

MARK SCHEME for the May/June 2015 series

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 should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2015 series for most Cambridge IGCSE[®], Cambridge International A and AS Level components and some Cambridge O Level components.

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Guidance notes for marking 9768/02

This Mark Scheme contains, on the following page, the **Generic Mark Scheme** (GMS), used for assessing all pieces of extended writing bearing 25 marks in the Cambridge Pre-U Geography, followed by **Indicative Content** for each question.

Whilst the GMS captures the essential generic qualities of responses in 5 mark bands (Levels), the Indicative Content is what it says: some indication of the probable content, 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. Responses may be placed in any GMS Level without fulfilling all the descriptors for that mark band, e.g. where the essay does not lend itself to the use of sketch maps or diagrams. Responses may exhibit characteristics of more than one Level and so examiners use the principle of best fit in determining response quality.

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.

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The Generic Mark Scheme (GMS)

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 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 or 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

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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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Arid and Semi-Arid Environments

- 1 Evaluate the relative importance of the climatic determinants to the location of arid and semi-arid environments.

Indicative Content

Climatic Determinants: Pressure and wind systems: Hadley cell; sub-tropical High Pressure Belt, movement of the ITCZ, on shore/offshore winds ideally mention specific winds like NE Trades, SW on shore winds.

Ocean Currents: Humboldt Current influencing the Atacama, Benguela current Namib deserts are the obvious choices. Drought periodicity; especially useful in relation to the Sahel i.e. a semi-arid area.

Specific examples are needed to illustrate, some **diagrams** would assist the explanations. Evaluative content will need **other factors: continentality** which of course is closely associated with climate anyway, **orographic** effects. Also there is the possibility of mentioning **human activities** which might exacerbate the desert like qualities of arid and especially semi-arid areas.

Higher level answers will be characterised by a detailed well illustrated knowledge of the climatic determinants and will include knowledge of other factors. The best will be comprehensive and see the role of human activities as an exacerbating factor. There will be accomplished illustrations of either the location of deserts in relation to factors such as ocean currents and/or circulation diagrams.

Lower level answers may know about the climatic determinants but will be less knowledgeable about the other factors. The application of factors to particular examples will not be especially secure and diagrams not well integrated nor accurately labelled.

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- 2 'Human activities may have consequences for soils and people in arid environments. Examine the validity of this statement.

Indicative content

Human activities may include: overgrazing, over cultivation, vegetation clearance, resource exploitation, water usage, secondary industry tourism etc. The syllabus offers a wide range not all of which need to be included but a variety embedded in examples would be ideal.

What is important is the **effect** of these activities on two specific aspects of these environments: soils erosion and degradation and people, i.e. migration, traditional response and preparation and famine and drought.

Some assessment is essential so there needs to be discussion of nature and scale of the activities in relation to their impacts and effects. Some of course will have more of an impact than others and location may influence the scale and nature of the outcomes.

Higher level answers may be narrow and much focussed on one or two examples or wide ranging with a finely balanced conclusion. Both approaches will be embedded within clearly located geographically sound case studies.

Lower level answers may tend to describe the activities and locate some examples but the effects of all three aspects of human and physical environment will not be clearly explained and assessed. Expect knowledge but less application and focus on the question as it is phrased. Often assessment and conclusions are limited and /or superficial.

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Glacial and Periglacial Environments

3 Examine the extent to which frost weathering and mass movement are important in producing a range of landforms in periglacial areas.

Indicative content: Frost weathering and mass movement are two but only two of the processes operating in the tundra. Good candidates will make this clear at the outset suggesting other processes needed to fully explain the variety and possible micro-nature of these features. There should be an awareness of the seasonality of climate which allows for partial melting and mobility of the active layer. A range of landforms is covered by the syllabus and can be included provided they are interwoven into the argument. So ground ice and permafrost may be part of the argument but separate from frost weathering which will be seen as freeze thaw action. The best may apply the term frost weathering to any form of ground ice and permafrost as the basis for these landforms. As long as there is a logical clearly developed argument, any approach suitably exemplified and justified is acceptable.

Landforms which may be included are: block fields, tors, nivation hollows, gelifluction lobes head and coombe deposits, and asymmetrical valleys but expect candidates to cover the landform associated with ground ice formation to produce comprehensive answers. E.g. involutions, patterned ground etc.

Higher level answers demonstrate awareness of the nature and scale of a variety of landforms/landscapes and apply frost weathering and mass movement clearly to their formation or not according to the approach taken. Well-labelled diagrams are a pre-requisite and these candidates may be aware that as the climate appears to change, i.e. global warming the landscapes may be subject to change and modification and threat in the future. Such conclusions which can include extrapolation based on the evidence characterise the best answers.

Lower level answers tend to focus on frost weathering which may not go beyond freeze- thaw and mass movement confined to solifluction and terracettes. They may also get stuck on tor formation as evidence of frost shattering. They are less sure of how to argue the case for ground ice and permafrost and the role of the active layer to produce a coherent logically argued approach. There will be knowledge but less secure development of argument application and evaluation.

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4 Discuss the possible impacts of human-induced climate change on glacial and periglacial environments.

Indicative content:

This question focuses on the role of human induced climate change on the physical and human aspects of periglacial landscapes. There is much concern about the **melting of tundra ice** in places like Siberia and the negative feedback effect of plumes of methane being ejected which in turn exacerbates the enhanced greenhouse effect. Here candidates are being asked to focus on the **consequences of such melting**, ground subsidence, the loss of ground ice, increased run off leading to flooding the consequences for migrating animals housing and construction projects etc.

Other key impacts include:

- The melting of Arctic ice permitting opening of sea routes.
- Melting and retreat of Greenland glaciers permitting the exploitation of rare metals.
- more meltwaters and potential flooding.

There are a range of different impacts that may be mentioned. Perhaps the answers will focus more on periglacial than glacial.

The larger scale consequences may go beyond these periglacial and glacial areas a point which might be part of a conclusion which considers extrapolation of these trends. , there are a range of consequences and much will depend here upon what has been taught and learnt therefore a flexible approach to assessment will be required.

Higher level answers will understand not only the causes in terms of physical processes but also the consequences for the physical and human environments.in both the periglacial and glacial areas although the latter may be better covered but that is acceptable. The response may be balanced although answers which favour the impacts on the physical environment will be more characteristic of the very best answers. The best answers will have conclusions which go beyond the contemporary to suggest what the future might hold. However the focus of these responses is firmly on atmospheric temperature increase in relation to the periglacial landscape both physical and human.

Lower level answers are less convincing about physical processes and the answer tends to discussion of the human environment and the possible effects on men and animals rather than physical processes and their outcomes in periglacial areas. The glacial coverage may be less assured.

Coastal Environments

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5 To what extent are beaches in profile and plan the result of wave action alone?

Indicative content: The question is inspired by the fact that the syllabus offers a section on beaches and their landforms which are produced due to wave action. What will characterise the best answers is an awareness of a beach both in plan and profile. Often candidates tend to focus on the profile discussing constructive and destructive waves. However the plan aspect offers an opportunity to discuss factors other than wave action as do profiles of course. Other factors include: geology, sub- aerial processes and some may mention tides and currents and sea level change.

Profiles: gently shelving beaches with offshore bars, steeply sloping beaches with berms. Storm beaches may appear.

Plan: swash aligned and drift aligned beaches headlands bays spits bars etc. Beware of the candidate who goes off at a tangent. The focus must be on plan and profile not whole sections of coastline.

Higher level answers are aware of both profile and plan form, covers both, uses well labelled diagrams keeping the focus narrow. There is awareness at the outset that there are factors other than wave action responsible for these plans and profiles and these factors are discussed. Both macro and micro landforms associated with beaches may be mentioned. E.g. cusps, runnels and ripples as well as headland and bays, bay head beaches, spits etc. A fully comprehensive panoply of landforms is not essential to achieve the top level. Focus on plan and profile will distinguish the best answers.

Lower level answers are rather uncertain about plan and profiles and there may be inaccuracies in the relationships made between wave type and the profile outcome. These candidates may focus more on plan because they feel more secure discussing headlands and bays. At the top of these levels there will be evidence of plan and profile at the lower end only one aspect may appear.

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6 'Coastal Ecosystems are an invaluable form of coastal protection'. Discuss the validity of this statement.

Content: Coastal ecosystems included in the syllabus are: Psammoseres, haloseres, mangroves and coral reefs.

All of the ecosystems or a narrow range may be used to illustrate the answers. The subject of the question is coastal protection which means that it offers scope for discussion of coastal protection strategies beyond these natural systems. This awareness needs to be clear and knowledge of the physical characteristics of the coastal ecosystem selected for inclusion is essential for access to the higher levels of the GMS.

Salt marshes which are an integral part of the managed retreat in the UK and part of government policy might be a suitable starting point. The best method of approach might be via 'hold the line' 'advance the line' 'managed retreat' and 'do nothing' approaches (i.e. this might be termed 'coastal re-alignment'). This is a slightly more sophisticated approach than the more traditional one of hard and soft engineering but credit either.

Higher level answers are characterised by an awareness that the question is about coastal protection rather than coastal ecosystems. At least one coastal ecosystem appears with details about its characteristics and how it can offer buffer zones to marine processes. They put the ecosystem firmly in the context of a coastal protection measure and in the case of salt marshes can offer the idea that it is part of an orchestrated managed strategy in some areas. The best will include carefully located examples of coastal protection strategies.

Lower level answers see coastal ecosystems as the subject and get carried away with presentation of what they know about, either in detail or a range of them. There may be fleeting reference to other coastal protection strategies but these answers are not well balanced nor focused accurately.

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Section B

Answer one question

Tropical Environments

- 7 **Biological diversity is considered a defining characteristic of tropical rain forest ecosystems. Evaluate the usefulness of the theories used to explain this diversity.** Biodiversity requires a definition: range of variation within the living world/ number variety and variability within the living world. (UNEP)

The syllabus contains a section on the biotic environment and includes a range of theories: **methods of coexistence; refugia theory; neutral theory and competition.**

This is a narrowly targeted question and demands detailed knowledge of the theories. At least two of them should be considered in detail whilst some answers may know about all of them. What matters is they are described and illustrated where possible in detail and that their **application** to biodiversity is made clear. Without the latter only the lower levels of achievement will be possible.

Higher level answers will not only know at least two of the theories in detail but be able to apply them to the concept of biodiversity and be able to illustrate them with reference to tropical rain forests. These answers will have at least one illustration of the theory and it will be clearly explained to demonstrate understanding as well as knowledge.

Lower level answers may focus on competition for space and light levels as the default position for this answer. The other theories may escape these candidates or the explanations of them and the application less successful. It is likely that these answers may focus on tall trees growing up towards the light and other vegetation growing in spaces as they compete for light within a dense forest without even explaining why the light is needed for successful functioning in the ecosystem.

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- 8 'Concern continues about unsustainable rates of deforestation in tropical environments'. Evaluate the strategies that have been implemented to manage these concerns.

Indicative Content: Concern: because countries like Malaysia and parts of Indonesia still allow large scale destruction of the forest in their pursuit of increasing GDP from exploitation of plantation crops and the utilisation of the income from the profits made by transnational companies. Palm oil plantations, cattle ranching, mineral exploitation, rubber resources and construction represent the activities which occur within these threatened tropical rain forest environments. The concerns arise from the consequences both physical and human, such as potential climate change via an increasing temperature because the 'carbon sinks' are being destroyed. The feedback effects in terms of changing albedos which result. The links are important and recognition of them will distinguish the higher level responses. Exploitation of the less developed countries may also be a cause for concern. There are a range of issues that may be raised but the concerns need to be set in a factual context and not just discussed in generic terms because then there is a tendency for answers to become vague.

The strategies which will be selected will include those suggested in the syllabus such as: selective logging; ecotourism, medicinal extraction, collection of produce. Not all are needed but the case for their sustainability is secure and unequivocal.

Of course the scale of concern could be addressed i.e. local national and global concerns and management.

Higher level answers know exactly why the concerns exist, the links between them and which strategies can be used to manage the threatened environment sustainably. Geographically precise and secure examples will characterise these answers. They will be underpinned by detailed factual knowledge and a good understanding of the concepts and spirit of the question.

Lower level answers may have some awareness of the simple implication of global warming. They know that large scale farming and TNCs cause irresponsible exploitation of the TRF but tend to discuss the issues in 'doomsday terms'. The subtleties of the argument are missing and the links between increased temperature feedbacks and detail about locations are missing. These candidates tend to write rather vague answers which are not convincingly applied to the question of concern.

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Temperate Grasslands and Forest Environments

- 9 'The structure and functioning of temperate ecosystems are inextricably linked'. With reference to either temperate deciduous forests or temperate grasslands, discuss the validity of this statement.

Indicative content: Temperate deciduous woodland: layers of trees, tree layer and canopy, shrub layer and ground layer. Characteristics, scale, species, adaptations of both flora and fauna.

Grassland: fewer layers, grass species heights characteristics. Flora and fauna should be included.

Functioning: focus on nutrient cycling could be the most appropriate approach. Also food chains and webs.

The inextricable links are related to the fact that the functioning determines the structure. Processes like photosynthesis, decomposition, uptake, fallout, seasonal changes in climate etc. can all be the focus for discussion to demonstrate a knowledge and understanding of the physical processes which underpin the development and operation and existence of either of these ecosystems. Although the focus of the question lies with structure and functioning it is something of a 'catch-all' question for candidates.

Higher level answers will be characterised by a knowledge and understanding of the physical processes which operate within either of these ecosystems to produce their characteristic structures. The best answers will have some reference to fauna as well as flora.

Lower level answers will tend to describe the ecosystem and nutrient cycling and food chains possibly. However what will be lacking is an appreciation of the inextricable links and how physical processes underpin the characteristic ecosystems of temperate grasslands or deciduous woodlands. The weaker candidates may include both as a failsafe measure.

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10 Evaluate the extent to which it is possible to manage either coniferous forests or temperate grasslands sustainably?

This is an open ended question giving candidates an opportunity to write about what has been taught and what they have learnt. Ideally the discussion will focus on strategies implemented at different scales such as:

Agenda 21 (globally and regionally initiated); international organisations; NGOs; government level either nationally or regionally (EU) and locally in the UK. There are a range of initiatives covered in the syllabus some of which will form the focus of the answer. Specific examples may provide the framework for these answers.

The concept of sustainability will be explained and integrated into the best discussions. Without it one aspect of the question will not be addressed.

Higher level answers will use a range of examples at different scales to illustrate their detailed factually secure answers. Often these candidates take specific examples to illustrate but without clear links of thought and argument between the paragraphs the highest levels will not be achieved. A definitive conclusion will be reached which may focus on the present but have reservations about the future. Reasons couched in factual knowledge and/or opinion why it may not be possible to achieve success in terms of sustainability may be offered. All in all these answers are convincing both factually and discursively.

Lower level answers may well have factual knowledge of management strategies but the concept of sustainability is not targeted convincingly and these answers are not especially well structured. They do not have a clear line of argument but tend to be a series of described strategies which are not well applied to the question asked.

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The Atmospheric Environment

11 To what extent are ocean energy transfers the main cause determinants of the distribution of global climatic zones?

Indicative Content: This question focuses on the **global energy budget** which involves both the vertical and horizontal transfer of energy. **Ocean currents** are part of the **horizontal transfer** of energy which probably could/should be the opening statement.

The other ones are the tri-cellular model via wind and pressure belts. Knowledge of the latter is crucial and actually a formative part of the answer. The discussion of ocean currents could be the subsidiary discussion without any compromise of the approach here. Good candidates may wish to display their three dimensional knowledge of the operation of the atmospheric system by reference to jet streams and the input of energy from the sun which powers the whole system and produces seasonal changes and variations. Global climatic zones must feature and the ones specified are: equatorial; semi-arid tropical; arid tropical; arid temperate; humid temperate; boreal and arctic. Not all are essential to a good answer but the latitudinal nature of the zones would form useful framework for successful answers.

However ocean currents are instrumental in influencing the location of some climates and their characteristics. Obvious examples would be cold currents and associated deserts e.g. Atacama and the cold Humboldt Current, the Namib and the cold Benguela current and the role of the Gulf Stream/ North Atlantic drift and the UK climate. The north Atlantic conveyor could be compromised by global warming which may be a factor under consideration by the best candidates.

Conclusions may suggest that in fact it is the general circulation of heat via pressure variation and the resultant winds that are the greater determinants but any conclusion well-argued and justified is acceptable.

Higher level answers know about the general circulation, the processes responsible and how these dynamics produce broad latitudinal climatic zones. There is an explicit understanding of atmospheric processes like adiabatic heating and cooling pressure and wind belts but these candidates are well aware and can quote examples of the influence of ocean currents and they reach a definitive conclusion based on and justified by their argument throughout.

Lower Level answers contain less secure knowledge and understanding of the general circulation in relation to its relative importance. The tri-cellular model is described and there is awareness of some ocean currents but these candidates are less sure of how the whole picture fits together to produce the latitudinal zones of climate. Few zones may even be identified.

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12 Evaluate short and long-term management strategies in areas affected by the monsoon climate.

Indicative content: Monsoon climates are characterised by a seasonal distribution of rainfall the onset of which can be dated and the season usually from mid-June has a large volume of intense rainfall for three/four months June to September. Good candidates will be able to quote some rainfall statistics. The intensity of rains can lead to flooding. Therefore can be seen as a hazard which has intensified over the last 5 to 10 years for two reasons: 1. the onset of the monsoon is unreliable it may be delayed or come early. Whichever happens it is unexpected and unpredicted and possibly unpredictable. 2. It has brought especially intense rainfall and more of it. Hence the hazard either in terms of flooding or drought.

In order to manage the hazard either immediate short term aid in the form of practical help whether within country or internationally can be available. Appeals for food, clothing, water shelter and money. Longer term is more difficult. It is costly, may involve major infrastructure projects like coastal protection levees or dams on rivers, new flood adapted housing; irrigation schemes, or improved methods of prediction involving highly capitalised technology and or knowledge about weather patterns. The latter is still an infant science and as yet patterns have not been sufficiently established to prove a basis for prediction.

Case studies of India/Bangladesh would provide much needed evidence underpinning discussion.

Higher level answers use examples from appropriate locations; address the issue of the causes which create the need for the short and long term strategies both of which are addressed. In conclusion many candidates will suggest that short term measures are always needed as the countries affected are economically poor and need aid but the long term highly capitalise measures are the only way to mitigate the effects of the hazard. There is little that can be done directly perhaps to mitigate the hazard itself, a point addressed by the very best candidates.

Lower level answers tend to describe the distinction between short and long term is not clearly made although both aspects may be included. The links to the nature of the weather will be insecure i.e. the physical Geography content insufficient for a higher level mark. Conclusion will be absent or weak and poorly expressed and short.