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FOREWORD

This booklet contains reports written by Examiners on the work of candidates in certain papers. **Its contents are primarily for the information of the subject teachers concerned**.

UNIVERSITY of CAMBRIDGE
International Examinations

GEOGRAPHY

GCE Advanced Level and GCE Advanced Subsidiary Level

Paper 9696/01

Core Geography

General comments

The paper aimed to examine a broad range of physical and human topics in a manner appropriate to both the range and abilities of the candidates. The paper seemed to perform very well and marks obtained covered the complete spectrum. The level of performance was extremely varied and performance polarised into 'weak' and stronger Centres. Many candidates were not able to sustain their performance over seven questions and would drop marks on at least one, often **Question 2** or **Question 5** if running out of time for ***Section A***. Wholesale omission of a question or questions in ***Section A*** was rare. There was some evidence that time had been handled poorly, most often seen in a rushed or truncated response to **Question 9** or **Question 10**, if tackled last. Many candidates remain slow to look at the figures provided and even slower to refer to them directly to give data support. Other candidates attempted to read the figures but had problems, for instance being misled by the inclusion of metres above sea level on Figure 1, struggling with the complexity of Figure 2 or failing to appreciate a cumulative representation in Figure 3.

Whilst expression could be loose, credit was given where there was a semblance of an idea or the recognition of something happening, even when the candidate lacked the vocabulary or technical terms to express this clearly (e.g. defining the basal surface of weathering).

There appeared to be a reasonable combination of straightforwardness and complexity in the data response questions in ***Section A***, with marks that most could achieve (3-5/10) and marks beyond those to differentiate the good and very good responses.

Some of the best work in the Human Core demonstrated candidates', and presumably, teachers' ability to reflect geographically on the world in which they live, e.g. for high death rate in **Question 3**, segregation in **Question 5** or the urban context for **Question 10**. This is welcome and to be encouraged.

Comments on specific questions

Section A

Question 1

(a) Some candidates failed to notice the negative temperature value to the SW. Most recognised higher and lower rural temperatures but failed to support this sufficiently accurately with data from the figure. Some were a little confused with the relative height data and tried to infer the effect of altitude on the data. The really good candidates did try to speculate about a potential frost hollow creating the negative rural temperatures to the SW.

(b) Few persisted with the night-time context (not repeated in the question). Most knew about human activities or absorption/release of heat energy but few were able to combine both aspects effectively to achieve four marks. Absorption was dealt with quite well but the slow release from urban surfaces during the night was often omitted. Although albedo was often mentioned many candidates expressed urban/rural albedos in the wrong way. Better responses explained the nature of urban and rural surfaces and their respective albedos quite well. As well as absorption and release of heat energy there was much discussion of heat sources in urban areas (cars, central heating, smoke, etc.) and the blocking effect of pollutants in the atmosphere. The weaker candidates failed to make a direct comparison between urban and rural areas. Occasionally, the blocking of urban areas by wind was mentioned as an anti-cooling effect.

(c) Precipitation was chosen most frequently but many candidates thought that rural areas received more precipitation than urban areas citing greater evapotranspiration. There was also a common misconception that urban areas had higher relative humidity. However, the better candidates recognised the slightly greater rainfall amounts received by urban areas and the possibility of more frequent high intensity events. The increased level of hygroscopic nuclei was frequently used to explain this but many ignored the possibility of air uplift as a result of the enhanced temperatures. The hygroscopic nuclei can only be important once the air has started rising. The weaker candidates concentrated on acid rain. Wind was often chosen as the characteristic and candidates usually mentioned a combination of less general amount of wind and the channelling effects between the buildings in urban areas. Direct comparison with rural areas was often omitted. The increased level of fog/smog and the general level of cloudiness were also discussed by some candidates.

Question 2

(a) The diagram appears in a number of textbooks but many candidates appeared unfamiliar with it. This meant that they had to look very carefully at the diagram to answer the question. Almost without exception candidates identified tropical forest successfully.

(b) Few candidates knew the term *basal surface of weathering* but many were able to use the diagram to infer what it meant. However, very few were able to relate it accurately to the processes of weathering. A sizeable number referred to 'basalt' when defining basal surface, clearly trying to achieve something by word association. Not surprisingly, candidates from African Centres were sometimes able to relate it to deep weathering and the development of inselbergs following exhumation. Some candidates might be more familiar with the alternative term *weathering front*.

(c) This part was answered generally adequately but the weaker candidates were unable to relate their knowledge of weathering to the diagram. Some simply described the diagram section by section not mentioning processes. Others went for processes but used recall without application and so described, say, freeze-thaw without making the link to depth of regolith. For many, temperature and precipitation were treated separately and it was only the better candidates who integrated both precipitation and temperature in their accounts. Better candidates mentioned rates and intensities, offered the classic equation of increase and differentiated chemical from mechanical weathering. A few, top, candidates used Peltier's diagram of weathering processes and temperature and precipitation axes, as a basis for answering the question.

Question 3

(a) Most were able to define death rate although a sizeable minority forgot the per year element.

(b) Even with the 'surprisingly' flag many candidates were defeated by this question and offered catastrophic explanations of everything from accidents, plague, disasters, September 11th, SARS and Asian flu. However, it is clear that some Centres had clearly taught age structure and the demographic transition model in such a way that its impact on death rates was understood. Candidates could achieve all three marks by explaining that in an ageing population most people die from old age and that because older age groups are represented strongly in the age structure, this makes average death rates high-er (not high). Some candidates recognised the lifestyle issues of stress, lack of exercise, obesity, fatty diets and mortality from cardio-vascular diseases and cancers (usually seen as the top two causes of death in MEDCs).

(c) This part was answered generally well. Better responses developed beyond the simply medical reasons, had better expression than 'bad' everything, and used examples such as civil war in Sudan, AIDS in Botswana and floods in Mozambique.

Question 4

(a)(i) Despite the prompt, some candidates identified a year, a fifty year period or a century (the prompt was there in the question to help candidates).

(ii) Many chose Africa (the top source area in the stack of cumulative migration) or Asia (by eye and not measurement perhaps?) rather than Latin America.

(b) Few interpreted 'items of information' suitably, failing to recognise it as a question about source data for the study of migration. Simple answers e.g. on age/sex or motives performed well. Circulation was not creditable e.g. so-called temporary migration for holidays. Weaker candidates wrote generally about push and pull factors associated with migration.

(c) The full range of answer quality was seen in answers to this subsection from the vaguest allusive slave trade, to a crisp response on a forced migration such as that provoked by the Rwandan genocide, or a voluntary one, such as the economic migration within or from southern Africa. Popular choices were Turkish workers to Germany, the post 2001 exodus from Zimbabwe, Mexicans to the USA, and Jews from Germany. In many responses the 'reasons' were better covered than the 'character' (who, when, where from, where to, how many, how, could be a useful checklist for future reference).

Question 5

(a) Careful observation of the figure paid off in that ordinary candidates could easily achieve three or four marks with simple comparisons based on what they observed. Few recognised any aspect of similarity (more demanding and not what one first notices). Most interpreted the term layout effectively although there was some pointless speculation in some answers about everything from happiness to security.

(b) Whilst there were some carefully worked responses with elements of attraction and repulsion, some candidates seized on 'segregation' and missed the 'ethnic' aspect. More general points about income were only creditable if linked in some way to ethnicity e.g. through immigrant groups being unwaged or low income earning or through the existence of economically powerful ethnic elites. The use of examples often distinguished better answers, whether generic, for instance about Chinatown, or specific to a named urban area, often from the candidate's own country.

Section B

Question 6 was by far the most popular choice with similarly small numbers opting for **Questions 7** and **8**.

Question 6

(a)(i) Defining the terms turned out to be a good differentiator. Heat was often omitted from the definition of evaporation and many failed to emphasise the change of state from a liquid to a gas (vapour). The transpiration part of *evapotranspiration* caused problems. Many candidates thought it sufficient to state that it was evaporation from the leaves of plants. For the full marks, the answers required the emphasis on water being transpired from the stomata (pores) of plants and vegetation.

(ii) Most candidates achieved two or three marks in this part. Infiltration was invariably accurate with percolation sometimes being only equated with lateral throughflow with little reference to the downwards movement of water.

(b) This was a very straightforward question and most candidates scored good marks. A flow diagram and the more usual slope diagram were both accepted. The only problems concerned vague and indistinct labelling of flows such as stemflow and interception and getting the flows in the wrong order on the flow diagrams. Occasionally the question was misinterpreted and a diagram of tributaries within a drainage basin was presented. Also flow was sometimes misinterpreted in terms of laminar, turbulent and helicoidal.

(c) This section was also a good differentiator: candidates either knew their drainage basin hydrology or struggled. Basin characteristics caused some problems. Three different land uses were sometimes offered (e.g. forest-covered, pasture, urban, etc.) without the realisation that it was the contrasts that were required and that these examples were not enough to answer the question. The most frequent characteristics offered were shape (circular, elongated) land use (usually forested/deforested) and relief (steep/gentle). The best answers produced good hydrographs with discharge, precipitation and peak/lag times accurately portrayed. The simplest way to answer the questions was to provide two different hydrographs (short lag, high peak/long lag, low peak) and simply refer to them when discussing the three basin characteristics. Quite often the axes of the hydrographs were not labelled and precipitation was omitted. The level of explanation varied and was a means of varying the marks from 6 to 8 out of 10. Quite often discharge was used in a loose way instead of referring to peak discharge. It was sometimes difficult to know whether total or peak discharge was being discussed. Also the reasons for the different hydrographs were sometimes vague; this was especially true of discussions about drainage basin relief. Statements about steep slope leading to rapid runoff are insufficient without elaborating on the lack of time for infiltration etc. and the greater speed of throughflow. Size was often used as a drainage basin characteristic but this was unsuitable unless it was stressed that other aspects had to be kept constant. It was in discussion of size that the conflict over peak/total discharge often occurred. Precipitation amount was also sometimes used as a characteristic but this is not really a basin characteristic and the response will depend on the other, main characteristics.

Question 7

This was not very popular. Responses were divergent: those that knew the topic scored very highly but most struggled with many of the sections.

(a) Some defined the terms in **(i)** with the help of temperature-height diagrams but, as usual, some got them back to front. Moderate candidates outlined the tendency for sinking air with stability and ascending air for instability, but were unclear about atmospheric mechanisms. Weak candidates were completely confused. Often without realising it, some candidates outlined 'conditional instability'. The weather in **(ii)** was adequately done.

(b) There were very few good responses to the night model **(i)** although some accurate diagrams of the four factor model were produced. However, most candidates scored a mark or two for vague references to heat loss from the earth and reflected back by clouds. The question was sometimes misinterpreted to mean sea breezes. Dew caused a number of problems with few candidates achieving top marks. Many answered with reference to the passing of warm air over a cold surface; few realised the importance of radiation loss on cold, clear nights. Some also described the formation of fog.

(c) A variety of responses was received to this part of the question and, considering its topicality, many responses were rather disappointing. The greenhouse effect was either known very well or was completely confused. Knowledge of which were the main greenhouse gases was also variable. Some concentrated on the diminution of the ozone layer which was marginal at best. Knowledge of likely climatic effects of global warming was very partial and most answers were too definite about the climatic outcomes and too uniform about their global distribution. The weaker candidates concentrated on polar ice cap melting causing rising sea levels, which was not relevant.

Question 8

Very few attempts and no really good answers.

(a) Candidates either knew the definitions or they did not. Flow was answered with vague references to mudflows without defining their characteristics and heave presented many challenges. In flows, very few had grasped the concept of internal deformation and faster movement in the centre than at the edges. Rock slide was answered rather better although many candidates wrote about rock falls and collapses. Most failed to get the important point about a failure plane and movement en masse.

(b) Most marks for this question were picked up in this part. Diagrams varied in their usefulness and accuracy. It was easier to pick up marks by doing more than one margin than to do one in great detail. Those that opted only for divergent margins had problems providing sufficient detail. There was some confusion over the mechanisms at work at convergent boundaries and there were some very curious diagrams. Some convergent boundary answers were spoilt by only mentioning mountain building and ocean trenches. Occasionally candidates failed to realise that a collision of two continental plate margins rarely produces volcanic activity.

(c) Few candidates interpreted form correctly and very few were able to offer any meaningful statements about form. Most answered by providing some very general statements of factors such as rock type, vegetation cover, and writing in detail about processes. The idea that some processes either increase or decrease slope angle and also produce different shapes, such as straight, concave or convex, was absent.

Section C

Question 10 was the most popular, followed by **Question 9**, with **Question 11** being very unpopular.

Question 9

(a) The rigour seen in previous years in defining this term was not apparent and definitions tended to be loose and fleeting along the lines of 'more resources than people' etc. Some valid examples of underpopulation were given, however, both the classic cases such as Canada and those known to the candidates, such as Brunei with its oil and gas wealth, were provided. A number of inappropriate countries were cited such as Japan, Germany, Italy and Singapore. Few mentioned the significance of underpopulation being related to the concept of appropriate technology. Better work was contemporary, dynamic and linked population numbers with resource exploitation.

(b) The basic point needed was the establishment of a population/resource equilibrium or balanced position, avoiding the problems of underpopulation on the one hand and overpopulation on the other. Some candidates were aware that theoretically this means highest standard of living for all. Some accounts were too 'perfect' suggesting that this brings the best of everything but many were aware of the desirability of the position both for governments and their populations. Better responses might have explored how this could be achieved or the fragility and difficulty of achieving such a balance.

(c) The full range of answer quality was seen here, from L3 responses contrasting Malthus's and Boserup's work and considering technological innovation and associated issues, to many which failed to interpret the question successfully and wrote about renewable and non-renewable resources and issues of depletion, import etc. A *resource base* is the resource endowment of an area, country or environment. It has elements of fixedness e.g. desert, thin soils, mountainous terrain, or simple extent, but much that is changeable through the discovery of resources, such as oil, or through improved technology or methods, such as in agriculture, mineral extraction or power generation.

Question 10

There were many adequate responses to a standard topic and some outstanding ones. Better answers paid close attention to the question, especially in **(a)** and offered suitable exemplar support.

(a) It was basic to a satisfactory answer to couch it in terms of urban pull factors and not rural push factors. Better answers identified say, not simple 'more jobs' but better and, perhaps, more secure, employment opportunities in the manufacturing sector yielding higher wages. It was important here as in **Question 4** to avoid circulation, so entertainment was valid as a pull factor for residence but not for a night out, medical facilities and hospitals for family healthcare and wellbeing not treatment visits etc. Many responses scored 3 or 4 marks readily but failed to offer the examples (specific, named or located) required of the operation of the factors identified.

(b) The basic answer seen was shanty town residence. This could be developed to achieve up to half marks but better responses identified a diversity of locations, some acutely and movingly observed (such as precisely where it is the homeless favour and why). This diversity included empty buildings, housing offered by employers, government high density areas and space offered by family or friends. Large urban areas such as the capital city offered suitable examples but there was some good use of textbook cases such as Brazilian favelas. Good quality responses integrated understanding of migration with that of the urban system.

(c) The full range of answer quality was seen here. Weaker responses, often struggling for time, produced a simple narrative on the problems of shanty towns, which was not the question's intention, or simply flagged what they could have written had they been able to, maybe by identifying some of the challenges involved (scale, funding, daily arrivals etc.). Zimbabwe's Operation Murambatsvina earlier in 2005 produced an unforeseen example as the basis for some good assessment of the usefulness of a strategy of wholesale clearance. There was also some good work on the potential of other strategies such as upgrading shanty towns and making them permanent or reducing rural-urban migration by rural development.

Question 11

There were only a few examples to comment on.

(a) Several candidates wrote about the general character of the CBD rather than the 'characteristic functions' required, so scored poorly. Some good, diverse responses were seen developing the precise nature of, say, retail a little (high order goods, department stores etc.) and avoiding non-CBD functions appropriately.

(b) This section was not well done or was omitted by some candidates. Few candidates seemed aware of fieldwork techniques and some wrote about displaying or presenting the collected information rather than obtaining it and recording it in the field. Teachers' attention is drawn to Assessment Objective 3.1 and given the limited potential of the Human Core for fieldwork, the likelihood of the urban context for questions.

(c) Moderate responses were received for this part, often because this was simply the last part of a script but also because candidates often shifted from the shops (retailers) of the question to write about shoppers (consumers) and the advantages and disadvantages they find of shops' peripheral locations. Recognised advantages included lower bid-rent, space for expansion, parking and showrooms; positive environmental externalities such as lower noise and pollution levels and ease of access. Disadvantages were harder to identify and differentiated the better quality responses, but included reliance on private transport, reduced custom and an increased need for promotion and advertising.

Paper 9696/02

Physical Geography

General comments

Overall, the questions proved to be accessible to the majority of candidates and there was only a very rare infringement of the rubric. Similarly, the majority of candidates possessed levels of knowledge and understanding commensurate with a study of physical geography at an advanced level. There were many answers of outstanding quality and the general standard showed a slight improvement on the previous year, although there was the expected wide range of quality.

As in previous years, the ***Hazardous Environment*** was the most popular option for candidates and although there were many excellent answers, some candidates lost sight of the need to provide a strong physical underpinning. Such answers often contained extended description of human responses which lacked necessary precision and detail in linking them to the physical events.

Examiners reported that there was an increase in the use of relevant examples to support descriptive and explanatory statements and this is to be applauded as they add immeasurably to the quality of answers, especially when provided with accurate data such as with climate and with tectonic events.

There was some evidence that many candidates were paying closer attention to the precise wording of questions although this is an area which still needs to be addressed by the majority.

Examiners continue to be impressed by the standard of written English by most candidates and the quality of many diagrams and the general presentation of their answers.

Comments on specific questions

Tropical Environments

Question 1

This was the more popular choice of the tropical environment questions, probably because part **(b)** was a familiar topic although many candidates failed to grasped what was required in part **(a)**.

(a) The mechanism of 'convectional heating' was too rarely understood in the context of the sequence of surface heating through insolation and then transference of heat to air near the ground and the generation of thermal uplift. Some candidates defined 'convectional heating' in terms of movements in the earth's mantle and linked to plate tectonics for which only limited credit could be awarded.

There was a wide range of quality in answers to 'how convectional heating can affect tropical climates'. Some candidates gave a clear explanation of convectional rainfall and the significance of the ITCZ related to tropical climates, but many accounts lacked precise knowledge of the processes.

(b) There were many good answers describing the 'natural vegetational structure of the tropical rain forest', often well illustrated with relevant diagrams detailing layering, heights and the variety of vegetation types. The second demand was generally less well attempted with too many only describing destruction of forest by various forms of exploitation instead of focusing on the question which required 'how human activities affected the structure and type of vegetation' and not merely the removal of vegetation. Most failed to show how clearance of trees led to increased light levels and the growth of secondary forest, or that soil deterioration inhibits a return to climax vegetation.

Question 2

Generally attempted by Centres regionally related to tropical savanna areas and this might explain why answers to part **(a)** were often weak or irrelevant.

(a) Although there were some good answers from Centres located more relevantly to landscapes similar to that illustrated by Fig. 1, many showed little understanding of the process of carbonation, the significance of jointing, stream incision and rapid chemical weathering in a hot wet environment. Many answers focused on stalactite formation, not indicated on the diagram and hardly a landform, and ignored towers, cockpits and dolines etc. A considerable number of candidates interpreted the landscape in terms of deep weathering and etchplanation and in some cases went on to contrast that with the theory of pediplanation. For such answers, only limited credit could be awarded. Good answers did recognise the significance of joint control and detailed the development of the relevant landforms in terms of chemical weathering, widening of joints to produce dolines, cavern collapse and the survival of towers in areas of more massive limestone blocks and so on.

(b) Here the balance was often redressed with some good accounts of the tropical savanna ecosystem revealing sound knowledge of the seasonality of the climate and its effect on vegetation, soils and nutrient flows. Some candidates made good use of diagrams including the Gersmehl type, although the relative scales of soil, litter and biomass were frequently too inaccurate. As with the tropical rain forest in **Question 1**, the 'contribution of human activities' was less well answered. The significance of firing, grazing and development of game reserves were too rarely related to the 'development of the ecosystem'. Again, as in **Question 1** most candidates concentrated only on the destruction of vegetation.

Coastal Environments

Question 3

This was by far the less popular choice for candidates offering this option possibly because of a perceived difficulty in attempting part **(a)**.

(a) Although many of the candidates who did attempt this showed an understanding of some of the 'factors', there were very few who could demonstrate how they affected cliff profiles; in fact the term profile was clearly not understood by the majority, i.e. the form of a cliff seen from the side such as its slope angle and shape; regular, rounded (slope over wall) vertical declining etc. Many candidates described the pattern of headland and bay, i.e. plan form, not profile. The few good answers demonstrated the effect of rock type and the dip of strata, active cliff foot erosion, subaerial processes, landslips and slides and so on. However, most were content to provide some of the processes and the nature of rock types, usually 'hard' versus 'soft', and left the Examiner to provide any 'influence'.

(b) Most candidates explained 'offshore bars' in terms of break point bars and this was accepted by Examiners but there was some lack of understanding of 'barrier beaches', i.e. the build up of sand or shingle across a bay to enclose a lagoon. Sand dunes were much better understood and explained. Answers were generally illustrated with competent diagrams which were often well annotated.

The 'protection of the coastal landforms' was often less well attempted. Examples of hard engineering structures were given but without due relevance to the landforms and were frequently inappropriate. 'To what extent' was generally ignored, i.e. that offshore bars have a tendency to migrate inland and little can be done to prevent it, or that beach nourishment may maintain barrier beaches and that vegetation planting and the restriction of trampling may preserve dunes. As ever, there were some good answers where these points were well addressed.

Question 4

This was the more popular question and yielded better quality answers in general.

(a) The majority of candidates showed a good understanding of both wave generation and the transport of sediment by different types of waves breaking and by longshore drift. There were those who merely translated wave transport to processes of river transport, and not infrequently referring to rivers in their text. Again the sources of sediment were well known by many candidates with some quoting percentages of that supplied from rivers, coastal erosion and the sea-bed. Some relevantly referred to supply from coral and shells. Answers which were less successful were often those which omitted to address each of the various demands of the question.

(b) The better answers were those where candidates applied the processes of wave erosion to stages in the formation of the landforms, i.e. the erosion of a notch leading collapse and cliff development and then retreat leading on to the creation of a wave cut platform. These answers were often well illustrated by the classic text book diagram. Weaker answers were piecemeal attempts with much repetition of processes and lacking in coherence; such answers often failed to refer to the role of structure, especially the role of jointing or faulting or that for sea arches, stacks and stumps there is the need for a headland or some other form of coastal protrusion.

Hazardous Environments

Question 5

The less popular choice although often revealing a depth and breadth of knowledge of the elements in the question.

(a) Examiners accepted both snow and rock debris avalanches, although the few candidates who only considered the latter had obviously restricted scope to provide a full response. Answers which misinterpreted avalanches as landslides or slips were not acceptable. Some candidates wasted space in detailing the effects of avalanches which were not required by the question and most answers were better on the causes such as human activities as well as sudden temperature rise, earth tremors, explosions and sound vibrations, than on their nature, although there were those who did recognise the different nature of avalanches and gave good accounts of differences such as wet or dry, airborne or ground flow as well as the type of snow and the possibility of a sub snow sliding surface of ice.

(b) The hazards were generally well explained in outline but many answers lacked precise conditions. The good answers were backed up with well chosen examples. With ‘coastal flooding’ some candidates only considered high and intensive rainfall such as that associated with hurricanes. Whereas Examiners accepted that this might be a cause in particular circumstances, the effect of storms, storm surges and tidal waves, such as generated by tsunamis, were more relevant. Similarly with severe river floods, the best answers stressed the importance of intensity and duration of rainfall coupled with other factors such as ground saturation, channel characteristics as well as the effectiveness of levees and so on. Also, in the case of landslides, some of the answers were only partial, i.e. ‘caused by earthquakes’ or ‘caused by heavy rainfall’ without detailing the need for slope instability or regolith saturation.

Some candidates failed to recognise the significance of ‘these hazards’ in the wording of the question and wrote in general terms including volcanic and earthquake hazards. There were however many good answers in which candidates recognised that warning of hurricanes was often effective but of tsunamis less certain. The need for effective coastal and river defences was recognised as well as planning for evacuation. The need to stabilise slopes by afforestation and to avoid excessive building on them were other valid ideas advanced.

Question 6

The more popular choice and most attempted question of the whole paper as the majority of candidates chose ***Hazardous Environments*** as one of their options.

(a) This was obviously a well rehearsed topic and as such the response from many candidates was an almost automatic one, i.e. they wrote in equal measure about all the different plate boundaries without due consideration of 'how' and 'where' earthquakes occur. The good answers recognised that most earthquakes occur at subduction boundaries and also added the significance of conservative boundaries such as that associated with the San Andreas faults. Good answers also revealed an understanding of how an earthquake is generated and that, from its focus, shock waves radiated and that the maximum effect was at the epicentre. Most candidates used diagrams, the best indicated foci, seismic waves and epicentres while the less effective were the standard plate boundary cross sections with little or no reference to earthquakes.

(b) The weaker answers were those in which candidates merely rewrote much of the data provided in Fig. 3. with no critical comment or provision of examples. In good answers, candidates recognised that magnitude and effect might vary depending upon locational factors such as density of settlement and quality of the built environment. The best answers were backed up with details from well selected examples of contrasting seismic events with damage and death toll data to illustrate the effects of magnitude, depth of focus, proximity to the epicentre and relative levels of technology and wealth. In many cases, candidates wrote little in response to the first demand of the question but wrote copiously about prediction, warning, building design, emergency services and education as responses to the reduction of the impact of earthquakes on lives and property. How well these were backed up with relevant examples and how accurate they were in detail determined the level of credit, e.g. some candidates merely stated the need for better or stronger building design whereas good candidates provided detail and examples. The evaluative element was also lacking in the less successful answers.

Arid and Semi-Arid Environments

Question 7

This was the least favoured topic of the physical options and the choice of question was roughly equally divided between the two available.

(a) The answers were generally disappointing, both in their coverage and the level of knowledge and understanding displayed. Firstly, there was some misunderstanding of weathering as some candidates included the erosional work of wind. Wind, although an element of weather, its effect can only be erosional. Most candidates recognised that the large diurnal temperature range led to thermal fracturing and rock disintegration but most answers lacked the fine detail of the role of mineral crystal content or the homogeneous nature of rocks. The distinction between exfoliation, block or granular disintegration was frequently blurred. Some commented effectively on the doubts cast on the efficacy of solely heating and cooling. The effects of salt weathering was rewarded but the role of freeze-thaw weathering was not, unless restricted to mountain areas where there might be sufficient rainfall on occasions as well as regular freezing temperatures to achieve it. Too few candidates made any reference to chemical weathering from the presence of water from dew or occasional showers which can promote, especially, oxidation and hydration.

(b) There was some quite good knowledge of convection rainfall events coupled with its infrequency to give rise to the generally and conditions as well as many answers containing references to types of run off and exotic, intermittent and internal drainage systems. Many wrote about oases but often without reference to water stores and aquifers. At the other end of the spectrum, many of the answers were limited in both content and understanding.

The responses to 'how human activities affect the hydrological regimes' were of a very wide range in quality. The best answers recognised that human activities were mainly exploitive through dam construction and raising ground water for irrigation. Some added that this could lead to salinisation and that much of the ground water was 'fossil' and a finite resource. The effects of vegetation from overgrazing were also well addressed by the better candidates but too many candidates wrote only of human activities with little or no reference as to how they might impact on the hydrological regime.

Question 8

Although equally popular to **Question 7**, this was generally less well attempted.

(a) Candidates were undoubtedly well prepared to answer a question on the causes of arid and semi-arid climates which has often been previously set, but most were less equipped to describe such climates. Such a question demanded some meaningful data about temperatures, precipitation, humidity, pressure and winds. Good candidates provided some of these and were able to write about the variability of rainfall and prolonged periods of drought as well as average amounts. Examiners were able to extract some credit where the approaches were totally causal as there were inevitably some descriptive elements within such answers.

(b) Too few candidates were able to add additional knowledge and understanding to the information provided by Fig. 4. There were some good answers where candidates followed a logical sequence of piedmont development from scarp recession of the mountain front to plantation of the pediment with an appropriate reference to possible processes including past wetter conditions with more active stream erosion. Explanations for the mesa and butte were generally unsatisfactory and too often couched in vague references to weathering rather than that they represented detached plateau remnants from stream incision under more pluvial conditions in the past. Depositional landforms were generally better understood as was the playa as a salt encrusted plain resulting from the drying up of a temporary lake produced by intermittent streams.

Paper 9696/03
Human Options

General comments

This was a demanding paper which differentiated between candidates well in terms of the syllabus's Assessment Objectives: Knowledge; Understanding and Application; Skills and Enquiry; and Evaluation and Decision-Making. Examiners reported on one common strength and a number of common failings amongst a large and diverse entry. The common strength was the use of exemplar material from the home country, which this syllabus purposefully encourages. This was seen, for instance, in relation to the location of manufacturing industry (**Question 10**), the production of electrical energy (**Question 11**) and export trade (**Question 13**). Common failings were, firstly, the tendency to make vague generalised comments either not focused on, or insufficiently related to, the central needs of the question and, secondly, the production of short, incomplete or unfinished responses which limited the potential award that could be made. Examiners also reported how few candidates offered annotated maps and diagrams in support of their work.

There were a small number of rubric errors. These occurred either when a candidate answered both questions under one optional topic or when they attempted more than two questions in total, such as one from each of the four optional topics.

Handwriting and use of language and expression were so variable as to make generalisation meaningless. It should be noted, however, that Examiners are encouraged to reward geographical understanding even when the ideas are obscured by limited expression, recognising that many candidates use more than one language and may lack technical, conceptually robust, vocabulary.

Comments on specific questions

Production, location and change

Question 10 was the more popular. Although Fig. 5, for **Question 9 (a)**, was unfamiliar, it is the case that structured questions offer candidates a number of different ways to accumulate credit.

Question 9

(a)(i) The correct regions to name were Yunnan and Shanghai, although no data support was needed. Although some candidates simply named the wrong regions, a significant minority wrongly identified the average values in the key from Border and Coastal.

(ii) Many candidates confused east and west, which destroyed the sense of the response made. Some misinterpreted 'east-west' as a phrase, or took a descriptive approach when an assessment was required. Most observed a basic pattern but could not support or qualify it. A full answer involved elements of agreement and of disagreement, with data support for both from Fig. 5.

(iii) Examiners noted that there were few good answers to the issue of 'further information' and that many candidates showed little awareness of sources. Many scored one or two marks for the ideas offered but these often were drawn from one subject area only, such as the nature of the physical environment (geology, soils, relief, climate) or the nature of the farming system. Better answers built up a diversity of items of information and demonstrated understanding of the potential and limitations of information.

(b) For a successful response, it was important to identify a suitable 'area' which had undergone agricultural intensification. There were classic studies of areas, such as India and the Green Revolution, and some good use of home country material. Weaker candidates dealt with their chosen area only vaguely, implicitly, or in name only 'e.g. China' (c.f. **(a)**). Some wrote about intensive agricultural production, not the intensification of agriculture as such, and so limited the possible award. High quality responses were distinguished by perspective, the use of detail and data, and often by the ability to distinguish between effects on different groups of people and/or locations.

Question 10

(a) Most candidates responded to a balanced question in an uneven way, writing far more for **(i)** than for **(ii)**. One common misconception was that economies of scale relate to making a single product and diseconomies of scale to making many products, which is simply not the case. Another common misconception was that economies of scale are just the advantages of an increased scale of output (and vice versa). Examples, usually generic, added to answer quality and helped to show the validity of the explanation offered. Few candidates could produce clear, simple, precise definitions. Often unnecessarily long answers received low marks.

(i) A good definition of *economies of scale* linked reduced unit costs and increased output to expansion or growth in industrial operations. Some candidates used the terms *internal* and *external* suitably. Internal economies for industry occur through practices such as specialisation or bulk purchasing. External economies may occur through such phenomena as a specialised labour pool or shared infrastructure.

(ii) Conversely, *diseconomies of scale* make unit costs higher in larger-scale operations, and may, in time, represent the loss of former economies of scale through further growth. Many candidates could identify inefficiency as a problem and some considered the challenges and costs to firms of increased communication or problems of keeping track of stock, orders and workers.

(b) Examiners reported that responses were often disappointing, given the straightforwardness of the topic. Most lacked precise knowledge of government policy and sound locational information within the chosen country, offering observations of more general elements such as industrial estates, planning controls or EPZs. Higher quality responses supported their assessment with specific policy (sometimes named and dated) and diverse named, located, examples of industrial location at the regional and/or local scales. Irrespective of answer quality, most candidates appreciated that other factors are also influential on industrial location, although the handling of these factors differentiated the award made within the given Levels.

Environmental management

This was most popular topic and responses fell reasonably equally overall between the two questions.

Question 11

Not all candidates appreciated that whilst part **(a)**, through Fig. 6, was about energy consumption in general, part **(b)** confined itself to the production of electrical energy only.

(a) CIE regrets the print error on Fig. 6 which made answering this part more challenging than first anticipated.

(i) The correct answers were either Africa or Asia and Oceania for fossil fuels (defined as oil, natural gas and coal); and South and Central America for renewable energy (hydroelectricity). Few candidates identified both correctly.

(ii) Most responses were simply physically deterministic in terms of resources for energy production, (i.e. if a country has the resource, they will use it). Better quality responses considered related issues of costs and imports and supported this with information from Fig. 6 or their wider knowledge. The highest quality work appealed to other considerations such as environmental concerns about emissions (reducing the use of, say, coal) or concerns about dependency on imports, especially of oil, causing countries to search for alternative sources of energy.

(iii) The interesting phenomenon of nuclear energy consumption in Europe and the former Soviet Union was commonly explained in terms of the region's financial and technological ability. Many candidates realised that countries had sought nuclear power either to reduce emissions, or to avoid an energy crisis on fossil fuel depletion or to meet unfulfilled energy demand. The Cold War context was pertinent and creditable in terms of research and development but not in terms of weaponry and militarism.

(b) This was often answered well, especially when home country material was used. More distant contexts, taken from text books, tended to be restricted in scale, whether China's Three Gorges Project or micro-HEP in Nepal, for example. This made it hard for the requisite 'issues' to emerge and for candidates to develop their response. Examiners reported that in most cases the assessment of sustainability, the question's second element, was better done than the explanation of some issues in electrical energy production, its first. Issues ranged from concerns about fossil fuels running out and global warming in some MEDCs, to the need for rural electrification, the challenge of rising demand, or the constraint of indebtedness on power production in some LEDCs. In the past sustainability has been defined on this paper as 'development which meets the needs of the present without compromising the ability of future generations to meet their own needs'. Whilst sustainability may be largely seen in environmental terms, other legitimate aspects included the financial (affordability) and continuity of supply. Better quality responses were conceptually robust and often differentiated between more sustainable aspects of energy production in the chosen country and the less sustainable.

Question 12

(a) Whilst environmental degradation was familiar as a concept to candidates, only a small proportion of them selected and applied the material they had effectively in terms of its occurrence in **urban** areas in **MEDCs**'. Weaker candidates thus wrote of environmental degradation in general, or pursued it in an unrobust manner including phenomena such as unrestricted disposal of industrial effluents or the problems of shanty towns. Most candidates took a descriptive response, or considered types of pollution (land, air, water) rather than identifying the factors for which they were asked. These factors are best understood to operate in four dimensions: economic, social, environmental and political. Although factors were embedded in the narrative in most responses, an appreciation of the scale and complexity of urban areas emerged even in the thinnest responses. Examiners observed that broad phenomena, such as global warming or holes in the ozone layer, were too prominent in the accounts given. Whilst many responses were heavily generalised, there was some good use of exemplar material, for instance in relation to pollution levels in US cities, or to the degradation of named inner city environments in the UK.

(b) Examiners commented on the creative manner in which many candidates had approached the novel and thought-provoking issue of the sustainable disposal of wastes. Whilst not an explicit syllabus topic, it drew heavily on candidates' understanding both of pollution and of environmental degradation. The question suggested a structure which many candidates profited from using in their response, i.e. 'solid, liquid, gas and particulate wastes'. Many added what they saw as special categories of waste, principally nuclear, with its attendant radioactive hazards, but also toxic substances. Good assessments considered at least two types of waste, but usually more, and identified elements of greater and lesser sustainability from a list of possibilities which included: burning, burial, landfill, treatment, recycling, reuse and the composting of biodegradable waste. It was good to see the use of examples, both generic and specific. Many candidates offered detailed information about particular schemes or initiatives, for instance, to clean up local water bodies, to strengthen environmental legislation or to collect, sort and recycle domestic wastes in an area.

Global interdependence

This was the second most popular option and responses to the two questions were seen in approximately equal numbers in the entry. **Question 14**, on tourism, appeared less popular than in some examinations, perhaps because of the need to interpret Fig. 7 in part **(a)**. Examiners commented that many Centres are preparing candidates well for **Question 13**, which was again on trade, this season.

Question 13

(a) Answers tended to be of middle to good quality. Common failings were to include imports (on a question about exports); to spend time giving an historical context before 1960; to overlook invisible exports in favour of visible trade; and to offer vague generalisations about change such as 'more agricultural products' or 'a decrease in minerals'. Examiners noted that the explanation given was often stronger than the description, for these reasons. Candidates set changes in exports' volume, composition, direction and value in a context of economic development and globalisation for the chosen country, whether MEDC, LEDC or NIC. As well as general shifts, better explanations brought in country-specific explanation, such as colonial ties to Britain being altered by its EU membership, as well as product-specific explanation, such as the development of synthetic substitutes for some materials. Quality was indicated by such elements as export product detail; the use of statistics, either absolute or relative; and by the dynamism of what was written.

(b) Quality in **(b)** did not match quality in **(a)** on the whole; its demand being considerably greater. Responses which scored well combined general assessment of the role of trade agreements with the use of specific named examples. The WTO and GATT featured appropriately, as did some regional groupings such as NAFTA, the EU or SADC. Some important contrasts were made between intention and outcome in world trading and trade patterns, between MEDCs and LEDCs, and between those "inside" a bloc or partners to an agreement and those left out. Weaker answers fell into vague generalisation or simply lacked the knowledge and understanding from which to answer. Although the mark allocation was larger (15 marks compared to **(a)**'s 10 marks), it was not uncommon to find that candidates had written more for part **(a)** than for part **(b)**.

Question 14

(a) Candidates were required to respond with understanding to Fig. 7 and were not expected to have knowledge of North America, except in the most general of terms. Many candidates identified Alaska with its high number of eco-tourism holidays, or could say simply that the US had national parks and Canada has wilderness areas. Factors which may help to explain the variations shown on the map, operate in four dimensions: physical, such as an appreciation of the fragility or great beauty of environments; social and economic, such as the presence of mass tourism destinations, degrees of urbanisation and industrialisation; or political, such as the implications of individual state governments making laws for their own state. There were few good answers seen, although some candidates whose performance on the paper was otherwise moderate, teased out a few factors satisfactorily. One Examiner commented that candidates did not make good use of the data that was available to them on the map to interpret.

(b) Few candidates had a sufficiently precise understanding of eco-tourism to score well. Many simply wrote about tourism in general (the inclusion of features such as five star hotels, casinos, shopping arcades, swimming pools was diagnostic) whilst persisting in referring to this as eco-tourism throughout, apparently seeing the two terms as interchangeable. There were some suitable countries chosen, such as Kenya, but few candidates focused on eco-tourism, and most took a general "outdoors" approach to tourism using national parks, game viewing and safaris. Whilst some of this activity is reputable eco-tourism, much is clearly not, whether bussing tourists in from Nairobi hotels or "chasing" game, disturbing breeding patterns, leaving tyre tracks in the bush, etc. High quality answers focused on one or more clear cases of eco-tourism, offered a detailed description and assessed the success from the points of view of local people of different sorts, appreciating their participation in the venture. These cases included Xcaret in Mexico, some named "eco" lodges in southern Africa or the Amazon and Zimbabwe's CAMPFIRE programme.

Economic transition

Although relatively few Centres appear to prepare candidates for this topic, those who take it often score well, and demonstrate elements of geographical synthesis in relation to the syllabus, in their work.

Question 15

(a)(i) Most candidates could offer a basic reason as to why social development should be studied as well as economic development, but few offered the detail, development or illustration needed to achieve both marks.

(ii) The broad linear (or direct) relationship shown in Fig. 8 was identified and expressed by most candidates. Fewer supported it with the necessary information from the figure, however, and fewer still recognised a degree of complexity in the data set, or some anomalies or exceptions, and offered data support for that, in order to achieve full marks.

(iii) This was answered weakly, for, although many candidates understood GDP and what it measures, few linked this specifically to economic development and so made observations, which although correct were not creditable. Some recognised that the distribution of income matters, others that GDP per person ignores the considerable contribution of the informal sector. A few commented creditably that economic development is a wider concept with other aspects, such as economic structure, which GDP itself cannot show.

(b) There were some very good responses to this issue, which showed an appreciation of resource endowment, usually in physical terms, and a good global perspective on economic development. So, for instance, Japan, known for having few resources and dependent on imports, might have been contrasted with some African countries, such as Nigeria, which are well-endowed physically, but do not have the political stability, finance and technology needed for certain further economic development. Many candidates pointed out creditably that countries such as Britain had based their industrialisation on their own resources (coal, iron, etc.) and on those of their colonies but are now service economies engaged heavily in tertiary and quaternary activities. Less able candidates who had perhaps been helped through part **(a)** by its structure, found this "big picture" assessment challenging and many produced thin, generalised and inconclusive accounts which were restricted overall.

Question 16

This appeared to be the least popular question on the paper, but the quality of responses seen was above average.

(a) Responses displayed good understanding of the upward spiral or cumulation which is basic to cumulative causation, and which reinforces growth and triggers further development. Better quality responses linked this to initial advantages, to spread effects and backwash effects and may have used terms such as linkages and multiplier appropriately. Candidates who used either a diagram, or a regional example as context, or both, seemed to find the description and explanation easier to make effectively.

(b) Prepared candidates produced some clear, well-informed, evaluative work. Some responses were based on "classic" cases of development management such as Brazil and Italy. Those based on the candidate's own country tended to be of better quality because the case knowledge was more secure. It was for the candidate to present, for the chosen country, what they judged to be 'the main difficulties for the government'. Those who presented two or more difficulties clearly, supporting their work with country detail and assessing their significance and impacts could score highly. The difficulties seen were diverse and ranged from corruption to hazardous environments, from the impact of AIDS on the economically active population, to persistent regional disparities or the protest of marginalised groups of people.