure systems and their seasonal movement and the coriolis force.

[8 – 10]

Level 2

A general grasp of the patterns with perhaps a concentration on the trade winds. Only a vague understanding of the role of pressure systems and seasonal change might well be omitted.

[5 – 7]

Level 1

A limited knowledge of the respective winds with little and often inaccurate explanation.

[0 – 4]

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Rocks and weathering

9 (a) (i) Define the terms *heave* and *flow* as they apply to mass movement on slopes.

Heave is the movement, usually of finer particles, vertically out of a slope usually as a result of wetting and drying. A good annotated diagram should be able to obtain full marks.

Flow is the downslope movement of material, faster at the top and slower with depth and at the edges, with internal deformation. A diagram will again be useful. [4]

(ii) Briefly describe a rockfall and explain how it occurs.

Rockfalls occur from steep, often almost vertical jointed and fractured rock faces, usually as a result of freeze-thaw cycles, wetting and drying and other weathering processes. Shaking by earthquakes is also acceptable. For full marks there should be some detail of the nature of the movement and the process involved. [3]

(b) Explain how granite is weathered and how this is influenced by its physical structure and chemical composition.

Both chemical and physical weathering should be covered. The joints in the rock will aid the processes of both physical and chemical weathering. The main minerals, quartz, feldspar and mica, will largely govern chemical weathering. Quartz is virtually inert, but feldspar and mica, especially feldspar because of its abundance, are susceptible to chemical weathering especially hydrolysis, leading to the production of kaolin. The different colours of the minerals will affect heat absorption and therefore insolation weathering. [8]

(c) Explain how human activities may influence the form and development of slopes.

This is a wide-ranging question, capable of being answered in many different ways. The syllabus mentions quarrying, mining and dumping of material on the earth's surface. All of these are relevant for the 'form' part of the question. The development of slopes will be affected by mass movements as a result of human activities such as undercutting by road construction and loading of slopes. The role of deforestation in de-stabilising slopes should also be considered. Soil erosion on slopes would also be relevant. This has to be explained as well as described. [10]

Level 3

A well balanced answer covering both nature and development of slopes. A good understanding of the processes involved, especially of the way in which slope changes occur. [8 – 10]

Level 2

Will try to cover both aspects but will probably be somewhat unbalanced. Understanding of the processes, such as the way deforestation may de-stabilise slopes, will be limited. [5 – 7]

Level 1

Will be restricted to brief statements of mining, quarrying, etc. with little knowledge of the way it affects slope development. Understanding of the processes will be partial and imprecise. [0 – 4]

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Section C: The Human Core

Population

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

the situation where there are too many people (1)
 for the available resources (1)
 at a given level of technology (likely to be the discriminator) (1) [3]

(ii) Describe two ways to reduce the problem of overpopulation.

There may be population initiatives (e.g. family planning, transmigration); resource initiatives (e.g. increased food imports, new mining); or technology initiatives (e.g. irrigation in crop production). Different birth control issues would count as one way. Credit valid **ways 2 and 2.** [4]

(b) With the help of examples, explain the causes and the consequences of food shortages.

The causes may be conceptualised as problems of production and supply, e.g.

	production	supply
social	illiteracy, low skills	disputes, ethnic conflict
economic	debt, high costs	transport, middlemen
environmental	weather, hazards, soil depletion	disruption e.g. from flooding
political	policy change, mismanagement	corruption, poor decisions

Consequences include hunger, malnutrition, famine, unrest, escalating prices, food riots, etc. Candidates may take LEDC or MEDC contexts or both. **Max. 5** for a general response. Credit causes/consequences, **4/4 to 5/3** and **3/5.** [8]

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(c) How far do you agree that optimum population exists in theory, but not in reality?

The syllabus requires a 'critical appreciation of the concept of ... optimum population ... exists theoretically at the point where population and resource usage is balanced (optimal) ... give everybody the highest standard of living. A diagram may assist. In reality, relationships between population and resources are complex and dynamic. A few countries claim to have optimum population, e.g. Singapore, but the country depends on food imports and foreign labour.

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. **[5 – 7]**

Level 1

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

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Migration/Settlement dynamics

11 (a) Compare the causes of rural-urban migration and urban-rural migration.

Movements from rural to urban and from urban to rural areas have different causes. Some candidates may take a push/pull factors approach, but it may be more effective to address causes directly in terms of changes in the life cycle, family life, employment, success, etc. Some similarity of causes may be suggested, notably betterment, which is the fundamental motive of all migratory movements. Contexts may be LEDC or MEDC or both.

No credit for consequences (which, in the past, some have confused with causes), **max. 4** for one only, given that comparison is needed. **[7]**

(b) For either rural-urban migration or urban-rural migration, describe the impacts on the rural area(s) affected.

Any relevant **impacts** are valid, although the syllabus does make a special mention of population structure (expect 'gaps' and 'bulges'). Again, LEDC or MEDC contexts or both may be taken. Impacts may be on the rural settlements, community dynamics and sectors of the economy such as production or service provision. In many LEDCs rural-urban migration sees grandparents caring for the grandchildren, land abandoned and women left in charge. Urban to rural migration places pressure on resources and infrastructure and may lead to an unbalanced population structure. In MEDCs, retirement migration especially to coastal areas impacts house-building and increases the burden on social services with high percentages of older adults. Credit any **rural areas** and associated impacts. **[8]**

(c) With reference to one rural settlement or rural area, outline some of the issues of its development and evaluate the responses.

The syllabus requires a case study of a village, hamlet or rural area. The issue(s) and associated responses depend largely on the choice made. Credit the clarity of identification of the issue(s), the detail and development of the example and the evaluation of the response (success/failure, financing, unexpected outcomes, further action needed, locations/people helped, etc.)

Candidates will probably

Level 3

Provide an effective outline of the chosen issue(s) in a detailed context and a developed evaluation of the responses. **[8 – 10]**

Level 2

Make a sound response which may be good in parts, but which is limited in detailed knowledge or in the evaluation given. **[5 – 7]**

Level 1

Offer a basic response which may be quite general or in name only. May struggle to identify the issue(s) and/or to give an evaluation. **[0 – 4]**

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Settlement dynamics

12 (a) (i) Give the meaning of the term *urban renewal*.

The replacement of old structures/buildings with new ones and the conversion of space/land from one use to another, or the twin processes of redevelopment and improvement, in towns and cities.

[2]

(ii) Suggest two reasons why urban renewal occurs in the central areas of towns and cities.

A number of **reasons** may be given, including:

- deterioration of buildings/no longer fit for purpose
- poor living conditions for residential population
- inefficient use of prime central land (e.g. low rise)
- potential profitability of redevelopment
- associated traffic problems and congestion
- response to hazardous events, e.g. bomb, fire, earthquake
- other, such as re-imaging

Credit examples which assist the reasoning. Max. 3 for one.

[5]

(b) With the help of examples, explain why different groups of people live in different residential areas within urban settlements.

Residential segregation, economically, by income (ability to pay, bid-rent) and socially by race/ethnicity (or religion) is commonly observed in urban areas. This results from processes such as invasion and succession, filtering, the operation of the housing market and the outworking of planning decisions; and from behaviours, negatively, in terms of avoidance and repulsion, and positively, in terms of choice and attraction to what the neighbourhoods or communities offer. LEDC or MEDC contexts may be taken. Credit exemplar detail and accounts which are conceptually sound and dynamic.

[8]

(c) Assess the view that the locations of economic activities in urban areas are moving outwards.

Centripetal movement is characteristic of much retail, manufacturing and service industry (space, accessibility, profitability, etc.), yet there is centrifugal movement also and concerns over urban sprawl and 'dead hearts' of cities.

Candidates will probably

Level 3

Develop a good assessment of different activities, with exemplar detail. Show firm conceptual understanding of urban dynamics.

[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 descriptive rather than evaluative. Write generally about activities or use an example in name only. Offer notes or fragments.

[0 – 4]