

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

June 2003

GCE A AND AS LEVEL

MARK SCHEME

MAXIMUM MARK: 100

SYLLABUS/COMPONENT: 9696/01

GEOGRAPHY
Paper 1 (Core Geography)



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Section A

Atmosphere and Weather

1 Fig. 1 shows the effects of a cold ocean current upon the formation of fog and a temperature height diagram for the area where the fog has formed.

(a) (i) Describe how the temperature changes with height. (2)

After an initial slight decline in temperature from 18 degrees there is a rapid gain in temperature, before resuming the normal rate of temperature decline with height.

(ii) Identify the feature marked as A. (1)

The bulge marked A in the ELR is an inversion.

(b) (i) Name the type of fog shown in the diagram. (1)

Advection fog.

(ii) Explain how and why the fog has formed over the ocean area. (6)

The cool sea surface causes advection cooling of the air as the air is cooled to dew point above the sea surface. This brings about banks of fog as water vapour condenses around hygroscopic nuclei (salt particles largely) below the temperature inversion (4 marks). The extra 2 marks are for those who can develop the idea of fog persistence due to inversion conditions and/or the rapid disappearance of the fog as air is blown over the warmer land surface.

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Rocks and Weathering

2 Fig. 2 shows types and processes of mass movement.

(a) (i) Which type of mass movement has both the fastest rate of movement and the greatest water content? (1)

Mud flow.

(ii) Which type of mass movement has the slowest rate of movement and the lowest water content? (1)

Soil creep.

(b) Briefly describe the differences between flow and slide. (3)

Flow is where material is transported with high liquid content and is relatively slow whereas slide occurs where there is a developed slide plane with faster movement and less water. Internal deformation in flows also acceptable.

(c) Describe and explain the occurrence of one of the types of mass movement shown on Fig. 2. (5)

Soil creep – probably the most common and widespread. Slow and almost imperceptible movement of particles down a slope. Leads to the accumulation of soil on upslope side of fences, walls and hedges, trees out of vertical alignment. Smooths and rounds slopes. Solifluction is similar to soil creep. It is found in periglacial regions and is most effective where seasonal melt of top layers allows an increased rate of movement. Rockslides and landslides are most active in areas of high relief and unstable slopes. In rock slides, the effects of bedding and joint planes are important in allowing the rock to fragment and providing slide planes. Landslides occur in areas of less strong rocks or where weathered material rests on solid rock. The prolonged build up of ground water loads the slope, reducing friction along slide planes and bringing about slope failure. Mud flows occur where heavy rain (or excess supplies of water from springs, etc.) increases pore water pressure forcing the particles into a rapidly flowing mass of material. Reward use of diagrams. Description and explanation of any one for the marks.

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3 Fig. 3A shows the age/sex pyramid for Singapore in 2000 and Figs 3B and 3C show the projected age/sex pyramids for 2025 and 2050.

(a) (i) Identify two main features of the pyramid in Fig. 3A. (2)

Straight-sided 0-19; large numbers or 'bulge' in working adults 20-54; declining numbers 55-80+; gender observation, e.g. greater female survivals 80+ or balanced/even profile. 'Convex' also acceptable as shape.

Credit **1** for any two points.

(ii) Giving evidence from Figs 3B and 3C, describe the changes in population structure projected for Singapore by 2050. (3 max)

Population growth/increases in numbers in all age groups (reserve). **1**

Rise in birth rate (noticeable especially in 2025). **1**

Disproportionate increase in ages 55 and older/increased life expectancy. **1**

Or for any other valid change. **1**

Each observation needs some **evidence** to achieve the mark.

(b) What are the possible consequences, for a country, of having an ageing population? (5)

Increased burden of care on the state e.g. healthcare, pensions reserve. **1**

Increased burden of care on individuals (as taxpayers or for family). **1**

Lack of labour/need for migrant workers.

Society is more stolid and traditional reflecting views/needs of aged majority.

Related growth in service sector, e.g. leisure, tourism, retirement homes.

Contraction and/or closure of youth-related services, e.g. schools.

Reactive incentives to increase birth rate?

Credit single points **1** developed points **2**.

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4 Table 1 gives information about the total urban population and the percentage urban population in more developed regions and less developed regions in 1970 and 1994, together with projections for 2025.

(a) (i) For the period 1970-1994, name the part of the world which showed (2):

A the least increase in total urban population

Oceania (1 million).

B the greatest increase in total urban population

Asia (634 million).

C the least percentage change in urban population

Australia/New Zealand (0.5%).

D the greatest percentage change in urban population

Latin America (16.3%).

For one correct identification **0**, two or three correct **1**, four correct **2**.

(ii) Compare the 2025 projected percentage urban population for the more developed regions with that for the less developed regions. (3)

The more developed regions all have % urbanised in the eighties **1** whereas the less developed regions are more diverse, **1** ranging from Oceania 40%, (Africa and Asia in the fifties) to Latin America at 84.7% (comparable with the more developed). **1**

(If a candidate just deals with the aggregate percentages **max 1**.)

(b) Suggest reasons for the high rates of urbanisation in many less economically developed countries (LEDCs). (5)

For reasons associated with rural-urban migration. **3**

Push factors reserve **1**; pull factors reserve. **1**

For demographic reasons. **2**

Compounded by relatively high rates of natural increase. **1**

A comment about the population structure. **1**

Total: 10

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5 Fig. 4 shows the layout of Brasilia, the capital city built in Brazil's interior.

(a) Describe the main features of the city's layout. (5)

CBD: symmetrical two-winged feature about a central monumental axis. **1**

Services: surround in clustered/functionally zoned areas, e.g. embassies, cultural sector. **1**

Transport: extensive road network, central bus station, peripheral railway station and airport. **1**

Residential areas: at some distance from core/high amenity value lakeside. **1**

If three or more of the above points observed but simply expressed. **2**

Absence of: industrial areas or provision for lower income groups/squatter settlement. **1**

(b) Brasilia was planned not to be segregated socially. Suggest reasons why it is more usual for residential segregation to develop within urban areas. (5)

A number of factors operate differentially.

Reserve **2** for income/ability to pay in relation to bid-rent theory and costs of housing/transport.

Credit **1** each of three other factors, e.g. status/social class; ethnicity; religion; operation of housing market, physical externalities, positive or negative; attraction and repulsion, etc.

Note: given the context, do not credit planning decisions in **(b)**.

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Section B: The Physical Core

Hydrology and Fluvial Geomorphology

6 (a) (i) Define the terms *throughflow* and *groundwater flow (baseflow)*. (4)

Through flow is the horizontal (parallel to surface) occurs downslope along well-defined lines of seepage (percolines) or above impermeable layer (e.g. clay pan). Accept lateral movement in soil of infiltrated water (2). Baseflow (groundwater flow) is deeper level of gravitational flow in downslope direction through rock to feed rivers and springs. Could effectively be shown by annotated diagrams (2).

(ii) Briefly describe the process of interception and give reasons why it is of importance in the hydrological system. (3)

Interception is the role of vegetation in intercepting rainwater before hitting the ground. It slows up the receipt of rainwater at the surface and reduces the amount through evaporation loss, etc. and therefore reduces saturation and surface run off (erosion).

1 mark for definition, 2 for importance.

(b) Briefly explain how each of the following may influence the hydrograph of a river (8):

(i) drainage basin shape

An elongated basin has relatively short lagtimes (i.e. flashy response). Round basins have longer lagtimes but higher peak discharge. Accept distance from gauging point on a parameter (2).

(ii) Geology

Permeable rock (e.g. chalk) store more ppt and release it more gradually giving low peak discharge and long lagtimes. Impermeable catchments (e.g. granite) give high peaks and short lag times (2).

(iii) rainfall intensity

High intensity rainfall may exceed soil's infiltration capacity leading to rapid runoff giving short lagtimes and high peak discharge (2).

(iv) drainage density

High drainage density implies rapid and efficient runoff giving sharp peaks on a hydrograph, with short lagtimes (2).

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- (c) **Explain how river floods might be predicted. Giving examples, describe the methods that may be used to reduce the effects of flooding. (10)**

Good candidates will describe flood prediction in terms of the calculation of recurrence intervals. That is, whether a flood of particular magnitude will occur in a specified time span (i.e. plotting flood height against average time intervals). Effects can be reduced by warnings, sandbags etc. preventing flood plain developments as well as hard engineering. **(8-10)**

More modest answers may confuse prediction with forecasting. This refers to shorter time intervals and often waits until rainstorm is in or close to a catchment. May employ hydrographs to work out flashiness of response. Reducing effects will concentrate on hard engineering although some recognition of flood plains. **(5-7)**

Basic accounts will have only a vague idea of prediction/forecasting and will concentrate on flood prevention via hard engineering, e.g. channel straightening, dredging, wing dykes, levees, etc. **(1-4)**

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Atmosphere and Weather

7 (a) (i) Define the terms evaporation and condensation. (4)

Evaporation is the changing of a liquid (water) to a gas (water vapour) by heating (2). Condensation is the changing of vapour to a liquid (water vapour to water) by cooling to dew point (2).

(ii) Give three conditions necessary for high evaporation rates. (3)

Conditions include insolation (i.e. heating), proximity of water supply, low humidity of air (vapour pressure), wind speed, ground surface.

Any three for the marks.

(b) (i) Draw a labelled diagram to show the greenhouse effect in the earth's atmosphere. (3)

Diagram should show entry into atmosphere of short wave radiation from sun (1) emission of long wave radiation from earth surface (1) and its absorption and re-radiation by carbon dioxide and water vapour, etc. (1) to give the greenhouse effect.

(ii) Describe what is meant by greenhouse gases and explain their influence on the temperature of the atmosphere. (5)

Greenhouse gases largely comprise carbon dioxide and methane (although cases can be made for others on a minor scale). They are greenhouse gases because of their ability to absorb and re-radiate outgoing terrestrial LWR thus retaining heat within the earth's atmosphere. This is vital for the survival of life on the planet. If they did not exist much of the surface would be too cold for existence and the hydrological cycle would not operate. Man's activities (fossil fuels, agriculture) have led to a marked increase in greenhouse gases leading to global warming and its attendant dangers.

(c) Explain how clouds are formed. Why do only some clouds produce rainfall? (10)

Clouds are formed due to the ascent of air and the operation of adiabatic cooling beyond dew point. This can effectively be illustrated by use of a temperature/height diagram showing lapse rates, dew point and cloud formation. The vertical extent of the cloud will depend upon SALR and will govern the production of rainfall. Good answers will show a clear understanding of lapse rates and cloud formation. They will demonstrate the difference between cumulo nimbus clouds and stratiform in the production of rainfall. (8-10)

More modest accounts will still display some understanding of adiabatic cooling and the production of clouds, although there will be less awareness of the manner of rainfall production. (5-7)

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To pass (i.e. $\frac{4}{10}$), there should be some awareness of the rising of air and its cooling to dewpoint for cloud production although the relationship of clouds to rainfall will be vague at best. (1-4)

8 (a) (i) Define the terms physical (mechanical) weathering and chemical weathering. (4)

Physical weathering is the mechanical breakdown of rocks largely due to temperature change; the chemical composition of the rocks remain unaltered (2). Chemical weathering is the breakdown of rocks through chemical changes to the composition of the rock (2).

(ii) Briefly describe one chemical weathering process. (3)

Any from the following:

solution - soil moisture and groundwater dissolve and wash away minerals such as rock salt or the product of other chemical weathering

carbonation - acidulated rainwater changing calcium carbonate to bicarbonate

hydration - affects minerals that have the capacity to take up water

hydrolysis - complex reactions affecting minerals in igneous and metamorphic rocks, e.g. feldspar in granite giving rise to residual clays

oxidation - minerals combining with oxygen usually dissolved in water, e.g. FeO - FeO₃.

(b) (i) Draw a labelled diagram to show sea floor spreading. (4)

Diagram should show crust, mantle rising magma and mid ocean ridge and stripes.

(ii) Describe one landform that is associated with sea floor spreading. (4)

The mid ocean ridge could be described or attendant vulcanicity (e.g. Iceland) or striped palaeomagnetism in rocks either side of ridge.

(c) Describe the chemical composition and physical properties of granite and explain how these affect its weathering and erosion. (10)

Granite is a hard, crystalline rock that is often coarse grained and is principally composed of feldspars, quartz and mica. They often occur as batholiths. Granite is susceptible to chemical processes such as hydrolysis. Rainwater penetrates along crystal boundaries and through joints and micro fractures. Weathering proceeds along major joints giving uneven effects resulting in large joint bounded blocks which can become detached from the bedrock (corestones). This can lead to the development of deep regoliths in the tropics. Good answers will understand the chemical properties of granite and the physical properties that can lead to differentials in resistance. (8-10)

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Others will understand something of the crystalline nature of the rock and its jointed pattern but will spend more time on the nature of the weathering (5-7), with little comprehension of properties of granite beyond hardness and jointing. Mostly an account of its weathering (1-4).

Section C

9 Fig. 5 shows the demographic transition model.

(a) Describe and explain the population trends for one country in Stage 2 of the model. (7)

Description. 3

Country detail 1; birth rate remains high 1; and death rate falls steadily/rapidly 1.

Explanation. 4

Of falling death rate 2 (transfer of medical technology; immunisation; improvements in water quality; increase in quantity and quality of food supply, etc.).

Of the birth rate remaining high 2 (high IMR; need for labour; security; lack of, and limited access to contraceptives; traditional society; religious beliefs; culture).

A general explanation not related well to the chosen country max 3 (i.e. DR 1 and BR 1).

(b) What social and economic factors help explain the population trends experienced by some more economically developed countries (MEDCs) in Stage 4? (8)

No credit for the observation that Stage 4 has low birth and low death rates.

Suggest factors relating to birth rates 4 and to death rates 4, but with no strict division between social and economic.

A full answer should recognise that these factors operate both at national or government scale and at the scale of the individual or family.

(c) To what extent can the demographic transition model help us to understand future population trends in less economically developed countries (LEDCs)?

The syllabus asks for 'a critical appreciation of the demographic transition model'.

Candidates may be aware that the model is based on the historical experience of a few MEDCs whose development and population transition occurred in a particular social, economic, political and environmental context. As such, for a number of reasons, the model may not apply well (e.g. the availability of contraception; significance of Islam; globalisation; NGO and charitable inputs to LEDCs, etc.). There

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is particular debate about the timescale and whether BR will ever drop to replacement levels in some LEDCs.

Candidates will probably:

- L3** Develop a coherent evaluation of the predictive value of the model, recognising aspects both of its usefulness and of its limitations, with the convincing use of examples. **(8-10)**
- L2** Present a sound assessment of some aspects of the model's predictive value but lack the detailed knowledge and perspective required to develop the answer further. For wholly positive – or negative – responses **max 6. (5-7)**
- L1** Show basic knowledge of the model but take a descriptive approach, lacking the understanding and skills to offer more than a perfunctory assessment of extent. **(1-4)**

Total: 25

10 (a) (i) Give the meaning of the term *population ceiling*. (3)

A population ceiling is a saturation level or maximum. **1**
 Also known as the carrying capacity **1**
 which acts as a barrier or cap or lid to population growth. **1**
 Cap on population compared to resource base. **1**

(ii) Explain two ways in which a growing population may adjust to the population ceiling. (4)

The possible adjustment is most easily shown on a diagram or diagrams: three situations may be known (instantaneous adjustment; S curve and J curve). Any two of these, **2** and **2**. Explanatory text and/or annotated diagrams acceptable.

See sketches.

(b) Suggest reasons why the concept of a population ceiling may be of limited usefulness in reality. (8)

A number of approaches are possible here, credit single points **1** and developed or illustrated points **2** or **3**.

3 (5) for the key point about its being a Malthusian concept
 - relationship to resource development and usage is fundamental, through the available technologies, especially agricultural; cf. the work of Boserup and the avoidance of Malthusian checks by innovation.

Other possible reasons **5 (3)** include:

- the definition of a saturation level/carrying capacity is somewhat subjective and statistically complex to measure;

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- concerns may not be about absolute numbers of people but of living standards (and disparities occur, e.g. rural/urban; elites/poor) - the discovery of new resources may change the ceiling, e.g. oil;
- environments are not closed systems and emigration may occur as a response rather than disaster.

(c) Why have many attempts at reducing the birth rate in less economically developed countries (LEDCs) had only limited success?

A different expression of the 'problems in reducing the birth rate' issue.

The command **why** should make the candidates offer a broadly-based explanation. Better quality answers may be distinguished by the variety of exemplar support, acknowledgment of the roles of governments and of individuals, and the recognition of differing responses from different groups of people, e.g. educated elites; rural agriculturalists, etc. Anticipate constraints, e.g. illiteracy, traditionalism, lack of finance.

Candidates will probably:

- L3** Produce a high quality answer with a clear explanatory structure and recognise the interaction of a variety of reasons operative at the national level and at the level of the individual/family. A response distinguished by overall perspective and detailed exemplar support. **(8-10)**
- L2** Present a sound but limited explanation of the reasons for qualified success in reducing the birth rate, perhaps lacking the overview or detailed knowledge to develop the answer further. For a response considering only one LEDC in detail, **max 7. (5-7)**
- L1** Offer a simple descriptive piece with little or no explanatory content. Whilst the candidate has knowledge of attempts at reducing the birth rate, this may remain general or be restricted to one aspect of this large subject area. **(1-4)**

Total: 25

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11 (a) (i) Give two reasons why there can be intense competition for land near the centre of towns and cities. (3/4)

In essence there is: a limited amount of space; demanded by many potential users; which is highly desirable in terms of its economic potential, cf. bid-rent.

For one reason **max 2**, for two reasons **3** or **4** if well done.

(ii) What evidence may be seen in the urban landscape of this competition for central space? (7)

Classically, the maximal use of plots (reserve **2**), e.g. high-rise buildings; use of basements; multi-storey and underground parking; decked transport systems and the absence of uncompetitive users, e.g. low density housing, factory development with the limited presence of others such as open space or vacant lots.

Credit may also be given for evidence such as fast building schedules or any other valid observation that may be **seen in the urban landscape**.

For a 'flight' response (i.e. users get out to cheaper, peripheral locations) **max 2**. Whilst it is valid it is not needed for full marks (**4/3**).

(b) Using examples, describe the attempts that have been made in more economically developed countries (MEDCs) to control the spread of urban areas. (8)

It is likely that candidates will respond with the two elements of the green belt (originated for London in 1947) and beyond it the building of *overspill towns* and *new towns*. This combination has been used in many cities to manage urban growth and protect rural environments and could constitute a full answer.

Other valid observations may be made, e.g. in relation to the granting and withholding of planning permission; the use of brownfield not greenfield sites, etc.

(c) Choose *one* rural settlement or rural area that is undergoing change. How positive are the changes that have taken place recently?

The syllabus allows the study of a rural area in a LEDC or a MEDC, so some diversity of context may be seen from those undergoing urbanisation, either proximate (land-use competition, shanty growth) or distant (emigrants, remittances) to the counter-urbanisation/re-urbanisation experienced in MEDCs.

Not treating the settlement/area as homogenous, and recognising positive or negative impacts on different groups of people is especially creditable.

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Candidates will probably:

- L3** Make a perceptive assessment of the change(s) experienced, with detailed support from the chosen area, in at least two dimensions (social, economic, environmental, political). **(8-10)**
- L2** Provide a limited assessment, lacking development or detailed exemplar support, but showing a reasonable appreciation of recent changes for the chosen case, area in two or more dimensions. **(5-7)**
- L1** Be unable to develop this convincingly, either lacking detailed knowledge of an example or the requisite skills in assessment. Take a descriptive approach in which the link to change may be tenuous. **(1-4)**

Total: 25

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GCE A LEVEL

MARK SCHEME

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GEOGRAPHY
Paper 2 (Physical Geography)



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Advanced Physical Options

- 1 (a) Explain what is meant by the term *basal surface of weathering*. Giving examples, explain why the basal surface of weathering is important in the formation of some tropical landforms. (10)

Basal surface of weathering is the weathering front found beneath the surface marked by a sharp transition from weathered to unweathered rock. It is thus the surface upon which active weathering is likely to occur. In tropical areas it is often located at depth allowing the accumulation of acidulated water to attack the minerals within the rock surfaces. This can be demonstrated by use of annotated diagrams. Good accounts will concentrate upon the basal surface and its impact. (8-10)

Many will soon devolve into a general account of tropical weathering and the formation of inselbergs, etc. (5-7)

Weaker accounts will provide a simple diagram to illustrate the emergence of inselbergs. To pass, they should at least indicate the basal weathering surface. (1-4)

- (b) Choose one tropical ecosystem and outline the main problems of its management. (15)

Level 3

Most will select either TRF or Savanna. In both cases the emphasis will be upon management of the ecosystem - not just vegetation. Hence, there will be some recognition of the respective levels of fragility within such systems, perhaps illustrated through nutrient cycles, etc. This is an opportunity to employ the case study required within the syllabus. (12-15)

Level 2

Seen primarily as an opportunity to explore the human impact upon the ecosystem, i.e. clearance and its consequences in TRF. Cultivation/ overstocking in the Savanna. The end result will usually be soil erosion and habitat destruction. Some examples cited but a generalised account. (8-11)

Level 1

Human activities merely seen as destructive with usual global consequences. Little appreciation of the interlinked nature of ecosystems. (1-7)

- 2 Figs 1A and 1B show the locations and mean monthly precipitation of selected places in Africa.

- (a) Divide the places shown on Fig. 1A into two groups according to the characteristics of their rainfall distribution. Describe and explain the variation in rainfall shown in the two groups. (10)

A sensible (but not the only) approach would be to group by the timing and length of the dry season with possible sub categories for amounts of ppt. Hence possible to produce 2 groups (1) Luanda and Bulawayo. Libreville

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have dry season, April to August although Libreville has higher ppt and shorter dry season (2). Timbuktu, Bathurst and Ougaduga all have dry seasons November to march, although Timbuktu is arid. Description of groupings as above with some explanation of equatorial/tropical ppt seasonality depending on which side of the equator the stations are located. Good candidates may even notice an E - W contrast.

- (b) Explain how rainfall variation can affect the natural vegetation and soils of ecosystems in the humid and seasonally humid tropics. (15)**

Level 3

The distribution of rainfall throughout the year as well as the total amounts will be seen as the main determinants of types of vegetation, i.e. the range from tropical or equatorial rainforest to savanna. Sensible use can be made of the data supplied. Rainfall amount and distribution are important factors in soil formation. High rainfall etc. can lead to base leaching and clay translocation whilst seasonal rainfall may limit movement to the wet season. Aridity can produce upward capillary and salinisation. **(12-15)**

Level 2

Some realisation of the relationships between vegetation and rainfall although this might be limited to TRF/Savanna contrast. Soils may be expressed in types latosols, red soils brown soils, etc. rather than related to the processes producing them. **(8-11)**

Level 1

Savanna/TRF contrast in terms of rainfall with some vague association of soils, e.g. deep soils in TRF that can be leached with vegetation removal. No real causal relationships expressed. **(1-7)**

- 3 (a) With the aid of diagrams, describe the nature of fringing reefs, barrier reefs and atolls. (10)**

Good annotated diagrams will probably be the key here and could receive the bulk of the marks. If well done could receive 3 marks each. Fringing reef should show (be described as) a coral reef that is attached to a shore either as a continuous wave washed erosion platform or separated by a shallow lagoon. Barrier reefs are of great thickness (e.g. Queensland) and are separated from coast by a wide and deep lagoon or strait. Atolls are ring-shaped islands surrounding a central lagoon.

- (b) Describe the processes of marine erosion. Using examples, explain how marine erosion can affect cliffed coastlines. (15)**

Level 3

Hydraulic, quarrying (cavitation), corrosion and solution will be accurately described and their effects illustrated by the production of wave cut platforms, wave cut notches and various cliff profiles. These can be effectively illustrated by use of diagrams. The interaction of process and landform will be evident. **(12-15)**

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Level 2

Reasonable description of processes, although may be some running together of hydraulic action and cavitation. Landforms such as caves, stacks, stumps, geos will feature but will not be clearly related to processes. (8-11)

Level 1

Processes will be rather inaccurate, although for a pass there should be some basic appreciation of processes such as corrasion. Landforms will be limited in scope and not related to the processes bringing them about save in rather unspecific and general terms. (1-7)

4 Fig. 2 shows a spit and salt marshes.

(a) Describe the main features of the spit and salt marshes and explain their formation. (10)

From the diagram good answers should describe a spit as an accumulation of sand and shingle that is attached to a coastline. Behind the spit are accumulations of silt and mud that are anchored by vegetation to produce marsh and creek areas. The laterals represent periods of growth of the spit. They are formed from beach sediment transported by longshore drift which accumulates where the coastline changes direction or where drift is held up by a river mouth or estuary. Accumulations of mud occur in the shelter of the spit and is colonised by halophytes.

(b) Explain why spits and salt marshes are subject to change and are considered fragile environments. Suggest ways in which they can be protected. (15)

Level 3

Spits can change shape due to both growth (laterals) or erosion. Some of these are indicated on the diagram. Storms or removal of sediment supplies can have severe impacts such that these features can be considered fragile. Salt marshes are equally responsive if the shelter of the spit is removed or pollution affects the estuarine or river silts and mud. Development or changes of sea level can also have severe consequences. Protection can be afforded by trapping sediment (groynes) or guaranteeing continuous sediment supplies. (12-15)

Level 2

Some awareness of the fragility of the environment through the impact of storms as well as the changing nature of the features. Seen in general terms rather than as parts of marine systems. Protection seen more in terms of hard engineering. (8-11)

Level 1

Only a basic level of awareness of the destructive capacity of storms, etc. Protection will be associated with sea walls, etc. (1-7)

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- 5 (a) Explain which areas of the world are most at risk from the hazard of tropical storms (hurricanes). (10)

Tropical Storms (hurricanes) are found in tropical oceans, either side of the equator (5-8 degrees N and S). They are not found along the equator where the coriolis force is weak. Generally they impact upon eastern coasts having been generated at sea with sea temperatures in excess of 27°C. July - October constitute the most prevalent months with the greatest poleward extensions of warm water. They are at their most hazardous when their most frequent paths cross densely settled coasts or islands as they rapidly dissipate inland. Effects can be maximised by funnelling onto low shelving coasts, e.g. Bangladesh. Credit use of examples.

- (b) Using examples, explain why the risks to humans posed by natural hazards can lead to different responses in different areas. (15)

Level 3

How risks are perceived by different people in terms of differing hazards can be explored. The balance between perceived risk, e.g. a one in one hundred year earthquake event as against a one in ten year flood. Even where risks are perceived (i.e. understood by the population) it still may not deter human occupation of hazardous areas, e.g. California, flanks of Vesuvius or Bangladesh flood plain. This is because of other physical properties of these areas that make them attractive to human occupation. Long range fatalism or short term gain can be responses. Actions will be affected by the relative wealth of the population, e.g. California as against Bangladesh Central America. (15-12)

Level 2

More on the nature of the risks rather than their perception. This will be compared for different types of hazard and the responses to the hazard will be compared in terms of actions to mitigate impacts. Some awareness of the factors that underpin this (i.e. wealth, nature of society and government, etc.) as well as the impact of particular physical environments. (11-8)

Level 1

Perception virtually ignored in favour of the actual nature of the hazard. Responses will be seen in terms of ameliorative or remedial action (e.g. 'earthquake proof' buildings, etc.). (7-1)

- 6 Fig. 3 shows the development of a landslide.

- (a) Explain the processes that could bring about a landslide and describe the circumstances under which it may become hazardous. (10)

The processes involved in a landslide viz. unconsolidated rocks (clay, sands) often resting on a mantle of more solid rock accompanied by the build up of ground water overloading the slope. Pore water pressure may force the particles apart in a sliding mass, promoting flowage. Rotational slide can occur after heavy rain whilst the lower part of the slope becomes

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highly mobile and forms mudflows. They are hazardous when close to settlements and the slopes are subjected to catastrophic slope failure (e.g. debris and ice avalanches consequent upon earth tremors). Human activities (dumping of waste, seepage from reservoir walls) can also trigger massive slope failure (e.g. Aberfan, Italy).

- (b) Using examples, explain the types of hazard that may be caused by volcanic eruptions. (15)**

Level 3

Volcanic eruptions are of various types, which should be described. Each provides different types of hazard extending from molten lava and pyroclastic bombs to the far more lethal pyroclastic flows. Explosive volcanoes (e.g. Santorini) are extremely hazardous when molten lava mixes with sea water. Hazards are not limited to the immediate product of the volcano, but include other attendant features such as tsunamis, landslides and mud flows. Good use of examples. **(12-15)**

Level 2

An awareness of different types of eruption and product although these will not be as clearly defined or explained as above. The effects will be seen in terms of impacts upon surrounding areas and may be illustrated by reference to a particular case (e.g. Mount St Helens). **(8-11)**

Level 1

Volcanoes seen in simplistic terms as all purpose hazards exuding lava and ashes. The resultant hazard effects seen in equally simple terms as engulfment by hot lava and ash. **(1-7)**

- 7 (a) Briefly outline the climatic conditions that can produce arid and semi-arid areas. (10)**

The climatic conditions producing aridity etc. are essentially global ones although use of more local examples is acceptable. The influence of descending air in the sub-tropical highs, cold ocean currents and rain shadow effects should all be explained in terms of the inhibition of precipitation. It is acceptable for a particular case study to be employed. Some good answers may produce evidence of prolonged drought brought about by failure of the monsoons or movement of the ITCZ. Human activities (deforestation, etc.) are not acceptable.

- (b) Explain how aridity can affect soils and vegetation. To what extent have human activities added to the problems of arid and semi-arid environments? (15)**

Level 3

The effect of aridity on soil formation is generally to produce aridsols. These are mineral based soils that lack profiles and are characterised by salt accumulations. The process of upward capillary movement and salt accumulation will be explained. The lack of moisture severely inhibits the uptake of soil nutrients by vegetation. This can generally only survive in

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arid areas by special adaptations that will be described and exemplified. Removal of vegetation coupled with increasing aridity in semi-arid areas can have disastrous effects on soil advancing desertification. **(12-15)**

Level 2

Soil will concentrate upon low moisture content and increasing salinity which may only be exemplified in general terms. Vegetation will concentrate on xerophytic adaptations as well as long taproots, etc. with little appreciation of the variety. Human activities will be seen as vegetation removal through overgrazing etc. bringing about erosion and desertification. **(8-11)**

Level 1

Vague references to desert soils (sand, lack of moisture, etc.) with little exemplified or any appreciation of soil formation. Vegetation will be unconnected with soils and will be seen in simple xerophytic terms. **(1-7)**

8 Photograph A shows a hot arid landscape.

- (a) **With the help of a labelled sketch diagram, identify and describe four features shown on the photograph (you may include both landforms and vegetation). (10)**

Diagram could identify the butte, indicating its steep vertical sides The debris slope below with its angel of rest, the sharp break of slope (knack), the pediment slope with its sandy surface deposits and the drought resistant, low shrub vegetation. The red soils and rocks could also be commented upon as could the hint of a mountain front to the right of the photo. Any four will suffice for the marks.

- (b) **High soil salinity and flash flooding are two of the problems that can make arid and semi-arid environments hostile to human occupation. Explain how these problems occur and to what extent they can be overcome. (15)**

Level 3

Soil salinity will be described and the processes causing it explained; the same will apply to flash flooding. Upward capillary movement will be explained as will episodic and sudden rainfall producing flash flooding whose effects can be exacerbated by types of desert landscapes. Effects can to some extent be overcome on limited scales. Examples or case studies could be cited of such things as irrigation, chequer board planting, wind breaks, afforestation, water management and harvesting, cross wadi walls, check dams, etc. **(12-15)**

Level 2

Some description of soil salinity and flash flooding although causes will be somewhat generalised. Similarly some remedial activities will be described although little assessment will be made to gauge the extent of their success. **(8-11)**

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Level 1

For a pass there must be some basic knowledge of soil salinity and flash flooding although the processes and causes will be at best vaguely stated. Only general examples of attempts at overcoming these problems will be evident and these will be very unspecific. (1-7)

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

June 2003

GCE A LEVEL

MARK SCHEME

MAXIMUM MARK: 50

SYLLABUS/COMPONENT: 9696/03

GEOGRAPHY
Paper 3 (Human Options)



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Production, location and change

9 (a) Fig. 4 shows the Mgeta agricultural system in central Tanzania, East Africa, for a low income farm and for a higher income farm.

(i) Using Fig. 4, identify one example of:

A an external input

either artificial fertiliser or maize bran **1** (do not accept rain, sunshine as not on Fig. 4);

B a throughput flow

a number are possible, use Fig. to check the accuracy of what is stated: throughput needs to be a flow not simply a label **1**;

C a subsystem

the most obvious is the maize field with its residues buried to re-fertilise the field **1** (any element with circularity).

3

(ii) How does distance from the house affect inputs to the Mgeta system shown in Fig. 4?

Inputs are lower, less frequent and have less nutrient value as distance increases: compare inputs into nearer plot (potato/bean field or vegetable garden) of compost, manure and ash, etc. with maize residues, artificial fertiliser and fallow regeneration of the maize field.

A full answer makes a clear overall statement supported with evidence from both nearer plots and the maize fields. General observation max 2.

3

(iii) Using evidence from Fig. 4, explain which farm's agriculture is more intensive and which is more subsistent.

The low income farm is more subsistent **0** (if other identification correct) as the harvest is not sold **1** (or there is only one external input).

4

The higher income farm is more intensive **1** because of the regularity, variety and volume of inputs into the system (and the care that a garden and pigs need).

2

i.e. identification **1**, sold/not sold **1**, elaboration **2**.

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(b) Why do food shortages still occur in some less economically developed countries (LEDCs)?

The context is likely to be that of the intensification of agriculture and the extension of cultivation in LEDCs, as given in the syllabus. The question could be responded to in terms of the limited success of these initiatives, their spatial inequality, or their inability to overcome catastrophic events whether environmental or political. Better quality answers may recognise the significance of the link to population growth (by natural increase and by immigration) in creating localised shortages, and may mention the involvement of charities and NGOs in famine relief, or make reference to trading patterns where food items go for export not local consumption.

Candidates will probably:

- L3** Develop an answer distinguished by its breadth of perspective, which shows good knowledge of examples of increasing agricultural productivity and a good understanding of the role of at least two other factors contributing to the occurrence of food shortages. **(12-15)**
- L2** Produce a generally sound response, but limited in its coverage of attempts to increase agricultural productivity and/or limited in its understanding of the interaction of factors to create food shortages. **(7-11)**
- L1** Take a descriptive approach to an explanatory question or lack the time or the material to address the issue of food shortage adequately. Answer frameworks, or the simply catastrophic, remain within this level. **(0-6)**

Total: 25

10 (a) Explain the term the *informal sector*. Describe the character of the informal sector in less economically developed countries (LEDCs).

For **the term**, credit definitional points:

informal 2 unofficial employment; outside the law/illegal; beyond the tax system and company registration, etc.; people find or create work for themselves; no need for formal qualifications or skills; no formal premises;

sector 1 includes both manufacturing and services; mainly services.

For **its character 7**, there is clear potential for overlap with the above:

- broad and diverse
- fast-changing/dynamic/opportunistic
- supplies everyday needs at affordable prices, e.g. rickshaw transport, pots and pans, shoe repairs
- may be tolerated by authorities or officially recognised, e.g. Kenya, India - low levels of capitalisation
- high levels of employment
- jobs for women and children

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- may offer 'a leg up' to the skilled and able
- often recycles waste materials, e.g. scrap metal, tyres, plastic bottles
- most visible and developed in urban areas, exists in rural areas also
- can be pollutive
- can be exploitative, etc.

Suggest credit single points 1 and developed or illustrated points 2.

10

(b) To what extent may the informal sector be a source of growth for the economy rather than just a means of survival for the individual?

There is growing recognition of the sector's potential. Many governments now take a more tolerant approach to the informal sector, in some cases removing some of the constraints on it to help expand work opportunities and to absorb the unemployed.

That said, most recognise that the informal sector's potential for economic growth is limited (most establishments remain small-scale, low turn-over, subsistent) and few informal firms have the capacity to 'formalise' with what that involves in terms of wages, contracts, premises, registration, advertising, etc. without outside help. Some areas have seen success through the encouragement of small business initiatives and the input of charities.

Candidates will probably:

- L3** Develop a clear assessment of the potential and of the limitations of the informal sector for economic growth, based on good knowledge of examples and an understanding of its operation, giving appropriate emphasis to its role as a means of survival. **(12-15)**
- L2** Make a reasonable attempt at assessing the sector's potential for economic growth but may lack the specific knowledge, conceptual understanding or skills of assessment to develop it more fully. **(7-11)**
- L1** Offer only a few observations in a description that makes little or no assessment of potential. Credit may be given for knowledge shown but the overall approach is ineffective. **(0-6)**

Total: 25

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Environmental management

11 (a) Fig. 5 shows energy consumption and economic development for selected countries in 1994.

(i) Describe the relationship shown in Fig. 5 between energy consumption and economic development.

Overall energy consumption increases as a country develops 1, an example 1, a recognition of an anomaly 1, e.g. Japan or Kuwait.

3

(ii) With reference to countries shown on Fig. 5, outline the factors which help to explain the differences in energy consumption between more economically developed countries (MEDCs) and less economically developed countries (LEDCs).

Credit demand and supply factors (for either one max.4).

Unpacking **economic development** will go a considerable way to explaining demand; agriculture, manufacture, services, transport, domestic; (do not credit population numbers as consumption is per person; cf. India and China) climate may get a mention, e.g. Australia (hot) and Canada (cold) as may energy conservation/efficiency, e.g. Japan.

Supply is more complex, including levels of economic development, resource endowment (cf. Kuwait), capital, technology, energy policy, trade, etc.

7

(b) What factors can restrict the development of renewable energy resources in less economically developed countries (LEDCs)?

Candidates should be able to produce a number of factors, the interaction of which is highly creditable. Some may be widely applicable, e.g. low levels of available capital, limited technologies, others specific to the country concerned, e.g. catastrophe, environmental or political. The position of non-renewable resources should be part of the discussion.

Candidates will probably:

L3 Provide an answer with a convincing overall perspective, well-supported with examples from a number of LEDCs, showing understanding of a range of factors which interact to limit the development of renewables and giving appropriate attention to non-renewable sources. (12-15)

L2 Develop a sound response, outlining some of the factors which restrict the development of renewable energy resources in at least one LEDC, but lack the wider understanding or overview needed for higher credit. (7-11)

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- L1** Make a simple response, which may remain general to LEDCs. Undue emphasis may be put on the catastrophic and the relative contribution of non-renewables may be ignored. Fragmentary responses remain in this level. **(0-6)**

Total: 25

12 (a) Table 1 shows levels of sulphur dioxide pollution for selected cities in some less economically developed countries (LEDCs) in 1996.

(i) Describe the main features of the pollution data given in Table 1.

Considerable diversity of pollutant levels **1** range from Caracas 24.3 to Bangkok 1224 **1**, i.e. 1200 micrograms or 50 times higher **1** one other comment on levels, e.g. variation between Chinese cities **1**

3

(ii) Suggest reasons why many cities suffer from high levels of air pollution.

Any cities are acceptable here.

Credit the polluters ⁴/₃ (manufacturing, power generation, domestic, transport);

and other contributory factors ⁴/₃ (e.g. lack of controls, flouting of laws, concentration of economic activity, inefficient technologies, climatic influences, urban growth, poverty/affluence, profit motives, etc.).

7

(b) Using examples, explain why some countries now protect environments at risk from degradation. Assess the effectiveness of the protective measures taken.

Degradation of any sort is acceptable, as are rural and urban environments, so some variation in approach is to be expected. Marine environments are acceptable, e.g. coral.

Environments are protected because of their qualities (wildlife, vegetation, landscape value, scientific interest, historical importance, fragility, global significance, etc.) and because of the threat(s) experienced leading to degradation, damage and loss.

Countries protect them because their governments have the awareness, foresight, time and finance to do so, or come under external pressure to do so, e.g. from MEDCs, UN, etc. Some may have other priorities or suffer from extreme poverty.

Protective measures vary hugely, e.g. World Heritage sites, National Parks, greenbelts, reserves, sanctuaries, development restrictions, zonation, access permits, etc. as do the means and effectiveness of their enforcement. Much

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depends on the examples chosen which may be very localised within candidates' home countries.

Candidates will probably:

- L3** Offer a carefully organised response, paying good attention to both elements of the question and using contrasting examples of environmental protection. Make a realistic assessment, with both positive and negative comments on the measures effectiveness. **(12-15)**
- L2** Cover both elements of the question, but perhaps not in a balanced manner. Make reasonable use of at least two examples of environments at risk and the associated measures, but offer limited assessment of the effectiveness of the protection. **(7-11)**
- L1** Address both elements of the question in simple terms, or perhaps omit one entirely. Have little specific knowledge of at risk environments or protective measures, and lack the language for, or skills in, assessment. **(0-6)**

Total: 25

Global interdependence

- 13 (a) Fig. 6 shows the balance of trade in consumer electronics for selected areas in 1994.**

The term consumer electronics includes products such as televisions and video recorders.

- (i) Describe the main features of the balance of trade for the areas shown in Fig. 6.**

Japan and E and SE Asia experienced a trade surplus (exports > imports) 1 United States and Western Europe had a trade deficit (imports > exports) 1 observation on size/scale or use of statistical support for both elements 1.

No credit for overall amount of trade as question is only about the balance (i.e. the differences).

3

- (ii) For any one of the areas shown, suggest reasons for the levels of exports and imports in consumer electronics.**

The syllabus has trade patterns in relation to development and innovation as a factor in the global market. As such being able to choose one area should allow the candidates to make best advantage of their background knowledge and understanding.

For the observation that consumer electronics get produced at an intermediate to advanced level of development 1.

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The reasons suggested may include: stage of economic development, role of government, trade agreements, locational advantage, consumer demand, etc.

For an answer that only deals with one element (likely to be exports) max 5.

7

- (b) **With reference to the trading strategy of one country which you have studied, discuss the major issues in its involvement in international trade.**

The apparently loose phrase **issues in its involvement in international trade** is a syllabus term, allowing the candidate to use the case study which they have.

Only **major issues** are asked for, so a full answer could be two only. A diversity of issues is to be expected, e.g. colonial ties, trading blocs, quality of manufactures, transport infrastructure, debt, political instability, etc. depending on the case used.

The command word **discuss** is not demanding but should be more than simply describe, i.e. how do these issues manifest and change, what implications do they have, what solutions are attempted for the problems, with what consequences. The potential is sufficiently great that it is valid to say 'mark on merit'.

Candidates will probably:

- L3** Develop an assured answer, distinguished by its clear structure, good knowledge of the trading strategy of the chosen country and the quality of the discussion of the issues introduced. **(12-15)**
- L2** Have sound knowledge of the trading strategy of the country chosen but find the identification and discussion of the requisite issues harder to fulfil effectively. **(7-11)**
- L1** Take a descriptive rather than a discursive approach, which whilst showing some knowledge of trade fails to convince on either the chosen case or the understanding of the issues of its trade involvement. Simple frameworks, or one issue responses, remain in this level. **(0-6)**

Total: 25

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14 (a) Fig. 7 shows a life cycle model of the development of resorts and tourist destinations.

(i) Describe briefly the character of the exploration stage.

Credit 1 three points from the following:

- it involves small numbers of tourists/generates minimal income (on Fig.)
- tourists tend to be the young, pioneering, adventurous sort or representatives of travel companies looking to discover new destinations
- attractions are unspoilt natural environments and cultures
- places tend to be remote, hard to access, little known or unknown
- few, if any, tourist facilities exist.

3

(ii) Explain why stagnation is being reached in some tourist areas.

More demanding, but the Figure makes clear that arrivals and income peak out. Examples may help, the classic cases are within Europe, e.g. Spanish costas or the English seaside resort but Kenya and other locations may be seen.

Explanations are likely to touch on issues such as overuse; congestion; deterioration of facilities; environmental degradation; lack of control; lack of management foresight; changes in fashion; competition from new destinations and forms of tourism, e.g. eco-tourism; crime and violence; political changes; inevitability? cf. model.

Suggest credit single ideas 1 and developed or illustrated ideas 2.

7

(b) How useful is this life cycle model in understanding the development of one or more resorts or tourist destinations you have studied?

The syllabus asks both for a critical appreciation of the model and for the detailed study of a tourist destination (probably home country?).

If a resort is chosen, some appreciation of development over time is needed to indicate the stages passed through and reached. Whilst this may also be the approach to a destination, it is possible that in taking a wider area or more than one example, that the candidate may be able to offer locations exhibiting different stages of development.

Its usefulness is readily apparent as a diagnostic tool, a means of comparison etc. but it is limited in that it is descriptive not explanatory and does not give any indication of the complexity of factors involved (classically demand, supply and facilitating factors).

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Candidates will probably:

- L3** Use their detailed knowledge of the resort(s) or destination(s), and their critical understanding of the model conceptually to produce an effective assessment of the model's usefulness and of its limitations. (12-15)
- L2** Make a reasonable attempt at the application of the model to the resort(s) or destination(s) studied but lack the knowledge, conceptual grasp of the model or skills in assessment to develop it further. Wholly positive (or negative, although unlikely) responses max 10. (7-11)
- L1** Offer a description of the development of the chosen resort(s) or destination(s), with little or no application of the model, and an assessment which is thin or simply perfunctory. (0-6)

Total: 25

Economic transition

- 15 (a) The world map in Fig. 8 shows manufacturing production, in terms of value added, in 1994 and Table 2 uses the same data to show percentage share of value added for the leading 15 countries.**

Describe the global distribution of manufacturing production shown (i) in Fig. 8 and (ii) in Table 2.

- (i)** For the map, mark on merit, one approach is to credit:

a very uneven distribution 1
 although every country/almost every country has some manufacturing 1
 there is clear concentration in a few countries 1
 limited contribution of the global South 1
 intermediate contribution of some LEDCs 1 e.g. China or Brazil
 or some other valid observation 1.

5

- (ii)** For the table, mark on merit, one approach is to credit:

the dominance of Japan and the United States (and Germany) 1
 together accounting for 47.9/nearly half (59.5/about sixty) percent of the total 1
 the 15 countries together contribute 85.8%, i.e. only 14.2% in rest of world 1
 only a few of the countries (five) can be regarded as LEDCs 1
 up to two other valid observations, e.g. six are European, MEDC/LEDC comparison 1.

5

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(b) Using examples, discuss the reasons for the growing globalisation of economic activity.

Whilst the syllabus term is industrial activity, the question uses economic activity in a permissive not a prescriptive sense, to allow the use of examples.

Candidates may approach this via their case study of one TNC or have a broader global perspective on **reasons** such as the borderless world, information flows, transport developments, technological innovation, comparative advantage, government policy on foreign direct investment, the media, etc.

The fundamental economic **reasons** should emerge both that producers seek to maximise profits by the international spatial division of labour, market penetration etc and that consumers desire access to the best quality and lowest priced products and that new markets emerge.

The **examples** used may be of countries or any products and/or services, e.g. Coke, tropical fruit, textiles, steel, although little weight should be given to the consumer electronics which appeared in Q13. The tourism sector may be included legitimately but should not dominate a response.

Candidates will probably:

- L3** Have a firm conceptual grasp of globalisation and produce a number of reasons for its growth, recognising the motives of both producers and consumers, using a variety of examples in support. The response is distinguished by its confidence in discussion and by its dynamic or interactive quality. **(12-15)**
- L2** Show sound knowledge of reasons for the growth of globalisation, but either the level of exemplification, or the perspective offered, limit its overall quality. Has a "satis as far as it goes" quality to the discussion which is diagnostic. **(7-11)**
- L1** Have a poor grasp of the concept of globalisation itself, and offer only one or two reasons for its growth. Lack suitable examples or offer examples in name only. Confused and tangential responses remain in this level. Candidates tend to describe rather than discuss. **(0-6)**

Total: 25

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- 16 (a) (i) Give the meaning of the term *core-periphery* in regional development.

The **core** area is the most developed economically and the most prosperous **1**;
the **periphery** is relatively disadvantaged and deprived socio-economically **1**.

The two are linked by flows of people, materials, wealth, etc. **or** a gradient exists between them as levels of economic activity, prosperity and development decrease **1**.

3

- (ii) Describe the character of the periphery in one country you have studied.

Suggest credit physical and environmental **3** social and economic **3**.
Named **and** located example **1**.

7

- (b) Using examples, describe government attempts to develop the periphery and assess the success of these attempts.

The country chosen in (b) may be different from that in (a) or more than one country may be used. What is needed is **attempts** plural.

Candidates will probably:

- L3** Make effective use of their knowledge in the description of at least two attempts to develop peripheral areas and provide a perceptive assessment of their comparative success/failure. **(12-15)**
- L2** Show sound knowledge of attempts to develop peripheral areas, but offer limited assessment of their success. For a one attempt response max 10. **(7-11)**
- L1** Lack the material (and/or the time) to produce a satisfactory response. Make brief or fragmentary answers that may remain vague and generalised and offer little or no assessment of success. **(0-6)**

Total: 25