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This document consists of **17** printed pages.

Question	Answer	Marks
Hot Arid and Semi-Arid Environments		
1	Photograph A shows an area in a hot arid environment.	
1(a)(i)	<p>Outline the physical features of the hot arid landscape shown in Photograph A.</p> <p>The landscape is: flat, stony, with some sand, dry, known as 'reg' In the distance are mountains which are known as 'hamada'</p> <p>A mark for each correct statement.</p>	4
1(a)(ii)	<p>Explain <u>two</u> ways in which the traditional lifestyle of the population is adapted to a hot arid environment.</p> <p>Adaptations:</p> <p>Animals: Camels for transport as the people do not have transport. They store water so can travel long distances without access to water.</p> <p>Clothing: long cotton coverings and a headdress that protects against the sun and the blown sand during sandstorms. Cotton is absorbent so more comfortable in high temperatures.</p> <p>Both people and animals need to be mentioned for full marks.</p>	6

Question	Answer	Marks
1(b)(i)	<p>Discuss the relative merits of strategies which have been implemented to combat desertification.</p> <p>Indicative content Candidates will be expected to define ‘desertification’ – is the process of ‘land degradation in which a relatively arid region becomes progressively dry.’</p> <p>Strategies: There are a range of possibilities: according to the syllabus they may cover a range of issues associated with: settlement transport and infrastructure economic development water supply mineral extraction. Expect case study material which may be focused and detailed. Not all these issues are needed for a higher level answer. Some reference to sustainability would be appropriate and a spatial context will be very useful demonstrating the candidates appreciation of the subject as spatial.</p> <p>15 marked questions marked using the generic mark scheme for these questions</p> <p>Level 4 (12–15 marks) Response demonstrates accurate, relevant and detailed knowledge and understanding. Shows good appreciation of the relevant context and a thorough analysis and evaluation of the question. Communication is clear, concise and coherent and use of terminology is accurate throughout.</p> <p>Level 3 (8–11 marks) Response demonstrates relevant knowledge and understanding. Shows a clear focus on the context of the question and a reasonable attempt at analysis and evaluation is made. Communication is coherent and balanced and the use of terminology is mostly accurate.</p> <p>Level 2 (4–7 marks) Response shows some knowledge and understanding with reference to the question. There is some development in the response but can be descriptive rather than analytical with little or no evaluation. Focus is often more on human than physical processes. Diagrams if used will have little annotation and may not be well integrated into the text.</p> <p>Level 1 (1–3 marks) Response shows little or no relevant knowledge and understanding of the context of the question. Limited analysis or evaluation of the relevant issue with the response being largely descriptive. Communication is basic and response lacks focus and structure.</p> <p>Level 0 (0 marks) No creditable response</p> <p>Higher level Answers will leave the examiner in no doubt of the meaning of desertification and a range of issues which the process produces. Then it is likely that some selected examples will be recounted. There will be precise reference to location and thorough evaluation in which the diagnosis leads to prognosis in an appropriate and developed conclusion. The latter may indicate the highest level answers.</p>	15

Question	Answer	Marks
1(b)(i)	<p>Lower level answers may contain some detail but there may be a vague reference to the processes of desertification which give rise to the need for the strategies and the evaluation and conclusions will be weakly developed and/or missing. The account will be narrative rather than evaluative.</p>	
1(b)(ii)	<p>‘Hot arid and semi-arid landscapes are not solely the result of processes operating in the present day’.</p> <p>Discuss the validity of this statement.</p> <p>Indicative content Water although infrequent and spasmodic in the present day landscape is responsible for the larger scale landforms such as wadis, i.e. dry canyons found in the Hamada. They cannot be accounted for by the hot arid rainfall deficient present day climate. Therefore it is hypothesized that they developed during the Pleistocene during pluvials. It is also likely that large quantities of sand were transported at this time to produce sand seas and the sand dune systems currently observed. A range of landforms should be used to illustrate the argument. Candidates may argue that the present processes merely modify these landforms which would be a sensible approach.</p> <p>Higher level answers will contain an assemblage of landforms diagrams integrated into the text will help to illustrate the argument and the argument will be concluded either by sitting on the fence and not following one line or the argument will be conclusive because the evidence produced is strong and convincing by reference to aspects like the dimension of the landforms and water rather than wind erosion for instance.</p> <p>Lower level answers will be treading less certain ground there will be reference to particular landforms notably wadis and sand dunes but the argument much less obvious and the conclusion less evidence based. Often these answers are descriptive rather than discursive and evaluative.</p>	15

Question	Answer	Marks
Glacial and Periglacial Environments		
2	Fig. 1 shows the temperatures for the last 17 000 years in Central Greenland.	
2(a)(i)	<p>Describe the trends in temperature shown in Fig. 1.</p> <p>The trend is upwards from a low of -44°C to a high of -32°C. Within the upward trend are major fluctuations, e.g. 14 000 years ago at the end of the Pleistocene, and then a 'big freeze' for 2500 years until 11 500 years ago. From then on there has been a huge and rapid (relatively) rise and then minor fluctuations since 9500 years ago.</p> <p>Give credit for the major trends and fluctuations.</p> <p>Without numerical values max of 3 out 4.</p>	4
2(a)(ii)	<p>Explain how and why the temperature changes shown may have influenced the ice covering in Greenland over the period shown in Fig. 1.</p> <p>The ice covering will advance when temperatures fall because accumulation exceeds ablation. Glaciers will move forward. As the temps rise they may have a period of advancing quickly as they become warm based for a while. Then as the temperatures climb ablation will exceed accumulation and the glaciers will retreat up the valleys. There will be more water. In the case of ice sheets there will be carving and increased incidence of icebergs off the coast.</p> <p>Ideally in the case of Greenland the candidates may be aware of the nature of the ice covering in the form of an ice cap but if only glaciers are mentioned full marks can be awarded for an explanatory detailed answer with some references to processes.</p>	6

Question	Answer	Marks
2(b)(i)	<p>‘Processes of frost weathering and mass movement produce clearly identifiable landforms in a periglacial environment.’</p> <p>Examine the validity of this statement.</p> <p>Indicative content The processes must be explained and illustrated. The landforms need not be exhaustive but in order to address the question diagrams need to demonstrate how they are identifiable via stratigraphy, composition, dimensions, form, etc. The listed landforms are: blockfields, tors scree slopes, gelifluction lobes, head and coombe deposits and asymmetrical valleys. Most of those are ‘clearly identifiable’. Diagrams are essential to a convincing answer.</p> <p>See generic mark scheme on page 3</p> <p>Higher level answers may select some of these landforms which will be well illustrated and labeled and part of the text and reference will be made to them. There will be evaluation which may or may not be at the end or within the answer. There will be convincing links made between process and form.</p> <p>Lower level answers will have a more limited assemblage of landforms and not demonstrate their ‘clearly identifiable’ nature. There may be diagrams but the answer will be descriptive with a weaker vaguer approach to evaluation. Diagrams may be tacked on to the end which is usually the mark of a lower level answers if they appear at all. Some weak candidates may select landforms from other parts of the syllabus which will not support the link between process and form.</p>	15

Question	Answer	Marks
2(b)(ii)	<p>‘The opportunities for human activity in either a glacial or a periglacial environment outweigh the constraints.’</p> <p>To what extent do you agree with this statement?</p> <p>Indicative content Opportunities: Will concern economic considerations: the list is comprehensive in the syllabus covering tourism water supply, energy, agriculture, primary industry settlement and infrastructure so there is a wealth of potential material from which to draw. Climate change may well play a role. Constraints need to be offered as part of a balanced argument. It will depend on the choice of environment which conclusion is reached. The conclusion reached will also depend on the argument made. There is not right or wrong line to take all that is needed is supporting evidence.</p> <p>See generic mark scheme on page 3</p> <p>Higher level answers will focus on opportunities and the counterbalance their argument with constraints evaluatively in order to reach a convincing well expressed conclusion. The best answer may offer a prognostication based on possible future climate change.</p> <p>Lower level answers may describe both opportunities and constraints, these answers will often be more detailed about one aspect and more descriptive overall rather than relating to the question. A convincing conclusion will not be reached because of lack of evidence. Examples used may be short on detail of location, case studies may not feature very much.</p>	15

Question	Answer	Marks
Coastal Environments		
3	Photograph 2 shows a cartoon illustrating the threats to a coral reef.	
3(a)(i)	<p>Outline <u>four</u> threats shown in Fig. 2.</p> <p>Threats:</p> <p>Fishing, oil spills, pollution from pesticides and fertilisers used in agriculture. Sediment and soil from ploughing which clouds the water reducing light levels, swimming, temperature increase and acidification of the water, and tropical storms and increased wave activity</p>	4
3(a)(ii)	<p>Explain the ways in which <u>two</u> of the threats you have described in (a) (i) may affect the conditions necessary for the growth and survival of coral reefs.</p> <p>Pollution from a number of sources killing the coral which is a living animal Turbidity and light loss so photosynthesis cannot occur, Pollution and damage from swimming, Fishing reduction in biodiversity of the reef and damage breaking off of coral, storms cause physical damage and increase turbidity and decrease light levels. Climate change may result in rising sea levels, and more acidification which kill the polyps.</p> <p>There is scope for any two with an explanation related to the growth and survival. Both aspects must appear for full marks. Two threats should be covered.</p>	6

Question	Answer	Marks
3(b)(i)	<p>Examine the extent to which cliff form is the result of its geology.</p> <p>Indicative content Cliff form should be explained. i.e. the height angle of slope and whether it is a simple or compound form of slope and where they are relative to the sea. i.e. the sea reaches the cliff foot or whether they are relict cliffs subject only to weathering. i.e cliff face processes. However they are the result of a number of factors of which geology is only one. The sea is crucial as are weathering processes. Some diagrams are essential to indicate from and past as well as present processes may feature. i.e. slope over wall cliffs.</p> <p>See generic mark scheme on page 3</p> <p>Higher level answers will be able to structure an answer around the factors which affect form. Geology will begin the answer with reference to the composition, height and structure i.e. bedding massive rocks etc. named rocks will be included and diagrams will be an integral part of the answer. These are clear accurate and well labelled. Having assembled and discussed a range of factors a conclusion based on the evidence will draw the argument to a close.</p> <p>Lower level answers are less sure of all aspects of geology and what is meant by cliff form. They will be less aware of all the other factors only some may be discussed diagrams poorly labelled may be tacked on at the end or add little to the answer. The argument will be flaky but there may be some content it is just not well structured.</p>	15
3(b)(ii)	<p>Examine the relative merits of managed realignment in the protection of coastal environments.</p> <p>Indicative content A term specified in the syllabus is non interventionist in contrast to hard and soft engineering and preferred government policy. This is because erosion rates are increasing and the finance is not available to implement the latter strategies. Reference to case studies will be the ideal approach here as detail and maps can be used to illustrate the policy. Although there is no reference to alternative policies do not penalize candidates who consider these others in their conclusion and/or evaluative comments although the answer should focus on 'managed realignment'</p> <p>See generic mark scheme on page 3</p> <p>Higher level answers will know in detail about the policy may be able to put it into the discussion of coastal protection which will attract credit. Maps and diagrams will facilitate the good answers and these will be evaluative seeing both pros and cons in terms of not only protecting the physical coastline but also those who, live and work in this environment.</p> <p>Lower level answers will have a much flimsier approach both to content and understanding of the strategy and its context. Some may even misinterpret the policy unconvincingly. Diagrams maps and examples will be in short supply and evaluation and conclusion not based on a great deal of evidence.</p>	15

Question	Answer	Marks
Tropical Environments		
4	Fig. 3 shows the nutrient cycle in a tropical rainforest ecosystem. Photograph B shows a profile of a tropical soil.	
4(a)(i)	<p>Using Fig. 3, describe the characteristics of the nutrient cycle in the tropical rainforest ecosystem.</p> <p>The flows between the three main stores of biomass and soil and are large as is the input of rainfall. The fallout from biomass to litter is small but constant and runoff is moderate. Biomass is the largest store that is where all the nutrients are held with soil and litter in decreasing amounts. The flows represent rapid transfer of nutrients between the three main stores.</p>	4
4(a)(ii)	<p>Explain the formation of the tropical soil shown in Photograph B.</p> <p>The rapid transfer of nutrients from the soil to the biomass because of continuous growth as well as the rapid leaching of these soils due to the high rainfall result in a nutrient deficient soil. The litter is narrow because there are plenty of soil organisms to decompose the fallout into humus which is then rapidly incorporated. There is an ash grey layer as the result of leaching of iron and aluminium, sesquioxides, a process known as eluviation, because precipitation exceeds evaporation all the year round. Weathering rates are rapidly supplying the soil with nutrients but they are dispersed rapidly. The soils are deep also because weathering rates are rapid.</p> <p>Some of these points with good use of terminology will provide the marks. The two diagrams must be related however for full marks.</p>	6

Question	Answer	Marks
4(b)(i)	<p>Discuss the extent to which conservation of tropical rain forest environments are essential both at a local and at a global scale.</p> <p>Conservation: essential because of the rapid rates of deforestation taking place across the globe.</p> <p>Locally: schemes like responsible tourism and ecotourism, carefully managed, selective logging, and small scale farming can adapt to the forest. Co-operation at a local level with forest communities education etc. can aid the philosophy.</p> <p>Global: co-operation between gatekeepers, governments, NGO's and interested parties like lobby groups can ensure conservation of the forest and all its myriad resources. Conferences between nations can issue policy statements and awareness raised through social media.</p> <p>There should coverage of both scales and some precise naming of policies strategies and examples to reinforce what might otherwise be bland answers.</p> <p>See generic mark scheme on page 3</p> <p>Higher level answers will include some case study material exemplifying the principal points. For instance ecotourism scheme and how they are constituted and what they involve. Knowledge of global actions will be evident and the answer underpinned by named specifics. Evaluation and a conclusion will be evident.</p> <p>Lower level answers will tend to the general. There will be outlines of schemes some knowledge of both scales but one may be at the expense of the other rather than a balanced account. For instance, there may be little knowledge about conservation groups or world conferences and statements which result from consultation. There will be little view about the relative merits of one or the other and a sketchy short conclusion.</p>	

Question	Answer	Marks
4(b)(ii)	<p>'Responsible tourism is not the only way in which tropical rain forest environments may be managed sustainably'.</p> <p>Examine the validity of this statement.</p> <p>Indicative content Responsible tourism is included under the side heading of sustainability so this concept should be inbuilt into the answer. The term should be defined and will involve more than purely ecotourism in the best answers. The responsibility should lie both within the host nations schemes and in invested in the tourists themselves. Its relation to the sustainability of the tropical rain forest should be apparent.</p> <p>See generic mark scheme on page 3</p> <p>Higher level answers will define the terms clearly and follow a route through to sustainability. Examples will be quoted and some of the arguments about pros and cons rehearsed and identified. Scales will be used to illustrate which may be either individual or local. Then there will be other strategies such the responses adopted by local people and the cultures existing in the forest in order to evaluate the argument. Good candidates might suggest that a combination of strategies is the way forward and in the conclusion prognosticate about the future of tropical environments.</p> <p>Lower level answers know the basics but cannot quote and develop examples. They may not evaluate adequately as they are notable to include alternative strategies such as managed use of the land by farmers introduction of new methods because of tradition for instance. Often these candidates write only in terms of the terms used in the question.</p>	15

Question	Answer	Marks
Temperate Environments		
5	Figs. 4A and 4B show two zonal soils found in temperate environments.	
5(a)(i)	<p>Identify the zonal soils shown in Fig. 4A and Fig.4B and briefly outline its principal characteristics.</p> <p>Fig 4A is a brown earth. The brown earth is principally brown with a slightly bleached lower A horizon. And a slightly darker B horizon. It is up to 2 metres deep and has a wide horizon of well incorporated mull hums in its upper layer.</p>	4
5(a)(ii)	<p>Explain how processes operating on the soil shown in Fig. 4B produce its characteristic features.</p> <p>The podzol has clearly defined horizons by depth and colour, a distinct deepish acid mor humus a bleached layer where iron has been eluviated. Which appears as an indurated pan lower down in the soil below which is a deeper horizon of iron rich soil. Precipitation exceeds evaporation seasonally so minerals are leached vertically and re-deposited lower down especially iron and aluminium sesquioxides. The characteristic coniferous forest produce needles which are not readily decomposed and lead to a buildup of acid humus on the surface which also helps to facilitate the leaching process.</p> <p>Lack of decomposition and leaching are the key explanatory points here</p>	6

Question	Answer	Marks
5(b)(i)	<p>‘Temperate woodlands are a valuable and irreplaceable resource and a priority for conservation’. – JNCC (Joint Nature Conservation Committee, 2013).</p> <p>Discuss the extent to which conservation initiatives are addressing the opinions of the JNCC.</p> <p>Indicative content There are two aspects to this question which require elucidation. The fact that the forests are irreplaceable and a valuable resource, there should be reasons why. The conservation aspect is also important. Comments about why the process is a priority should be addressed. The question really spans both human activity in and management of temperate woodlands.</p> <p>See generic mark scheme on page 3</p> <p>Higher level answers will explain how and why natural woodland has disappeared over time which may include both human and physical factors and the ways in which the woodlands are utilized as a resource. Management will be addressed in the form of government initiatives, lobby group activity, farming initiatives for instance in response to the advice offered by the JNCC. The idea of sustainability will be built into the answer.</p> <p>Lower level answers will ignore the issue of sustainability and will write an account of temperate woodlands over time without highlighting the terms of the question in any detail. Whilst there may be awareness of the woodlands as a resource not a great deal is included in any detail and some of the information may not be directed to the question. There will be little evaluation of the statement in terms of the advice to the government and how it is implemented.</p>	15

Question	Answer	Marks
5(b)(ii)	<p>To what extent are the effects of ecological change on the structure and functioning of temperate grasslands the result of natural factors?</p> <p>Indicative content</p> <p>Ecological change may be the result of both natural and human factors. The factors should be identified . Natural may be disease, natural disasters, invasive species, and human may be climate change, deforestation fire acid rainfall. There may be others which are equally relevant.</p> <p>The functioning i.e. nutrient recycling and structure the layers found in temperate forest or grasslands should be covered. An argument should be constructed evaluation and a conclusion reached.</p> <p>See generic mark scheme on page 3</p> <p>Higher level answers will cover all the main aspects of the question with specific knowledge of examples to illustrate the points made. Locations, schemes and even scales may be included. What is clear is that these candidates understand both ecological change and how the ecosystems are structured and function. Good conclusions may offer prognostications.</p> <p>Lower level answers are less secure in terms of an understanding of processes. Ecological change may be vaguely defined and either structure or functioning is given perfunctory treatment. There is less detail about the ecosystem generally to produce an unconvincing evaluation and weak conclusion.</p>	15

Question	Answer	Marks
6	Figs. 5A and Fig. 5B show the pattern of air and oceanic circulation in the southern Pacific Ocean.	
6(a)(i)	<p>Identify the pattern shown in Figs. 5A and 5B and describe the patterns shown in Fig. 5B.</p> <p>Fig 5A is the southern oscillation i.e. the normal conditions i.e. a neutral year ENSO. Fig. 5B is an El Nino event. During El Nino events the pattern of winds is reversed, the thermocline off the coast of Peru does not rise close to the surface resulting in warmer water offshore. There is high pressure on the east coast of South America and lower pressure over South East Asia and Australia.</p>	4
6(a)(ii)	<p>Explain <u>two</u> ways in which the pattern of air and oceanic circulation may have economic implications for the countries shown in Fig. 5B.</p> <p>Economic: poor fishing off the coast of Peru. Fishermen cannot make a living if at subsistence level there is poverty at the individual level and economic hardship nationally because they do not have a pilchard harvest to market and export. There may be periodic droughts in Western South America. On the coasts of Australia and SE Asia there may be floods due to high rainfall due to the low pressure system which results in lack of land harvests and poverty.</p>	6
6(b)(i)	<p>'Anticyclonic weather may provide opportunities for human activity'.</p> <p>Discuss the validity of this statement.</p> <p>Indicative content</p> <p>Both summer and winter anticyclones need to be addressed. Some outline of the weather associated, and the responses made by the following: agriculture, irrigation, drainage, poly-tunnel and glasshouse cultivation. Spending patterns retail responses, travel and transport leisure and tourism construction industry, etc. the list in the syllabus is long. Targeted areas for consideration are better than lots of wide coverage with no detail, the coverage does not need to be exhaustive for a good mark. However both seasons are essential to the best answers. In addition opportunities are only half the story and the best candidates will consider constraints and reach a conclusion about the relative importance of the two aspects.</p> <p>See generic mark scheme on page 3</p> <p>Higher level answers will offer both seasons describe the associated weather conditions which will be linked to the opportunities and the obverse side of the argument. An evaluative answer with a substantial conclusion offering perhaps a balanced view will characterize these answers.</p> <p>Lower level answers may not see both winter and summer weather but focus on the summer. The meteorological component may be missing or weakly developed with all the discussion about human response. This is a physical Geography paper so knowledge of meteorology needs to be evident. Evaluation of the argument is weak and the conclusion unconvincing.</p>	15

Question	Answer	Marks
6(b)(ii)	<p>Discuss the extent to which the impacts of global warming can be managed.</p> <p>Indicative content Warming of the atmosphere, its principal causes and trends needs to be included at the outset to set the context.</p> <p>Prevention may be possible through reduction of carbon emissions but legislation and changing perceptions are far more difficult to control. Therefore the conclusion may be to manage and adapt to the problems. Most governments and global consultation bodies are advocating both. There should be consideration of strategies implementation to date current trends of thinking and future possibilities.</p> <p>See generic mark scheme on page 3</p> <p>Higher level answers will cover the points raised in the Indicative content with precise knowledge backed up by statistical evidence and detail of strategies. There will be an evaluative argument about the relative merits of prevention over management, economic social and political factors may be usefully considered.</p> <p>Lower level answers will write what is known about global warming may take a doomsday scenario approach to the problem but are unable to support their view with detailed knowledge. Scale may not be a consideration. There is insufficient in the way of a convincing conclusion because the argument is not well supported.</p>	15