GEOGRAPHY **9696/01**

Paper 1 Core Geography **For Examination from 2010**

SPECIMEN MARK SCHEME

3 hours

MAXIMUM MARK: 100

This document consists of **13** printed pages and **1** blank page.

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International Examinations

[Turn over

Section A

Hydrology and fluvial geomorphology

1   **Fig. 1 shows some features associated with the valley of a river channel.**

   (a) (i) **Name and briefly describe the feature marked as A.**   **[2]**

            A is an oxbow lake or cut-off. It is a curved area of stagnant water detached from the main channel.

       (ii) **Name and briefly describe the feature marked as B.**   **[2]**

            B is a slip off slope or point bar – an area of sand and gravel located within the inside of a meander bend.

   (b) **Explain the development of this river channel and** one **of the landforms shown on Fig.1.**
                                                                                      [6]

       The channel is a meandering channel and can be explained in terms of helicoidal flow and pool and riffle sequences. Most are likely to choose to explain oxbow lakes, in terms of the erosion of the neck of the meander by faster currents on the outside of the bends until cut through and attendant channel straightening with a detached horse shoe lake that is gradually silted up. Some may choose point bars – deposition of sediment on the inside of bends where the current slows. Few will deal with the steep slopes and old gravels that represent past meander migration of the channel.

                                                                                [Total: 10]

Atmosphere and weather

2   **Fig. 2 shows the mean (average) temperatures (°C) in July.**

   (a) **Describe** two **differences in the pattern of the isotherms between the northern and southern hemispheres shown in Fig. 2.**   **[4]**

       Higher temperatures (30°C) established over Africa-Asia in the northern hemisphere.
       Northward shift of isotherms of northern summer.
       Greater latitudinal distortion of isotherms over land and sea in the northern hemisphere.
       Lower temperatures (-20°C) in Antarctica.

       Any two for the marks.

   (b) **Describe and explain the differences between the temperatures of land masses and sea areas.**   **[6]**

       In the southern hemisphere (winter) isotherms displaced to N over seas, whereas in the northern hemisphere (summer) they are displaced northward over land areas. This is due to the different thermal capacities of land and sea. Sea heats up more slowly in summer (in N) and cools more slowly in southern hemisphere (winter) as more heat is retained in oceans. Conversely land heats up and loses its heat at a faster rate.

                                                                                [Total: 10]

Rocks and weathering

3 **Fig. 3 shows a classification of mass movements according to water content and velocity.**

  (a) Give the water content and range of velocities that are associated with:

   (i) debris flows;

    Between 1 cm per second and 10 m per sec, high water content.

   (ii) rock falls.   **[2]**

    Between 1 m per sec 100 m per sec, low water content.

  (b) Describe the nature of solifluction and explain under what conditions it occurs.   **[4]**

    Solifluction is the slow down slope movement (1 mm per year to under 1 cm per day) of materials that have high water content, usually derived from seasonal thawing. Associated with cold climates.

  (c) Describe soil creep and explain why it occurs at such low velocities.   **[4]**

    Soil creep is the very gradual down slope movement of soil under gravity. Some will ascribe it to the process of heave whereby particles are lifted by frost action at an angle to the slope and fall back upon melting. Others may cite general slow viscous movement or slippage that is insufficient to bring about shear or slope failure. It is slow because of low angles and cohesion of materials.

                                                                                [Total: 10]

Population

4   **Fig. 4 shows age/sex pyramids for China, an LEDC in Asia, in 1990 and predicted for 2040.**

   (a) **Identify** two **main features of the age/sex pyramid in Fig. 4A**.   **[2]**

   Credit (1) each of two features,

   wide base, narrow top, balanced M/F, exceptionally large 20-24 cohort, transitional shape, even stepped appearance above 40, other (mark on merit).

   Please do not accept: progressive or regressive; youthful or aged; or anything about vital rates (BR/DR).

   (b) **Draw a simple labelled diagram to show the possible shape of China's age/sex pyramid in 2015**.   **[3]**

   Mark on impression, looking for a narrowing base, the filling out of the upper part of the pyramid and possibly the 20-24 cohort now aged 45-50.

   A full answer has good shape, labels both axes and may annotate.

   Accept either an age/sex diagram as in figure or an outline structure.

   (c) **Explain the predicted increase by the year 2040 in the percentage of China's population aged over 40 years.**   **[5]**

   By a combination of reduction in fertility/drop in birth rate and of the increase in life expectancy/reduction in mortality.

   Suggest credit fertility/BR (2-3) and LE/mortality (3-2). Whilst most candidates will see a single explanation not both, the more aware will recognise an ageing population. China-specific material is acceptable but may be a snare to some given the dates here; a general demographic explanation is fully acceptable as the syllabus does not require the study of China.

   [Total: 10]

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Migration / Settlement dynamics

5   **Fig. 5 shows a model of how migration within a country may occur in steps.**

A behavioural model derived from E G Ravenstein (1885).

(a)   **Identify** one **similarity and** one **difference between movements A and C on Fig. 5**.   **[2]**

similarity: rural source/origin or capital city destination (1)
difference: **A** in three steps but **C** direct or **A** further (1)

(b)   **Outline** two **reasons why migrants may move in steps**.   **[3]**

Credit (1) or (2) in combination such **reasons** as,

cost
means of transport or networks
familiarity (nearer to home)/unfamiliarity (the unknown)
intervening opportunities
review outcome and make further decisions
lack of information about ultimate destination
other barriers or obstacles
following friend/family
other

(c)   **Using examples, explain why many migrants who move to a capital city later settle elsewhere (as seen in movements D, E and F on Fig. 5).**   **[5]**

In **D** the migrant leaves the capital city for a regional centre.
In **E** the migrant leaves the capital city for a small town.
In **F** the migrant returns to the rural area (source).

This may be for reasons which are positive (e.g. work transfer, marriage) or negative (e.g. failure to establish home or find work, disputes). They operate in dimensions which are social, economic, environmental or political. Candidates may use other contexts such as the life cycle or perception/reality to help with the explanation.

Better answers may be indicated by reference to Fig. 4, by the examples being offered in support of the explanation and by the appreciation of a number of different outcomes and explanations for different migrants.

[Total: 10]

Settlement dynamics

6   **Figs 6A and 6B show low, middle and high income areas of the cities of São Paulo, Brazil (an LEDC) and Chicago, USA (an MEDC).**

   (a) **Outline the differences in the distribution of low income areas in the two cities.   [4]**

      distribution involves both location and extent.

      Credit differences (1) or allow (2) for a well developed point supported from Figs 6A and 6B.

      e.g. in SP low income areas dominate the city but in Chicago they make up a smaller proportion of the urban area
         peripheral in SP but central in Chicago with three outliers
         clear zones to N, E and S in SP, less of a clear pattern in C
         but one large area to E on lakeside
         mainly around CBD in C but separated from CBD in SP by other income groups
         sectors or wedges in SP but a ring around the CBD in Chicago

      Please do not credit counting how many low income areas there are in each city.

   (b) **Suggest reasons for the location of** high **income areas in cities such as São Paulo and Chicago.   [6]**

      A combination of factors, key ideas include bid-rent, transport and accessibility and amenity. Note that it is 'such as', as no knowledge of either city is required.

      In São Paulo (LEDC) the most desirable land is central because of historical factors, poor transport provision, central servicing and the way the city has grown e.g. high income groups distancing themselves from low income areas. Only the high income groups can bid for the most desirable land and the property market etc work to exclude others.

      By contrast in Chicago (MEDC), which has a better transport network and high levels of car ownership, high income areas are spread throughout the city. They may be older-established e.g. within low income area near CBD (gentrification? historic buildings?), or peripheral newer (greenfield sites or former villages now within city limits?) Association of high income areas with positive environmental externalities and features e.g. high ground for views, parks, lake front to north of CBD. Central locations have lost attractiveness for high income groups and employment and services have moved to suburbs, so many choose to live close to them.

      Suggest mark (3/3). There is no need to integrate the two suggested explanations. For one city only, if done well, max. (4).

                                                                  [Total: 10]

Section B: The Physical Core

Hydrology and fluvial geomorphology

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

Interception is the trapping of precipitation by vegetation (leaves, branches, etc.) (2)

Stemflow is the flow of water from precipitation down trunks, stems of plants, etc. to reach earth's surface. (2)

(ii) **What is meant by the term *water balance* in a drainage basin?** **[3]**

Water balance is an expression of the inputs/outputs of the hydrological system in a drainage basin. It is expressed in terms of precipitation, run off, evapotranspiration and storage. It can be most easily expressed as the equation:

$P = Q + E +/- S$. (3)

(b) **Using simple sketch hydrographs, explain how a change in land use in a drainage basin from woodland to urbanisation may affect river discharge.** **[8]**

Diagrams or a diagram of storm hydrographs could be employed to show the change from a relatively gentle discharge curve for wooded land use to the steeper curve of urbanisation. Lag time is thus diminished as interception is lost and the more permeable surfaces are increasingly replaced with impermeable concrete. This gives rise to more surface (or canalised) flow which will reach the channel quicker giving rise to a steeper rising and falling limbs on the discharge curve. Much can be achieved by well annotated diagrams.

(c) **How can the abstraction (removal) and the storage of water by humans affect flows and stores within a drainage basin?** **[10]**

Abstraction occurs not only directly from channel flow (irrigation, water supplies, etc.) but also from groundwater sources through wells, boreholes, etc. The former will affect discharge levels whilst the latter will affect water tables, baseflow and ultimately channel flow. Storage will be seen largely in terms of reservoirs. These increase surface storage, regulate channel flow, ironing out flood peaks, etc. It also deprives water from the lower parts of the catchment (e.g. Nile, Colorado, etc.). Evapotranspiration rates may also increase as may groundwater supplies in part of the catchment and decrease elsewhere.

Candidates will probably:

L3 Develop good answers considering these elements in terms of changes to stores and flows. **[8–10]**

L2 Develop more moderate answers which will deal more with human interference but will be aware of some system change. **[5–7]**

L1 Provide weaker answers which will concentrate almost exclusively on descriptions of the activities of abstraction and storage rather than the effects. **[0–4]**

[Total: 25]

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Atmosphere and weather

8 (a) (i) **Define the terms *condensation* and *sublimation*.** [4]

Condensation is the change of water from a vapour to liquid form induced by cooling (e.g. saturated air reaching dew point temperature. (2)

Sublimation is the direct change of water vapour to a solid (ice) state. Produced either by condensation onto a frozen surface or at altitude the production of ice crystals (e.g. cirrus clouds). (2)

(ii) **Describe the differences between snow and hail.** [3]

Snow is solid precipitation and is composed of single ice crystals. It generally falls to earth more gently and can produce a depth of deposit. Hail is in the form of ice pellets and falls fast from cumulo-nimbus clouds. Hail is usually spherical and larger stones are comprised of concentric shells of ice. Any three points for the marks.

(b) **Using diagrams, explain the formation of cumulo-nimbus (thunderstorm) clouds.** [8]

Good diagrams will show DALR and SALR with ALR. Cloud base will be shown at dew point with continued ascent at SALR to produce a considerable depth of cloud (with or without anvil top). Explanation will be in terms of uplift caused by a trigger (e.g. convection) and unstable or conditionally unstable conditions producing continued uplift and hence condensation through cooling after dew point temperature has been reached. Weaker accounts will merely deal with convection, cooling and condensation with little or no reference to lapse rates.

(c) **Explain the causes of the present global warming and describe its possible climatic effects.** [10]

Global warming has been produced by increases in greenhouse gases (notably carbon dioxide and methane) which have intensified the greenhouse effect. Thus less long wave radiation (lwr) escapes from the atmosphere leading to warming. The higher temperatures experienced could lead to a shift in climatic belts with warmer climates extending further north. It could also increase drought in certain areas as well as more dynamic systems due to greater heat and hence more energy. Thus increased incidence of hurricanes (e.g. 2004). Ice cap melt also has climatic implications as more water changes the water balance and hence evaporation and precipitation.

Candidates will probably:

L3 Develop good accounts which will show understanding of the greenhouse effect and make some sensible suggestions regarding climate change. **[8–10]**

L2 Provide more moderate accounts which will give some account of warming and effects. **[5–7]**

L1 Give poor accounts which will merely provide apocalyptic scenarios of sea level rise, etc. **[0–4]**

[Total: 25]

Rocks and weathering

9 **(a) (i)** **Define the terms** *biological weathering* **and** *solution weathering*. **[4]**

Biological weathering is the mechanical breakdown of rocks by burrowing animals and tree roots. If the action of organic acids is included give credit. (2)

Solution weathering is the dissolving of minerals by water. Can be seen as the final part of limestone weathering but should not be confused with carbonation. (2)

(ii) **Describe the effects that pressure release (dilatation) has upon rocks.** **[3]**

Pressure release is the removal of an overlying burden allowing an upward expansion of the underlying rocks. This leads to cracks at right angles to the surface (sheet jointing.) This can lead to large scale exfoliation.

(b) **With the use of diagrams, show how fold mountain building occurs at tectonic plate margins.** **[8]**

Diagrams should show convergent plate boundaries with sediment being upfolded above the subduction zone. These sediments could be derived from the ocean floor in case of the collision of an oceanic plate and continental plate or can be folded between two continental plates. There should be some account of compression leading to folding and uplift for full marks.

(c) **Explain how human activities can affect the weathering of rocks and the development of slopes.** **[10]**

Human activities that can affect rocks are mining and quarrying exposing rocks to sub- aerial weathering or producing subsidence. The surface can be affected by dumping of waste, landfills and spoil tips. Pollution can produce acid rain and hence increase weathering processes. Slopes can be affected by some of these activities (e.g. spoil tips) which can lead to disastrous slope failure (e.g. Aberfan). Similarly the construction of reservoirs can overload slopes bringing about dam collapses. Slopes can be undermined by roads, etc.

Candidates will probably:

L3 Develop good answers linking human activities to process and hence effects. **[8–10]**

L2 Give more moderate accounts which will often catalogue action with effect with limited accounts of processes. **[5–7]**

L1 Give weak accounts which will catalogue human actions with little reference to weathering or slope development. **[0–4]**

[Total: 25]

Section C: The Human Core

Population

10 Study Fig. 7, which shows the demographic transition model.

(a) Describe and explain the population trends in Stage 1 of the model.   **[7]**

both BR and DR are high, say 34–40+ per thousand (not on graph)
both rates fluctuate
fluctuations in BR/DR almost self-cancel such that NIR is very low
barely or rarely exist today e.g. remote tribes (some texts still have Bangladesh)
but the historical situation in all countries (may name and date)
BR is high as there is high IMR and low LE, no birth control, etc.
DR is high as food supply is variable, diseases uncontrolled, no medical help, etc.

Suggest credit description and explanation integrally, if no explanation max. (4).

(b) Some versions of the model include an additional stage of transition, Stage 5.

   (i) Outline the characteristics of this possible Stage 5.

Follows the low fluctuating Stage 4, as BR drops below DR permanently and country has negative NIR of modest proportions, say <1%, and therefore a contracting population.

Associated with high stage of economic development, ageing populations and results in reduction of total population over time. Great concern to governments, may result in populationist policies.

Suggest credit (5/3) taking strength and development of **(ii)** into account.

   (ii) What evidence is there today of the existence of a Stage 5?

A little or not much. Comes from a few MEDCS, e.g. Italy, Sweden, UK.

Reward well candidates who can give place/NIR data and those who point out that although evidence is limited trends/transition continue and the model assumes that all countries will follow.

Credit (3/5) with **(i)**   **[8]**

(c) What factors may affect the timing of the demographic transition experienced by different countries? Use examples to support your answer.

The key timing issues are the fall in the death rate (heralds start of Stage 2) and the fall in the birth rate (Stage 3) but candidates may refer to any other aspects.

For MEDCs it was innovation and economic development which affected both e.g. developments in food production, clean water supply, immunisation for DR, aspiration, falling IMR, birth control for BR. For many LEDCs the timing of the transition has been influenced by transfer of technology, aid programmes and disrupted by corruption, war, unrest, fundamentalist beliefs, etc.

Candidates will probably:

L3 Develop a good answer clarifying factors in at least two dimensions (social, economic, political, environmental) affecting the timing of both BR and DR, with reference to located and reasonably detailed examples. **[8–10]**

L2 Show partial but limited awareness of aspects of the issue of timing, either considering only BR or DR, factors in one dimension (probably social), or producing an answer where knowledge and conceptual understanding are firm but examples are limited. **[5–7]**

L1 Have little grasp of timing and the relationship between factors and the DTM's stages. Make a few points in relation to BR and/or DR but lack the knowledge, skills – or time – to offer more. **[0–4]**

[Total: 25]

Migration

11 (a) (i) Give the meaning of the term *international migration*.

the movement of population/people (1)
across national borders or from country to country (1)
for more than one year (likely to be the discriminator) (1)

(ii) Describe briefly the character of one example of international migration you have studied.

Example must fall within above definition e.g. not tourism or visits.

Mark on impression, looking for conceptual background e.g. forced/voluntary, and detail (where: source, destination; who: scale, people; why: push/pull factors; when: date, duration, residence/return; how: means, mode). (4) **[7]**

(b) What are the main political barriers to international migration? **[8]**

They may be to emigration (exit) e.g. China, North Korea or to immigration (entry) e.g. the USA and the famous – to candidates – green card.

They may be formal (visas, permits, EU citizenship) or general e.g. the nature of the regime, incidence of civil war, persecution of minorities, enmity between governments, the security situation, etc. A full answer considers more than one type of barrier and offers exemplar support. For a one barrier response (probably visas), max. (5).

(c) **To what extent do you agree that** economic **migration is usually beneficial to both sending and receiving countries?**

economic migration relates to employment, the international labour market and the prospect of betterment. Good assessment should get at 'usually'.

sending countries may benefit (reduction in unemployment, remittances, taxes, enhanced skills on return) or be disadvantaged (brain drain, brawn drain, loss of entrepreneurs and leaders, investment in education "lost", etc.)

receiving countries may benefit (filling job vacancies unattractive to nationals e.g. Caribbean migration to UK postwar, German gastarbeiter; gaining skills and perspectives e.g. IT consultants, doctors) or suffer (flooding job market, EU labour circulation and benefit applications, perception of putting locals out of a job, etc.)

Candidates will probably:

L3 Provide a good assessment, which is quite balanced sending/receiving and benefit/disadvantage. Have a strong conceptual understanding of economic migration and a variety of examples to support their work. **[8–10]**

L2 Demonstrate suitable understanding of some aspect or aspects of the issue, show knowledge of some example(s), make a partial assessment. Responses which cover only sending or receiving countries or only benefit (or cost) remain in this level. **[5–7]**

L1 Make an answer which is essentially descriptive rather than evaluative. Show limited or wrong understanding of economic migration and little knowledge of examples. Fragmentary and note-form responses remain in L1. **[0–4]**

[Total: 25]

Settlement dynamics

12 (a) Describe two **problems that high rates of urbanisation have caused for cities in LEDCs.** **[7]**

Two **problems** of the candidates' choice: very likely to see growth of shanty towns/squatter settlement as one, would accept slums as a second. Better candidates may however take a generic approach, e.g. demand for housing outstrips supply or lack of permanent housing.

Also expect to see unemployment, growth in crime and public disorder, unplanned growth (loss of agricultural land, unsafe building), congestion, infrastructure not coping (transport, water, power, etc.), other.

Articulation of the nature of the problem and locational detail may be indicators of quality.

Credit each (3) or (4) to max. (7), but max. (5) if only one problem is covered, or, if in your judgment the second is in effect the same problem.

(b) **What may be done in rural areas of LEDCs to reduce the rate of urbanisation?** **[8]**

Investment to reduce the push factors and make the urban pull factors less attractive,

job creation
agricultural development
resource exploitation
education
healthcare
other services
tourism
other.

Promulgating information about the realities of city life, e.g. costs of living to alter perceptions.

Credit candidates who point out that some ways are more effective and reward well examples of such schemes in LEDCs, if offered.

(c) **To what extent is finance the key to solving** one **of the problems you identified in (a)? Use examples to support your answer.**

Again very likely to see a shanty towns answer here, but any problem is possible (although it must have been introduced in **(a)**).

Whilst finance is likely to be very important in most cases, better responses should recognise the operation of other factors e.g. community involvement, government priorities, political situation.

In considering finance candidates may touch on issues such as debt and debt repayment, aid, NGOs assistance, corporate sponsorship, etc. as well as corruption, inflation, funds drying up, etc.

Candidates will probably:

L3 Provide an effective assessment of the role of finance in solving the chosen problem and evaluate the contribution of at least one other factor. Offer good exemplar support and structure the response well. **[8–10]**

L2 Make a reasonable attempt but lack the knowledge of examples, understanding of the problem or skills to provide a fuller response. The assessment may be valid but be 'tacked on' to a descriptive piece. **[5–7]**

L1 Offer only a few ideas here, struggle to deal with finance as an issue or provide a general response without examples. Make little or no assessment. Fragments and notes remain in L1. **[0– 4]**

[Total: 25]

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