CAMBRIDGE INTERNATIONAL EXAMINATIONS
GCE Advanced Subsidiary Level

MARK SCHEME FOR the November 2001 question papers

8696 GEOGRAPHY

8696/1   Core Geography

These mark schemes are published as an aid to teachers and students, to indicate the requirements of the examination. They show the basis on which Examiners were initially instructed to award marks. They do not indicate the details of the discussions that took place at an Examiners' meeting before marking began. Any substantial changes to the mark scheme that arose from these discussions will be recorded in the published *Report on the Examination*.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the *Report on the Examination*.

• CIE will not enter into discussions or correspondence in connection with these mark schemes.

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

SECTION A

1. Fig 1. shows flows of water in a cross section of soil and bedrock

(a) Name the flows shown as A, B, C.   (3)

A is overland flow, B is throughflow, C is baseflow (groundwater flow)

(3)

(b) Describe what is meant by percolation   (2)

Percolation is infiltrated water that continues to move downwards under the pull of gravity into and through the underlying rock to form groundwater.   (2)

(c) Describe and explain the occurrence of one of the flows you identified in (a).   (5)

Overland flow on the surface of a slope where rainfall intensity exceeds infiltration capacity. This could be due to soil (surface) condition (ie impermeability or saturation).
OR   Throughflow is the movement of infiltrated water laterally in a downslope direction. This may take place where downward movement is restricted (eg clay pan) or through percolines (pipes).
OR   groundwater or base flow is the downslope movement of percolated water within the saturated zone feeding river channels and springs.   (5)

2. Fig 2 shows temperature and height diagrams for 0600 hours and 1800 hours for a place on one day.

(a) What do the abbreviations ELR and SALR represent?   (2)

DALR = Dry Adiabatic Lapse rate, SALR = Saturated Adiabatic Lapse Rate.   (2)

(b) Describe two differences between diagram A and diagram B.   (2)

Relative positions of the lapse rates shown ie ELR in relation to DALR and SALR, Nature of the rates between the two diagrams ie ground temperature and respective cooling rates, condensation level, stability against instability. Data should be read from diagram.
Any two will suffice for the marks.   (2)

(c) State and explain what weather changes are likely to occur between 06.00 hours (A) and 18.00 hours (B).   (6)

Description and explanation of the changes from (I) atmospheric stability   - slight temperature inversion in ELR and low condensation level leading to possible dew or mist (low level condensation) to (II) atmospheric instability where the lapse rates indicate adiabatic cooling to condensation level through convection produced by ground heating. This could lead to the development of cumiliform cloud and possible rainfall.   (5)

3   Fig. 3 shows the age-sex pyramids for two districts in a less economically developed country (LEDC). Each is experiencing the impact of HIV/AIDS on its population structure.

(a) Identify the main features of each pyramid.

Candidates should take an overall look at the pyramid and its shape and not produce a bar by bar description.

For District S, credit the following features up to 3 marks:

          quite triangular. stepped or 'intermediate' in shape   (1)

a broad but narrowing base/high but falling birth rate (1)
male/female balance in most age groups (1)
but uneven in 35-39 **or** 60+ cohort (1)

For District T, credit the following features up to 3 marks:

notably uneven, broken up, patchy. unusually irregular (1)
seen from 20 years of age or in the adult population (1)
gaps or missing cohorts (1) eg male 30-34 or female 25-29
bulges or larger cohorts (1) eg males 20-24.   **[6]**

(b) Giving evidence from Fig. 3 , explain in which district you consider HIV/AIDS to have had the greater impact on the population structure.

For the identification of District T (1).
For the evidence and explanation given (3): credit points (1) and developed points (2).

background understanding of HIV/AIDS as a cause of death amongst the sexually active with death occurring after a number of years.

recognition that the gaps or missing cohorts are largely related to AIDS deaths

the birth rate is falling largely as a consequence of HIV/AIDS within the population

Credit the counter-argument that the population structure of District S looks more 'normal' still and that HIV/AIDS is too recent or minor or both that its impact as a cause of death cannot yet be seen easily. A full answer however **must** make some explanatory reference to District T.   **[4]**

4   Study Fig. 4 which provides an outline map of selected states in India and shows their fertility rates in 1992 and spending on health and education per person.

Candidates need to learn the discipline of putting knowledge of the relationship between the following phenomena aside, as credit is only awarded for answering from the data presented. It is early days in the cultivation of data response skills and we may encounter considerable irrelevance or difficulty in finding / expressing relationships.

(a) What relationships does the information suggest,

(i) between fertility rate and spending on health,

A clear negative or inverse relationship with fertility rates highest where health spending is lowest (1) eg (UP, B, MP) but beyond this no apparent relationship (1). For exemplar support for **either** of these two observations (1).

(ii) between fertility rate and spending on education?

An inverse relationship exists for many states, with fertility rate dropping as education spending increases (or spending has a positive effect) (1) with exemplar support (1). but anomalies and exceptions exist - for an example eg TN or AP (1).   **[6]**

(b) To what extent is it true to say that a North-South pattern exists in the distribution of fertility rates within India?

Candidates could shade in the outline map to help them and may submit it with the script but only annotation or comment on the map could be credited, not the mapping itself.

As this is a **to what extent** issue, please allocate for agreement with evidence to support 2) and for disagreement with evidence to support (2

There is a broad spatial inequality between the North and the South (1) eg the three lowest fertility rates are in the three southernmost states (K. TN, AP) and the highest (UP) is on India's northern border (1).

but credit two observations of divergence. eg

the northernmost state, Punjab, has a medium rate.
there are unnamed states without data given which limits the pattern
and there is some East-West element observable.   [4]

5   **Fig. 5 shows the annual average rate of growth of** urban **population from 1995 to 2000.**

An opportunity to consider an issue at the global scale. No knowledge of the names of individual countries is to be expected.

   (a) Describe the main features of the spatial distribution shown.

It is likely that candidates will write in terms of continents, compass points or belts/bands.
Credit the following ideas, however expressed:

-    areas of low % growth in the north eg North America and Europe extending across the map and seen in the south eg Australia (to a lesser extent). (2)
-    Africa, the Middle East and Asia show all high growth (5% or more) (2)
-    the variety within continents eg Africa or South America / anomalies / discontinuity between neighbouring countries or the exceptional position of South America. (2)   **[6]**

   (b) Suggest reasons why some parts of the world experienced an annual average rate of growth of urban population of less than 2% for this period.

Candidates need recognise this is **urban** population growth and not just population growth.

An explanation should make reference to the late or later stage of urbanisation reached (1) when a high percentage of population already live in urban areas (1).

Other creditable points include:

- Urban population growth correlates strongly with overall population growth. many are Stage IV or V countries with low fluctuating birth rates and death rates and small % growth.
- Stronger growth of smaller towns is offset by loss from large cities. giving a low average
- Some are hostile environments or centrally planned countries which may restrict movement.   **[4]**

Section B

6 (a) (i) Describe two processes by which rivers erode their channels. **(4)**

Two from :-
Abrasion (corrasion) angular fragments are dragged along and wear away the channel floor or through pot holing
Hydraulic erosion - sheer hydraulic power of river flow opening up joints etc
Chemical erosion particularly in limestone and chalk by acidulated water. **(4)**

(ii) Describe the general effects of erosion on the shape of the river channel. **(3)**

Vertical downcutting – deepening the channel. lateral erosion – widening the channel
Some may suggest headward erosion (eg waterfalls) . Any two acceptable. **(3)**

(b)   (i) Draw a labelled diagram to show braided river channel. **(3)**

Diagram :-

(3)

(ii) Briefly explain how braided channels develop. **(5)**

High discharge periods allow the entrainment of large sediment loads which are deposited as discharge recedes. This allows the development of sands and gravels some of which will be subsequently washed away whilst others develop vegetation to trap more sediment. **(5)**

(c) Suggest how human activities might affect flows within a river channel. **(10)**

Human activities can affect the channel itself through straightening, damming. diverting etc. Also they can affect flows through abstraction. Indirect effects can be through changes in land use within the catchment affecting the amount and speed of flows to the channel. Better accounts (8 –10) will link material to the channel and not give vague accounts of catchment area characteristics. **(10)**

7. (a) (i) Describe the differences between rain, sleet, hail and snow. (4)

Rain comprises water droplets of greater than 0.5 mm that fall to the earth's surface from clouds; Sleet is a mixture of snow and rain which can reach the surface when temperatures are as high as 3 – 4C. Hail comprises large roughly spherical ice pellets . 5 – 50mm in diameter showing layered internal structure; snow is the aggregation of ice crystals that reaches the ground in a frozen state. (4)

(ii) Choose one of the above (rain, sleet, hail, snow) and briefly outline the conditions under which it might occur. (3)

Rain is caused by condensation around hygroscopic nuclei brought about by the adiabatic cooling of air beyond dewpoint ie instability.
Sleet is produced in a similar manner but where air temperatures remain low enough for some ppt to reach ground in a frozen state.
Hail is only produced in Cu Nb clouds with sufficient strength of updraughts to allow increment of ice layers . Snow is essentially frozen rain where temperatures are low enough in the lower atmosphere for crystals not to melt.
Any one of the above. (3)

(b)   (i) Draw a fully labelled diagram to show the 'day model' of radiation balance in the Earth's energy budget. (5)

Diagram to show
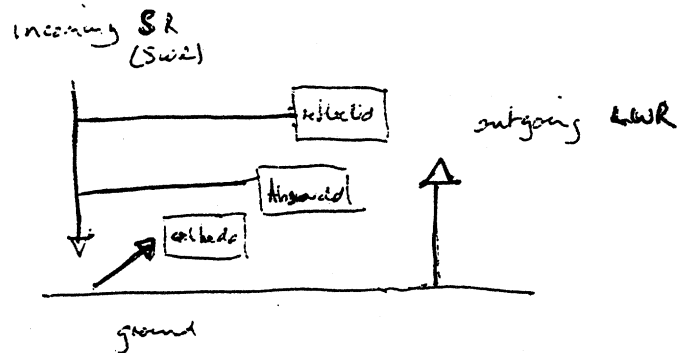
(5)

(ii) Briefly outline the general effects of ocean currents on the global distribution of temperatures. (3)

Ocean currents are responsible for the transfer of c20% of atmospheric energy polewards. generally they carry warm water polewards and cold water towards the equator although the net effect is a transfer of heat polewards. They play a crucial role in exchanging heat between high and low latitudes and strongly influence climatic characteristics of places.
Any three substantive points. (3)

(c) To what extent should the possible effects of global warming be of concern. (10)

Global warming is caused by the increase of greenhouse gases in the earth's atmosphere (CO_2 and methane) giving rise to the greenhouse effect (i.e. of longwave radiation within the earth's atmosphere. Effects can be alteration to the earth's climatic zones through warming of the oceans, increasing dynamism (El Nino, cyclones etc) and rising sea levels . Do not expect a universal coverage although for good marks (8 – 10) the nature of greenhouse effect and the seriousness of its effects for food production, settlement etc should be debated to some degree. Most will merely catalogue effects in a type of doomsday scenario.

8. (a) (i) Define the terms *insolation weathering (thermal fracture)* **and**
   *pressure release (dilatation).* **(4)**

Insolation weathering (thermal fracture) is caused by large diurnal temperature ranges in hot desert areas leading to stresses within the rock due to expansion and contraction.
Pressure release is produced by unloading (removal of overlying burden) . Produces curvilinear jointing or pseudo- bedding planes in igneous rocks. (4

(ii) Briefly describe how vegetation and relief can influence weathering. **(3)**

Relief will affect aspect and slope (ie exposure) and rate of removal of weathered material, Vegetation effects will be through humic acids and roots
Any three substantive points for the marks. (3)

(b)   (i) Draw a labelled diagram to demonstrate sea floor spreading. **(3)**

Diagram:-
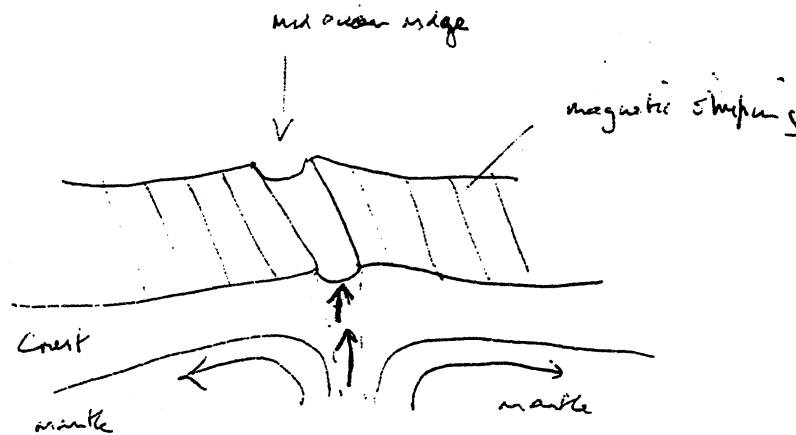
(3)

(ii) Give a brief explanation of sea floor spreading. **(5)**

Due to crustal divergence (convection currents) where magma rises to form mid ocean ridges and material on either side demonstrates a striping of rock magnetism. (5)

(c) Using examples explain how the properties of either granite or limestone can affect the weathering and erosion of the rock. **(10)**

Granite is an igneous rock which is hard and has considerable strength. Its mineral content is also hard (quartz and feldspar) but its vertical and horizontal jointing make it vulnerable to both chemical and physical weathering This can be developed in the context of tors (blocky appearance) or Castle koppies. The impact of deep chemical weathering may also be considered.
Limestone is a sedimentary rock but can be cohesive and quite hard. Again it is vulnerable to weathering via joints and bedding planes through carbonation to give rise to a range of weathered features both below and above ground.
A comprehensive description of landforms is not required as the emphasis is on rock properties and weathering processes. (10

Section C

9 (a)   Give the meaning of the term *natural increase rate* of population and explain how it is calculated.

Natural increase rate (NIR) or rate of natural increase is. the difference between (1) the birth rate and the death rate, or BR - DR, where birth rate is the number of live births (1) and death rate is the number of deaths (1) expressed per 1000 people or population (or as a percentage) (1) in a year / per annum (1).

For an example whether real or imaginary 2).   Positive or negative NIR can be expressed.
eg Botswana   BR   36 per 1000 -   DR   6 per 1000   =   NIR   30 per 1000 or 3% a year   (1991)

[7]

(b) In what circumstances is natural increase of population likely to be very low? Support your answer with examples.

Candidates should recognise that natural increase is minimal when birth rates and death rates are equal or nearly equal and self-cancel.

The classic manner in which to answer this is by appeal to the Demographic Transition Model Stage 1 and Stage 5/end 4, and most candidates are likely to have been prepared in this way.

It is conceivable that catastrophic circumstances may also be appealed to eg Mozambique's floods 2000 where massive losses reduced natural increase in the short term, but this is not needed for a full answer.

For Stage 5/end 4   MEDCs   (5)   For Stage 1 (rare) or catastrophe or both (3)   **[8]**

(c) 'Raising a girl child is as worthless as watering a neighbour's plant' (a traditional saying from South India). Assess the influence of cultural factors on the birth rate in one less economically developed country (LEDC) you have studied.

Using a proverb to stimulate thought and reaction. Candidates can of course answer without reference to the issue of gender but it is likely that most answers will cover this aspect.

Better quality answers are likely to recognise that cultural factors affect birth rates in two dimensions: both traditional attitudes to children and to family size, through issues such as labour, inheritance. bride price, and to population policy or attempts to reduce or control the birth rate through issues such as the education of women. decision-making, religious beliefs, resistance to change etc.

Candidates may argue from a well-documented case such as China's One Child Policy that although the birth rate is significantly reduced, cultural factors are still strong eg preference for boy children, infanticide of girls, and are most noticeable in rural areas which are less affected by modernisation and harder to control.

Look for some analysis, balance and weighing of the strength or weakness of cultural factors and for country detail. Any awareness that cultural factors are stronger in some areas than in others is very creditable.

Candidates will probably:

L3   Develop a perceptive answer in an evaluative framework, recognising cultural factors
        operating in both dimensions and making good use country detail.   **[8-10]**

L2   Show reasonable awareness of cultural factors but produce an answer lacking in either
        assessment or country detail or both. whilst making a number of meaningful points.   **[5-7]**

L1   Be unable to develop a convincing answer and may simply describe the operation of a few
        cultural factors in their chosen country or generalise. A limited approach.   **[0-4]**

10 (a) With the aid of diagrams, give the meaning of the terms,

The diagrams anticipated are a rank-size distribution in (i) and a simple map in (ii) with a sphere or spheres indicated. Other approaches are feasible and should be marked on merit.
If no diagrams produced max.4 (allocated 2.2)

(i)   primate city,

A primate city is an exception to the rank-size rule as it is well over twice the size of the second city, and pre-eminently important eg political (often the capital), economic and administrative   (4)

(ii)   sphere of influence.

A sphere of influence is the area around a settlement which comes under its influence eg for marketing, education. transport etc. A number of different spheres of different sizes exist for any one settlement. (3)

Please show in the text   /4   /3   **[7]**

(b) Explain why many countries are dominated by one or two large cities.

There are a number of reasons for this, which need to be built up to make an adequate response, both LEDCs and MEDCs exhibit this dominance.

- former colonies where development was focussed at point of entry / the capital
- countries without a countrywide developed stable economic and political administration
- countries which are recently urbanised
- centralised countries eg France
- small countries where one city is 'sufficient' eg Luxembourg
- centres of empires with a long history eg Britain and Austria

Indicators of quality may be awareness of exceptions and counter-examples and an understanding of a process basis to the development of primacy/urban dominance. The process likely to be found is that of initial advantages, historical circumstances and the subsequent attraction of people, production, trade at a rapid rate and at the expense of other centres by cumulative causation and the multiplier effect. Later this disproportionate growth may be magnified by investment decisions, prestige etc.

As the question is about **many countries** a one country answer is inadequate **max.4**   **[8]**

(c) With reference to one country which is dominated by its largest city, assess the consequences of this dominance for the rest of the country.

Candidates need to recognise that the emphasis has shifted from the primate city to the rest of the country. As the topic of economic development and spatial inequalities is in Year 2 of the new syllabus, it will be interesting to see what kind of response candidates make here (rural-urban migration is one obvious area for comment. as is service provision).

The consequences can be interpreted widely depending on the country chosen, but should be seen both in positive and negative terms, although there is no expectation of balance.

Candidates will probably:

L3   Show keen awareness of a number of consequences. both positive and negative, and make a
        sound assessment of the interaction with good use of supportive detail.   **[8-10]**

L2   Pursue one or two points in detail or offer a general overview, which while soundly based on
        the chosen country. offers a limited assessment.   **[5-7]**

L1   Make a descriptive answer of dominance, which may lack specific knowledge and which
        offers little or no assessment. A poor approach to the question set.   **[0-4]**

11 (a) Why may there be strong competition for space (spatial competition) within urban areas?

This can be approached in a number of ways, although the starting point is likely to be that according to bid-rent theory in a free market the highest bidder obtains the use of the land. For this reason spatial competition is at its highest at the centre (in the CBD near the PLVI) and in areas where land is sought after and desirable eg peripheral areas with good access and amenity value.

Contributing factors are:

- the number and diversity of potential land-uses and users in urban areas
- a context of urbanisation and strong urban growth (migration and NIR) in many areas
- the lack of space in fully built-up areas
- the influence of planning decisions restricting available space
- desirability of urban and central locations for many activities
- the operation of the property market etc.

Answers do not need to be exhaustive, credit single points (1) and developed or illustrated points (2), thus a full answer consists of four or more ideas.   **[7]**

(b) Choose one city experiencing problems with the provision of its infrastructure. Describe the evidence of and give reasons for, these problems.

Candidates need to fulfil both demands **evidence** (5) and **reasons** (3).

For **infrastructure** we should accept any of the following: transport, water, sewerage, telephone. electricity, waste disposal and other basic utilities but NOT education, medical services etc.

Any evidence of overuse, lack of access to or inadequacy of supply or of its poor quality is valid. Whereas for a shanty town in an LEDC's city this could be tapping overhead power cables in a LEDC and a MEDC's city it could be delayed repairs, transport failing to keep to timetable or concerns about water safety.

Any reasons are likewise acceptable given the city chosen in areas such as demand, planning, finance etc.

Please show in the text,   ' ·   /5   /3   **[8]**

(c) Evaluate the success of recent attempts to improve the provision of infrastructure within your chosen city.

Candidates need to introduce the **recent attempts** in order to **evaluate the success**. It is not necessary that the answer covers all the elements of infrastructure introduced in **(b)** and can mention others or narrow down into one area legitimately if there is detailed knowledge. given the time available and the modest mark allocation.

Candidates will probably:

L3   Present a clear and quite detailed overview of improvements to one or more infrastructural elements in a carefully evaluative framework, recognising areas of relative success/failure.
                                                                                                        [8-10]

L2   Outline infrastructural improvements reasonably but make a partial or limited evaluation of the success of these attempts. and lack the material (or time) to develop the answer further. **[5-7]**

L1   Have a basic knowledge of some aspects of infrastructural improvement or cover general issues without the necessary evaluative context and locational detail.   **[0-4]**