

**MARK SCHEME for the May/June 2010 question paper
for the guidance of teachers**

9768 GEOGRAPHY

9768/02

Paper 2 (Global Environments), maximum raw mark 50

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

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

CIE is publishing the mark schemes for the May/June 2010 question papers for most IGCSE, Pre-U, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.



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Guidance notes for marking 9768/01

In marking questions in Sections A and B of this paper, the indicative content and levels descriptors on the following pages should be used throughout. In marking questions in Section C, which are worth 25 marks and based upon extended writing, the **Generic Mark Scheme (GMS)**, used for assessing all pieces of extended writing bearing 25 marks in the Cambridge Pre-U Geography, should be used in conjunction with the **Indicative content** for each question.

Whilst the GMS captures the essential generic qualities of responses in 5 mark bands, the Indicative content is what it says: some indication of the probable content in responses, or possible approaches, to the questions and titles set. Candidates may develop their own approaches to questions. Examiners should not expect to find all the Indicative content in any one response, such as to achieve a Level 5 award. The same mark may be awarded to different pieces of extended writing for different reasons.

CIE expects Examiners to use their geographical judgement and professional experience, combined with guidance given by Senior Examiners at the Standardisation Meeting and during the standardisation process, in assessing responses appropriately.

Use of the Generic Mark Scheme

The Generic Mark Scheme is used together with the indicative content for each essay question.

Responses may be placed in any level without fulfilling all the descriptors for that mark band, for example where the essay does not lend itself to the use of sketch maps and diagrams. Responses may exhibit characteristics of more than one Level and so examiners use the principle of best fit in determining response quality. The grid below gives an indication of the relative weightings of the Assessment Objectives at each Level.

Level	Marks	AO1 Knowledge and Understanding	AO2 Skills	AO3 Analysis and Evaluation
5	22–25	15	3	7
4	18–21	14	2	5
3	14–17	12	2	3
2	10–13	10	1	2
1	0–9	8	0	1
Total		15	3	7

Guidance on how to use the above table relating Assessment Objectives to marks, when awarding credit to essays is given in boxed text at the bottom of page 3.

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The Generic Mark Scheme (GMS)

Examiners are encouraged to copy this page (or the same page in the Specimen Papers) and to keep it in front of them at all times when marking.

Level	Marks	Assessment criteria
5	22–25	<ul style="list-style-type: none"> • Wide-ranging, detailed and accurate knowledge and clear, high order understanding of the subject content • Relevant, detailed and accurate exemplification used effectively • Logical and clear organisation; good English expression; full and accurate use of geographical terminology • Well annotated and executed sketch maps/diagrams integrated fully with the text • Fully focused on the specific demands of the question • Systematic analysis and a critical approach to evaluation; appropriate application of concepts and theories • Conclusion shows high level insight and is logical and well founded on evidence and argument
4	18–21	<ul style="list-style-type: none"> • Good knowledge and depth of understanding of the subject content • Appropriate and well developed exemplification • Logical organisation; sound English expression; appropriate use of geographical terminology • Clearly annotated sketch maps/diagrams well integrated with the text • Well focused on the demands of the question • Elements of systematic analysis and ability to evaluate; generally appropriate application of concepts and theories • Conclusion is sound and based on evidence and argument
3	14–17	<ul style="list-style-type: none"> • Sound knowledge and understanding of the subject content lacking depth in some areas • Appropriate but partial exemplification, may not be integrated with the text • Generally clear communication but lacking some organisation; English expression and use of geographical terminology are mostly accurate • Sketch maps/diagrams generally used effectively and appropriately • Specific demands of the question mostly met • Some ability to analyse and evaluate; limited application of concepts and theories • Conclusion is limited and has some links to the rest of the response
2	10–13	<ul style="list-style-type: none"> • Some knowledge and understanding of the subject content lacking depth and detail • Exemplification used may be limited or not fully appropriate • Limited organisation; English expression is basic with some accurate use of geographical terminology • Sketch maps/diagrams may have inaccuracies and limited relevance • Question is addressed broadly or partially • Analysis, evaluation and application of concepts and theories are limited and may be superficial • Conclusion is basic and may not be linked to the rest of the response
1	0–9	<ul style="list-style-type: none"> • A little knowledge and understanding of the subject content; response may also contain unconnected material • Exemplification, if used, is simple and poorly related to the text or may not be relevant • Lack of clarity and organisation; English expression is simple with inaccuracies; geographical terminology, if used, is basic or not understood • Sketch maps/diagrams are limited or poorly executed and may lack relevance • Question is understood weakly and may be addressed slightly • Superficial statements replace analysis and evaluation; application may be minimal or absent • Conclusion may be absent or simply asserted

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How to annotate essays and show marks awarded

Ticks

Examiners are asked to tick at point of credit and not in a large or loose manner such that it is hard to ascertain what has been credited. Please avoid simply ticking at the end of paragraphs to indicate you have read them. All pages and sketch maps/diagrams, if used, should, however, bear some sign that they have received your attention, such as the simple annotation 'Seen'.

Other annotation

Examiners may find a number of symbols and annotations useful. The most commonly used are given here.

Indicating

?	an uncertain or doubtful point or an unconvincing argument
^	omission
^^	major omission
cf	compare with ...
IR or NR	often accompanied by wavy down ruling in the margin, irrelevance
(text)	identification of text for associated marginal comment
e.g.	example

Comments

Comments on responses are useful both in forming an initial assessment of quality and for any Senior Examiner who reviews the marking at a later stage. Comments will usually reflect the descriptors in the GMS and/or the Indicative content, but other comments may be helpful, such as when an essay is clearly unfinished.

Positive comments may be made, but derogatory remarks must be avoided.

Showing marks awarded at the end of a response

In awarding a mark to an essay, please indicate the level, quote one or more phrases from the GMS to support the award made and show the mark, out of 25, ringed. The marks derived from each AO, in whole marks (no half marks) should be given, totalling to the total mark awarded, for example:

L4 Good K and depth of U, diagrams accurate and well-integrated, sound conc. based on evidence and argument.

AO1	13	AO2	2	AO3	4	
						$\frac{19}{25}$

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Section A

Arid and Semi-Arid Environments

- 1 Examine the relative importance of ocean currents in determining the distribution of arid environments. [25]**

Indicative content:

Ocean currents are extremely important in determining the distribution of arid environments. Examples would include the influence of the Benguela current in SW Africa and the Humboldt in western South America. However there are many desert regions that do not owe their existence to ocean currents but are principally determined by global high pressure belts. In particular, Australia, North Africa and North America are influenced by the high pressure systems generated as part of the tri-cellular model of atmospheric circulation. Other deserts are influenced by continentality (e.g. Gobi) and thus distance from the sea, rather than ocean currents, specifically. Still other deserts are influenced by rain shadow – Talikmakan and Patagonia. Many deserts are caused by a combination of the above.

Lower level responses are unlikely to give a balanced discussion of the various factors determining the location of arid environments and might well describe different desert regions rather than concentrate on the underlying causes of their distribution. Better responses will examine the importance of ocean currents within the context of the other factors and in this way present a balanced discussion. A distinguishing feature of high level responses might be the recognition of ocean currents in determining some of the main hyper-arid regions of the world. Such responses might also note the complexity of causal factors and how desert regions are often caused by a combination of factors.

- 2 Examine the extent to which the world is regarded as less arid at present than in the past. [25]**

Indicative content:

There is no doubt that the world has experienced far wetter times in the past and candidates are likely to discuss pluvial periods. Supporting evidence and examples is expected and candidates might draw on examples such as the pluvial lakes of SW USA (Bonneville and Lahontan) or those of North Africa (Lake Mega-Chad). Candidates might well discuss other evidence for wetter climates, possibly citing relic shore lines, middens and lime deposits. Whilst it is true that there have been wetter times than we are currently experiencing, it is also true to acknowledge that there have been far drier times in both our recent and distant geological history. Candidates might well examine the last glacial maximum and the corresponding increase in global aridity associated with ice expansion. Candidates may want to discuss evidence for these times of greater aridity and may call on evidence such as relic dune systems.

Lower level responses are likely to be very generic and lack example material and supporting evidence, including the accurate use of dates. Such responses may well agree that the world today is less arid and make comparisons only to past pluvial events. Higher level responses are likely to look both at pluvial periods and periods of greater aridity as well as citing convincing examples and supporting their writing with a range of accurate evidence.

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Glacial and Periglacial Environments

- 3 To what extent should basal sliding be considered the most significant form of ice movement? [25]**

Indicative content:

Basal sliding is an extremely important method of glacial movement and is particularly responsible for the faster rates of movement associated with alpine/warm based glaciers. Candidates are likely to discuss its significance by way of the melt-water at the base of the ice serving as a slip plane upon which the ice can reach relatively high speeds. However basal sliding is far from the only form of glacial movement and candidates might well discuss the role of internal deformation as a key factor in the movement of all ice forms, as well as cold based ice sheets. Other forms of movement might include surge conditions or sub-glacial bed deformation.

Lower level responses are likely to focus mainly on the role of basal sliding and where other forms of movement are mentioned will tend towards a basic description. Higher level responses are likely to offer comparisons of the different forms of movement and evaluate their differing significance in relation to specific glacial forms.

- 4 Examine the extent to which periglacial environments can be managed in a sustainable way. [25]**

Indicative content:

Periglacial environments are environmentally fragile and at risk of overexploitation through human misuse. In particular, demands might include the following:

- Tourism
- Mining and quarrying
- Settlement
- Infrastructural development
- Military demands

Their fragility can be seen as a result of the sparse vegetation, nutrient deficiency and hostility of the active layer/prevaling climate. Such environments can easily become irreparably damaged. As a consequence, sustainable management is very necessary as well as being particularly demanding. In many regions, sustainable approaches have been taken and met with considerable success. In regions such as Alaska and northern Canada, in particular, impressive National Park policy and wilderness zones have been established to limit overexploitation and unsustainable mismanagement of these delicate environments. In other regions (notably in Siberia), attempts to manage periglacial environments sustainably have not met with such success and the economic demands on the landscape have become more significant than the will behind their protection.

Lower level responses are likely to be highly descriptive of different management techniques. In particular it is expected that such responses might focus more on misuse rather than management. Higher level responses are likely to evaluate the strategies in a balanced manner and discuss examples of where management for sustainability hasn't worked as well as where it has. Such responses will be supported with good exemplar material.

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Coastal Environments

- 5 To what extent does the economic development of coastal environments produce as many problems as it does benefits? [25]**

Indicative content:

There are a great many economic opportunities to be developed within coastal environments and for a variety of interest groups:

- Resource exploitation (e.g. fishing)
- Manufacturing and energy industries
- Recreation and tourism
- Settlement and retirement
- Military training

Such initiatives often bring substantial economic gains without which, in some cases, socio-economic deprivation would prevail. The socio-economic benefits could be discussed in terms of their positive effect on national and local revenue as well as associated tertiary business. However, such enterprises can also have broad-ranging and substantial negative impacts in a socio-economic and environmental context:

- Environmental spoiling, including the degradation of specific ecosystems
- Economic dependency
- Social conflict

An evaluation of this claim would depend greatly on the location discussed and thus exemplar material is needed throughout. In many regions, it could well be argued that the negative impacts outweigh the relative benefits of the development, whilst in other areas, the reverse is true.

Lower level responses are likely to lack evidence and example material and evaluation will be one sided and lacking detailed interpretation. Higher level responses will understand that such discussion is determined, in part, by location and thus the specifics of the particular economic development, including the sensitivity and sustainability with which it has been developed. Such answers will be clearly evaluative.

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- 6 Choose two coastal landforms of depositional origin and discuss the conditions under which they develop. [25]**

Indicative content:

Coastal landforms of depositional origin might include:

- Mudflats
- Saltmarshes
- Sand dunes
- Spits
- Barrier Islands
- Beaches

The conditions under which they develop vary considerably depending on such factors as tidal strength, direction and range, as well as the availability of sediment, wave form and shoreline morphology. The two landforms selected should be discussed in the context of the specific conditions behind their formation and exemplar material is expected to support this discussion.

Lower level responses may only consider one landform or might well be imbalanced in their treatment of the two. Such responses are likely to lack substantial exemplification of process and supporting examples. Higher level responses will understand the link between coastal 'conditions' giving rise to specific processes and thus landform development and will be well supported with example material.

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Section B

Tropical Environments

- 7 Examine the role of climate in determining the current distribution of tropical rainforests. [25]**

Indicative content:

Climate is imperative in the distribution of tropical rainforests, in particular by way of supplying high annual temperatures (mean temperature of coldest month being over 18 degrees) and high rates of precipitation (annual rates of more than 1200mm). It is thus principally determined by latitude and the location of the low pressure equatorial trough. It is the relative permanence of the high angle solar radiation that maintains the high temperatures and in so doing gives rise to characteristic convective rainfall, often on a daily basis. It is only in such environments that we find sufficient energy to drive the required growth rates, competition and structural diversity to generate the characteristic biodiversity. Thus we find tropical rainforests in a relatively narrow belt along the equator, incorporating the 3 main blocks: American block (Amazon/Orinoco basins, Pacific coasts of Ecuador and Colombia extending northwards to southern Mexico), Eastern tropics (Malay and Indonesian archipelagos, NE Australia, West Pacific islands, SE Asia/Indochina), Africa (Congo Basin, Madagascar). The impact of climate is particularly well exemplified in those equatorial areas conspicuously lacking in tropical rainforest – equatorial east Africa and Andean South America – where the altitudinal climatic regime provides a clear limiting factor.

Lower level responses are likely to lack a convincing geographic knowledge of rainforest location and will struggle to link the location with clear understanding of underlying climatic parameters. Higher level answers will understand the need for energy in the form of both temperature and moisture and examine the importance of both in the distribution of distinct equatorial regions. Such responses will be well supported with evidence and examples.

- 8 Outline the nature of soils found in tropical rainforests and how they relate to the nutrient cycling found in such environments. [25]**

Indicative content:

Whilst it is difficult to generalise about tropical soils (and a discussion of heterogeneity could take place), the most common soil type for discussion should be the laterites (oxisols). Tropical soils, like all soils, are inextricably linked to nutrient cycling processes. Soil formation in the rainforest environments is characterised by very rapid rates of deep weathering due to high levels of heat and humidity. They also tend to be very old (often more than 100my) and with little recent volcanic activity to add new nutrients. As a consequence, these soils are left with concentrations of the more insoluble aluminium and iron minerals giving such soils their reddish/yellow appearance. This is coupled with extremely high rates of leaching associated with such heavy rainfall regimes. Thus soil in the tropical rainforests is very nutrient poor and lacking depth. The topsoil is only 2 to 5 centimetres deep, in part due to the extremely high rates of nutrient uptake. Most of the carbon and other nutrients are locked up in the living biomass and dead/decaying matter. As organic material decays, it is recycled so quickly that few nutrients ever have the opportunity to reach any great depth within the soil, leaving it relatively azonal and lacking fertility. Decaying matter is processed so efficiently because of the abundance of decomposers. As vegetation dies, the nutrients are rapidly broken down and almost immediately returned to the system as they are taken up by the plants.

Lower level responses are unlikely to offer a convincing understanding of tropical soil structure and, in particular, to be able to link this to nutrient cycling. Higher level responses may well be characterised by an appreciation of the links between specific nutrient cycling processes and the formation of unique soils.

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Temperate Grassland and Forest Environments

- 9 Discuss the relative importance of the factors influencing the distribution of temperate grassland environments. [25]**

Indicative content:

Major areas of temperate grassland would include the prairies of the north American central lowlands and the high plains of the US and Canada. The prairie of eastern Washington state and the Californian grasslands are also temperate grasslands. The Eurasian steppes from Ukraine eastward through Russia and Mongolia as well as the South American pampas of Argentina and Uruguay should also be included. The African veld in South Africa is considered the main grassland of the African continent. There are many factors determining the location of these environments but fundamental would be the climatic regime, typically consisting of hot summers, cold winters and moderate rainfall. This gives rise to soils that are deep and dark with particularly fertile upper horizons. Candidates might well discuss the importance of seasonal drought and occasional fires in preventing the invasion of woody shrubs and trees. Grazing and human interference are also very important factors in the control of temperate grassland locations.

Lower level responses are unlikely to have a sound geographic understanding of the distribution of these environments. Such answers will lack examples and place specific information. Similarly, they are unlikely to appreciate the range of determining features and may concentrate on just one. Higher level responses will have a much greater appreciation of the global distribution, will be able to support their understanding with accurate examples and will appreciate the range of characteristics that help to define and determine the location of such environments.

- 10 Assess the extent to which agriculture has been the main economic motivation for the clearance of temperate deciduous woodland. [25]**

Indicative content:

Whilst agriculture has traditionally been an important force behind the clearance of temperate deciduous woodland, it must be viewed alongside many other important factors. Certainly in Europe, much of the clearance of deciduous woodland that took place over the last millennia was motivated by agrarian principles and this was intensified still further after the agricultural revolution and then, most recently, with the dawn of agribusiness. However it is also true that clearance has taken place for other reasons. Much of the early clearance of woodland was associated with clearance for firewood and indeed in the 18th and early 19th century was the primary source of fuel. The introduction of foreign species has also been extremely important, for example, the introduction of rhododendrons has proved a particularly potent force in preventing the growth of new deciduous saplings. Similarly, the last century saw the replacement of ancient and other woodland with conifers and other non-native trees. In this time also, we see the destruction of woodland to make way for urban expansion and settlements (an act that continues today amidst fierce resistance). Other factors might include recreational and industrial pressure.

Lower level responses are likely to concentrate on the role of agriculture in the clearance of deciduous woodland. Such responses are unlikely to identify other economic pressures and will lack much example material. Higher level responses will offer an evaluation of the question and whilst examining the importance of agriculture as a primary cause will likely acknowledge other economic motivations in a well supported discussion

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The Atmospheric Environment

11 To what extent are mid-latitude storms the main hazard associated with the polar front? [25]

Indicative content:

Mid-latitude storms are an important and serious hazard associated with the polar front region. Both historically and today, Europe has been at the mercy of 'tempests' and storms that have caused devastating flooding on land and proven a severe coastal hazard. It might be argued that flooding is in fact more of a threat to Europe today than any other hazard and certainly poses the greatest insurance loss. Candidates may well discuss the snow storm and blizzard hazards more commonly associated with North America and these are certainly worthy of considerable discussion. However there are other hazards associated with the polar front that must not be ignored. In particular, anticyclonic conditions have given rise to both winter and summer hazards. In summer, the frequency of drought and heat waves is apparently increasing and a recognisable threat. Similarly, anticyclonic conditions in winter can give rise to hazardous frosts and fogs.

Lower level responses are likely to concentrate on the hazard associated with flooding and are unlikely to recognise the severity of other hazards associated with high pressure. Supporting examples are unlikely to be detailed. Higher level responses are likely to offer more of an evaluation of the relative significance of both anticyclonic and low pressure systems as hazards on the polar front and examples will be used in support of such a discussion.

12 Examine the causes of El Niño and its impacts on people around the Pacific and beyond. [25]

Indicative content:

El Niño involves important temperature changes in the surface waters of the eastern Pacific of more than 0.5 degrees. It is associated with a relaxation in the trade winds which decreases the thermal differences and efficiency of upwelling. In effect, surface water circulation reverses. El Niño's warm current of nutrient-poor tropical water, heated by its eastward passage in the Equatorial Current, replaces the cold, nutrient-rich surface water of the Humboldt Current. In the atmosphere, this causes the trade winds and the Walker Circulation to weaken further. Instead of warm, moist air rising over Australia, El Niño brings dry, sinking air in its place. Changes in water temperature and associated air pressure cause floods, droughts, fires and other hazards around the world. Consequences include warm and very wet summers along the coasts of northern Peru and Ecuador and this can cause major flooding. Drought, famine and fire in Australasia are common. Consequences on other parts of the world are numerous and far reaching but might include:

- Drier and hotter weather in parts of the Amazon River Basin, Colombia and Central America.
- In North America winters are characteristically warmer than normal in the upper Midwest states, the northeast, and Canada, whilst California, northwest Mexico and the south western US, are wetter and cooler than normal.
- East Africa experiences wetter than normal conditions.
- South-central Africa experiences drier than normal conditions.

Lower level responses are likely to be insecure in their knowledge of causal processes. In particular, it is likely that such answers will lack detailed assessment of the atmospheric-oceanic interrelationship and the resultant pressure differences. Consequences are likely to be understood but very possibly restricted to the Pacific, with little exemplification or extension to elsewhere in the world.