Cambridge Assessment International Education

# Cambridge Pre-U

**GEOGRAPHY** **9768/01**

Paper 1 Global Environments **May/June 2022**

MARK SCHEME

Maximum Mark: 50

**Published**

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 International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the May/June 2022 series for most Cambridge IGCSE, Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

This syllabus is regulated for use in England, Wales and Northern Ireland as a Cambridge International Level 3 Pre-U Certificate.

This document consists of **20** printed pages.

## Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

GENERIC MARKING PRINCIPLE 6:

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

## Guidance notes for marking 9768/01

**Levels of response marking** is used for the 6 mark and the 15 mark questions.

This Mark Scheme contains, on the following page, the **Generic Mark Scheme** (GMS) used for assessing all pieces of extended writing bearing 15 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. Responses may exhibit characteristics of more than one Level and so examiners use the principle of best fit in determining response quality.

Cambridge International 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.

**Generic Mark Scheme (GMS)**

| Level | Marks | Assessment Criteria |
|---|---|---|
| **5** | **13–15** | • Detailed and accurate knowledge and clear, high order understanding of the subject content<br>• Relevant and accurate exemplification used effectively<br>• Clear organisation; good English expression; accurate use of geographical terminology<br>• Fully focused on the specific demands of the question<br>• Thorough analysis and a critical approach to evaluation; appropriate application of concepts and theories<br>• Conclusion is logical and well founded on evidence and argument |
| **4** | **10–12** | • Good knowledge and depth of understanding of the subject content<br>• Appropriate and effective exemplification<br>• Logical organisation; sound English expression; appropriate use of geographical terminology<br>• Well focused on the demands of the question<br>• Good analysis and evaluation; generally appropriate application of concepts and theories<br>• Conclusion is sound and based on evidence and argument |
| **3** | **7–9** | • Sound knowledge and understanding of the subject content lacking depth in some areas<br>• Appropriate but partial exemplification, may not be integrated with the argument<br>• Generally clear communication but lacking some organisation; English expression and use of geographical terminology are mostly accurate<br>• Specific demands of the question mostly met<br>• Some ability to analyse and evaluate; limited application of concepts and theories<br>• Conclusion is limited and has some links to the rest of the response |
| **2** | **4–6** | • Some knowledge and understanding of the subject content lacking depth and detail<br>• Exemplification used may be limited<br>• Limited organisation; English expression is basic with some accurate use of geographical terminology<br>• Question is addressed broadly or partially<br>• Analysis, evaluation and application of concepts and theories are limited and may be superficial<br>• Conclusion is basic and may not be linked to the rest of the response |
| **1** | **1–3** | • Little knowledge and understanding of the subject content<br>• Exemplification, if used, is simple or may not be relevant<br>• Lack of clarity and organisation; English expression is simple with inaccuracies; geographical terminology is basic or not understood<br>• Question is understood weakly and may be addressed slightly<br>• Superficial statements replace analysis and evaluation; application of concepts and theories may be minimal or absent<br>• Conclusion may be absent or simply asserted |
| **0** | **0** | • No creditable response. |

## Section A

Answer **one** question from this section.

### Hot arid and semi-arid environments

| Question | Answer | Marks |
|---|---|---|
| 1(a)(i) | **Fig. 1.1 shows part of a hot arid landscape in Arizona, USA.**<br><br>**Briefly describe the landscape shown in Fig. 1.1.**<br><br>The landscape is arid with some small individual shrubs on the flatter sandy area in the foreground. Some small angular boulders on top of the red sands.<br><br>Steep break between the flat land and the steeply rising lands which culminate in perpendicular square towers and chimneys of rock. e.g. Landform A.<br><br>There are mesas (larger flatter expanses) and buttes (smaller columns) in the background. Straight slopes with narrow horizontal bands of more resistant rock which protrude along these slopes. | **4** |
| 1(a)(ii) | **Identify and explain how the landform at <u>A</u> may have been formed.**<br><br>Landform A is a butte; tall narrow, steep sided column of rock with a lower angled unconsolidated base.<br><br>Formation: downcutting and backcutting by rivers during wetter periods. Periods of earth movements when there was isostatic uplift giving the rivers more erosive energy for downcutting. Differential erosion caused the more resistant rock to be left upstanding and recession. Backwearing leads to the formation of the pediplain. The butte represents a smaller narrower version of the mesa as a result of continued weathering and erosion. Present day processes may only be modifying these landforms, e.g. the formation of scree slopes as weathering and erosion occur. Some description of the landform should be included for 6 marks. | **6** |

| Question | Answer | Marks |
|---|---|---|
| 1(b)(i) | **EITHER**<br><br>**To what extent is desertification the result of climate change?**<br><br>Indicative content:<br><br>Knowledge definition of desertification. Degradation of the land/soil. It becomes unproductive. Some indication of locations. e.g. Sahel. The how and why of its occurrence. i.e. physical and human causes.<br><br>• Climate change: Physical causes and then perhaps merging discussion into the human induced climate changes. These points should be linked to the land/soil and the effects of rain, winds and desiccation resulting in erosion and leaching of soils to produce an unproductive medium for crop growing and survival/trading and the economic consequences.<br>• The syllabus includes a host of human factors which would balance out the conversation about climate change: overgrazing/overcultivation, irrigation leading to salinization, overpopulation, deforestation, vegetation clearance, urban and industrial developments. Good candidates may realise that some of these may feed into climate change. e.g. the idea of albedo and the feedback effect.<br><br>Higher level answers will feature a discussion of the factors and then their consequences. The best answers will either be extensive in their range of factors and or in-depth consideration of case studies to illustrate the general points made. The conclusion should reflect the argument made and the best answers may try to predict the future recognizing that desertification is a process.<br><br>Lower level answers will focus on the factors probably including case studies but will be less clear about the relationship between factor, its influence on process and the consequent outcomes. | **15** |

| Question | Answer | Marks |
|---|---|---|
| 1(b)(ii) | **OR**<br><br>**To what extent does climate play a role in the natural sources of water found in hot arid and semi-arid environments?**<br><br>Indicative content:<br><br>There are three natural sources of water mentioned in the syllabus: aquifers, coastal mist and fog, and dew.<br><br>There are two factors that govern these sources of water. Initially, the climate, i.e. temperature range and extremes, and rainfall totals and reliability and evaporation which is the link between the two and then human factors, i.e. water abstraction, tree and shelter belt planting, agriculture and other developments. Case study material may be useful to illustrate the points the candidate makes.<br><br>Higher level answers will be confident in knowledge of the natural sources of water, and illustrate coastal deserts that are characterised by fog and mist i.e. The Atacama Desert. Here the population utilises the water. They will either be in detail about the balance between the physical and human factors which influence the availability of natural sources, or they will be about all three sources and discuss them even if not in an equal amount of detail.<br><br>Lower level answers may discuss one of the natural sources, especially aquifers, but show less knowledge about the other two. The level will depend upon the extent, range and depth of knowledge when answering this question. | **15** |

**Glacial and periglacial environments**

| Question | Answer | Marks |
|---|---|---|
| 2(a)(i) | **Fig. 2.1 shows the predicted changing extent of permafrost in northern Eurasia and North America.**<br><br>**Describe the predicted changes to the extent of permafrost by 2050.**<br><br>This is a spatial question. By 2050 there is: an increase in areas predicted to thaw, located on the margins of the current covering of permafrost, especially Canada, Alaska, The Hudson Bay area, small pockets in coastal Greenland, S. Russia. i.e. further south, and beyond the Arctic circle. Look for some generalization and then specific examples for four marks. | **4** |
| 2(a)(ii) | **Explain <u>two</u> ways that the predicted changes, such as those shown in Fig. 2.1, may impact upon human activities.**<br><br>Ways include: changing migration patterns, food sources, fishing, hunting. Also, subsidence of buildings, e.g. thawing will increase the water content of the underlying material as foundations of the building, hence the collapse or cracks in the walls of homes. An increase in disease, health issues, clothing, a decline in indigenous way of life. Release of methane and its implications for climate change which may produce a positive feedback and cause further thawing e.g. fires. There are a variety of choices, two need to be well developed for three marks each i.e. credit given for a point which is then developed with a little more detail/explanation. | **6** |
| 2(b)(i) | **EITHER**<br><br>**To what extent is the formation of a corrie (cirque) the result of abrasion?**<br><br>Indicative content:<br><br>Description of the form of a corrie and where it may be found as an introduction. Result of weathering i.e. frost shattering, plucking and abrasion. For these processes to occur there must be active ice. This is fundamental to formation. A diagram would help to show the bergschrund at the head of the snowfield, trickling water, frost action on the backwall where the loosened rock is plucked by the forward movement of the ice to form the tool for abrasion. The rock is then used as the abrasive tool to deepen the corrie as the ice moves out of the overdeepened hollow.<br><br>Discursive element: Both processes are essential for the formation, in fact, the argument can be made that without plucking, abrasion would not be possible because ice alone cannot abrade rock.<br><br>Higher level answers will conclude with this sort of assessment whereas lower level answers may adequately present the formation of the landform but be much weaker on the assessment of the ‘to what extent’ element of the question. | **15** |

| Question | Answer | Marks |
|---|---|---|
| 2(b)(ii) | **OR**<br><br>**Assess the role of mass movement in the formation of landforms in the periglacial environment.**<br><br>Indicative content:<br><br>Knowledge of the processes of mass movement as a process, of which the precursor has to be some form of weathering to produce the comminuted and broken-down material that can be moved under the influence of gravity with the aid of a lubricant i.e. water. The range of landforms listed in the syllabus include: blockfields, tors, scree slopes, gelifluction lobes, head and coombe deposits, and asymmetrical valleys. A full catalogue of landforms is not required. For instance, a comparison between a tor and gelifluction lobe, head and coombe deposits as a part of asymmetrical valley would be well compared with scree slopes. However, many micro-landforms are produced by ground ice so these will be discussed as a comparison. Diagrams will aid any answer if well-labelled and included as part of the argument.<br><br>The sort of comparisons outlined above would demonstrate a higher level answer because the comparisons would assist the argument that mass movements are not the only process and factor influential in the formation of periglacial landforms. The best answers may see mass movement as a modifier rather than an initiator of landforms.<br><br>Lower level answers may show some knowledge of the landforms but the argument may get lost in a catalogue of all the landforms considered relevant. | **15** |

**Coastal environments**

| Question | Answer | Marks |
|---|---|---|
| 3(a)(i) | **Fig. 3.1 shows the outcome of a recent mass movement event on a stretch of coastline in the UK.**<br><br>**Describe the features of the cliff-line shown in Fig. 3.1.**<br><br>Steeply sloping, straight, partly vegetated coastline. There is a slip which is less steep, with a toe of material at the base, and a scar at the cliff top. There is some evidence of slipped blocks covered in part with vegetation. | **4** |
| 3(a)(ii) | **Explain how the instability of the cliff-line has affected the human activities shown in Fig. 3.1.**<br><br>Affects include: Caravan park owners may lose their asset, owners of the land may lose an asset and the rental income. Farm shows grazing land which is being lost to the sea. Animals and income may be lost. Loss of the coastal footpath. Potential loss of life. The answer should be related to the instability of the cliff line i.e. physical processes such as erosion due to heavy storms at high tides causing undercutting of cliff and cliff collapse or landslips for full marks. | **6** |
| 3(b)(i) | **EITHER**<br><br>**To what extent do the landforms found in macrotidal environments differ from those found in microtidal environments?**<br><br>Indicative content:<br><br>The syllabus distinguishes between macrotidal (range above 4 metres) e.g. mudflats, salt marshes and sand dunes, and microtidal (range under 2 metres) e.g. spits and barrier islands. Note: Macrotidal coasts can result in notches at the base of the cliff, recession and wave cut platforms as well as those itemised in the syllabus. This means there is a variety/range of landforms that can be discussed. Not all the landforms need to be featured because the assessment element of the question might focus on the point that it is not variety that is the key, but nature, form and scale that is produced by these two contrasting environments. Details of the meaning of macrotidal and microtidal is crucial and then some detailed knowledge sufficient to form an assessment/evaluation in the conclusion.<br><br>Higher level answers will formulate a cogent evaluative argument either throughout or in the conclusion.<br><br>Lower level answers may have difficulty with the evaluation of variety and not really appreciate other parameters that can be used. | **15** |

| Question | Answer | Marks |
|---|---|---|
| 3(b)(ii) | **OR**<br><br>**'Coastal environments present more opportunities than constraints for settlement and port development'. Discuss the validity of this statement.**<br><br>Indicative content:<br><br>A great deal will depend upon the line of argument taken and the case study material available to the candidate.<br><br>Opportunities: for the visitors and developers: physical i.e. beaches, flat coastal plain for building then accommodation, retail outlets, promenades, health and economic and social, a range of activities etc. Benefits for the resident population: economic principally. Desire of people living in urban areas who want to have holidays by the sea. The seaside and the salt water was seen as a health asset as early as the Regency period. The answer might take a historical view of the development. Largely economic and social benefits. Port development led to trade historically. Ports were often the first settlements to be built in an emerging economy.<br><br>Constraints: for the local population: pollution, overcrowding for both parties, loss of aesthetic value of the area, coastal protection, waste disposal, noise from port development, visual pollution from huge container ports for instance and the cost of public services. Physical constraints may be the tidal range for instance in Southport and Blackpool the sea recedes some distance offshore and the water is very shallow. A coastline which is facing a long fetch may experience surfing waves which may be a mixed blessing for those who do not surf e.g. Porthmeor Beach, St Ives, Cornwall.<br><br>The evaluative element is likely to concern who or what are bearing the costs and who or what are reaping the benefits. Mostly the conclusion would be that the costs are born by the population in the resort and the benefits by the visitors. The physical environment is crucial to any argument of this type. Case studies could act as the hinge of the argument.<br><br>Higher level answers will be balanced, seeing all sides of the argument and may use examples and exceptions which diverge from any expected conclusion.<br><br>Lower level answers may present some of the benefits and costs and show knowledge but lack a conclusive argument. | **15** |

## Section B

Answer **one** question from this section.

### Tropical environments

| Question | Answer | Marks |
|---|---|---|
| 4(a)(i) | **Fig. 4.1 shows the number of species with height in a tropical rainforest.**<br><br>**Describe the changes in the number of species with height shown in Fig. 4.1.**<br><br>Fewest species on the forest floor, i.e. less than 200 species. Gradual steady increase through the understory to a plateau. A steep increase into the canopy where the peak is 1000 species. Double the species compared with the understory. Steep fall off in the emergent layer. Two peaks should be identified, locations within the forest given, along with some figures. | **4** |
| 4(a)(ii) | **Explain why the greatest number of species are found in the canopy layer.**<br><br>Reasons: ecological niches, e.g. nests, migrating birds and animals, light, air, water, anchors for plants, parasites, saprophytes, epiphytes. Co-existence, interconnecting food chains and complex webs. Most of these theoretical concepts are itemised in the syllabus so expect some theoretical knowledge even if it not wholly comprehensive. | **6** |

| Question | Answer | Marks |
|---|---|---|
| 4(b)(i) | **EITHER**<br><br>**'Tropical rainforests can be managed sustainably only at individual and local scales.' Discuss the validity of this statement.**<br><br>Indicative content:<br><br>Definition of the meaning of sustainability; i.e. maintaining the biodiversity habitats, and contribution of the climate, i.e. as a carbon sink. There needs to be knowledge of schemes and management of the forest in the face of all the threats to the environment. A range of these are set out in the syllabus. Examples of international economic pressures versus attempts at individual and local scales could be a route to a successful answer e.g. Malaysia and the government approach to oil palm production versus small-scale schemes in the Amazon in terms of ecotourism, conservation schemes and selective logging.<br><br>Sustainability at individual and local scales is outlined in the syllabus as: traditional responses within existing cultures and responsible tourism but clearly the question goes further and these two examples are a small part of the question. This question turns around the expected question about international solutions to a smaller aspect of the syllabus. It is meant to assess that but clearly the focus will be on the larger scale solutions.<br><br>Higher level answers will be able to reach a conclusion along the lines that local scale and individually operated management and sustainability goes only a small way to contribute to a much larger scale problem. International trade and large-scale economic decisions govern rainforest sustainability arguably.<br><br>Lower level answers may struggle to include much about the local scale and instead focus on all the transnational pressures on this environment. | **15** |

| Question | Answer | Marks |
|---|---|---|
| 4(b)(ii) | **OR**<br><br>**To what extent are the structure and formation of soils in the tropical rainforest ecosystem the result of rainfall?**<br><br>Indicative content:<br><br>The formation of soils is the result of several factors: climate, geology, vegetation, fauna, time and human activities. This is the context in which this question should be approached. The structure of the soil could well be illustrated by soil profiles. The classic tropical soil is the oxisol but no named examples are included in the syllabus so do not expect specific named soils. They are leached, deep, infertile often clay rich with large peds rather than being a fine soil. Characteristic features are: their colour, i.e. red due to the unleached iron oxides, their nutrients tend to be concentrated in the vegetation rather than the soil. Rapid breakdown and recycling biomass to provide nutrient release to the soil due to the high temperatures and rainfall. It is the P:E ratio where P is greater than E all the years round that leads to the rapidly and comprehensively leached soils. The K, Ca and Mg tend to be leached under these conditions leaving the alumino-silicates like Fe and Al in the soil. Human activities in the form of deforestation result in soil erosion and increased leaching. Time is an important factor because these soils have developed undisturbed for thousands of years as they occur on the stable bases of major continents like South America and Africa.<br><br>Higher level answers will explain and assess the various factors and will likely conclude that rainfall is simply one factor and possibly not the single determining factor that explains these soils.<br><br>Lower level answers may not see the significance of all the other factors and especially the key factors of time and human activities that produce such distinctive soils.<br><br>Candidates may be more confident writing about formation rather than structure. If only one is covered very well a maximum mark at the top of Level 3 can be awarded. However, a balance of discussion between structure and formation and the links between them would be ideal and could achieve the top of Level 4. | **15** |

**Temperate environments**

| Question | Answer | Marks |
|---|---|---|
| 5(a)(i) | **Fig. 5.1 shows the theoretical effect of a natural disturbance on the percentage of vegetation cover in a temperate environment.**<br><br>**Using Fig. 5.1, describe the changes in the percentage of vegetation cover over time.**<br><br>Steep decline (1)<br>End of the disturbance shows a much slower recovery rate than the post disturbance decline, over a longer period of time. (1)<br>It is a gradual recovery and then it plateaus/levels-off. (1)<br>However, the ecosystem even after recovery does not reach 100% vegetation cover/the same level of ecosystem integrity that it had initially (1). | **4** |
| 5(a)(ii) | **Suggest <u>one</u> cause of natural disturbance and using Fig. 5.1 explain how it may impact on a temperate environment.**<br><br>Possible causes and consequences (candidates to choose one) include:<br>• Deforestation/clearance for agriculture; leads to bare soil erosion and/or leaching loss of nutrients, breakdown of the nutrient cycle clearance for agriculture<br>• Coppicing/pollarding: is human management, allowing more light development of an understory, so that recovery might be more rapid in these circumstances.<br><br>Recreation is another cause that could be explored. Good candidates will relate the cause and effect back to the theoretical graph. Credit too for use of ecosystem terminology. | **6** |

| Question | Answer | Marks |
|---|---|---|
| 5(b)(i) | **EITHER**<br><br>**To what extent does the functioning of a temperate deciduous woodland depend upon its annual leaf-fall?**<br><br>Indicative content:<br><br>Knowledge of the nutrient cycle of a TDF is the key to a good answer. the seasonal input of the leaves every autumn. This allows the vegetation to conserve water and energy as the light and water and temperature levels drop, and how they are decomposed, incorporated into the soil and the uptake by the roots for the subsequent season's growth and flowering and fruiting. The balance of location of nutrients is important too as well as the above to below ground biomass ratio. However, whilst this knowledge is the basis for the answer, it is really a question about all the other factors which operate in such ecosystems e.g. climate change, human intervention etc. may be more important than the natural functioning of these forests.<br><br>Higher level answers will recognise this and may be able to conclude that given human activities in these ecosystems in fact the annual leaf fall has become less important as a factor in their functioning.<br><br>Lower level answers may struggle to find ways of assessing the evaluative aspect of the question and be able mainly to outline the nutrient cycling. | **15** |

| Question | Answer | Marks |
|---|---|---|
| 5(b)(ii) | **OR**<br><br>**'Climate change is only one factor responsible for changing the natural landscape in temperate environments.' To what extent do you agree with this statement?**<br><br>Indicative content:<br><br>The syllabus lists a range of factors responsible for changing the natural landscape, the question invites the candidate to discuss climate change as well as all these other factors with reference to examples to support their arguments.<br><br>Syllabus includes: Climate change, acid deposition, recreational use, fire, hedgerow removal, timber logging. The question is broad so that examples may be taken from a range of temperate ecosystems, grasslands and/or forests and/or heathland and moorland or only one, with all approaches acceptable.<br><br>Higher level answers will see that the obvious conclusion is that the changing natural landscape in temperate environments depends on the place and time, and that the statement is broadly true. Others may suggest that increasingly climate change is overwhelmingly the key factor.<br><br>Lower level answers may not be definitive in their conclusion and are not likely to offer a forecast for the future.<br><br>Hedgerow removal suggests that different scales of example could be included in the answer. This would be perfectly acceptable. | **15** |

**The atmospheric environment**

| Question | Answer | Marks |
|---|---|---|
| 6(a)(i) | **Fig. 6.1 shows average surface air pressure for January and July.**<br><br>**Using Fig. 6.1, describe the pattern of average surface air pressure in January.**<br><br>Band of HP in low latitudes north and south of the Equator<br>LP in high latitudes 60N<br>Anomalies LP over Australia<br><br>HP at 60N and south 1005 mb<br>High pressure in the northern hemisphere<br>Variable S tropics<br><br>Candidates need to recognise the bands of HP and LP and give pressures in mb and latitudes for 4 marks. Ideally, there should be mention of pattern and anomalies. For full marks some indication of degrees N/S are needed. | **4** |
| 6(a)(ii) | **Explain why the differences in average surface air pressure for January and July shown in Fig. 6.1 cause seasonal variations in weather in Asia.**<br><br>January: Asia monsoon high pressure, out-blowing winds from the sub-continent to the sea. Therefore, dry continental air produces the dry monsoon season.<br><br>July: Low pressure dominates over the Indian Ocean and Bay of Bengal, winds blowing in from the sea, moisture laden, rain bearing, wet monsoon season.<br><br>Cause: Migration of the ITCZ and the circulation of air around HP and LP areas. Ideally 3 plus 3 marks for each season but take a balanced view of the answer as a whole. | **6** |

| Question | Answer | Marks |
|---|---|---|
| 6(b)(i) | **EITHER**<br><br>**'In 2019 the UK set a target to bring all greenhouse gas emissions to net zero by 2050.' To what extent can this target be achieved?**<br><br>Indicative content:<br><br>Definition and knowledge of global warming in the introduction. Causes: greenhouse emissions, e.g. $NO_x$ $CO_2$, $NO_2$, $CH_4$, etc. Knowledge that there are strategies at different scales. Although the focus of the question is on small-scale of which there must be evidence, many answers will turn on the larger scale measures and international co-operation that is needed. Arguably these are better and more effective solutions. This issue a broad, open-ended question that candidates may easily lose focus and not concentrate on the smaller scale and individual measures that can feed into the bigger picture.<br><br>However, the best candidates will see that without intervention at every scale and level of government/industry activity, international agreements (e.g. Kyoto protocol, Paris Agreement etc.), drawdown technological fixes, e.g. plant based diet, avoid air travel, one fewer child, conserve resources, reduce consumption e.g. electricity, plant trees etc., individual voices to change attitudes, etc. and without the will, the target set will not be reached. Answers in 2022 also to mention/be aware of progress both for the UK and the international action of COP 26 in Nov 2021.<br><br>Higher level answers may suggest that the target is unrealistic and be able to support such a conclusion.<br><br>Lower level answers that do not reach Level 3 or 4 may be knowledgeable but struggle with a clear assessment and evaluation of this very open-ended question. | **15** |

| Question | Answer | Marks |
|---|---|---|
| 6(b)(ii) | **OR**<br><br>**'The polar front dominates the annual weather patterns in the cool temperate western maritime climate'. To what extent do you agree with this statement?**<br><br>Indicative content:<br><br>Polar Front: definition, development with a diagram ideally, relationship to the Jet Stream, air masses i.e. Tm and Pm air, associated weather.<br><br>However, the maritime air masses are not the only air masses to influence the weather in the cool temperate western maritime climate. Tc and Pc air anticyclonic weather occur predominantly seasonally. The details need development. Seasonality is an important part of the question.<br><br>The conclusion will be far-sighted and good answers will indicate that climate change is already having an impact, more rain in the winter, hotter summers change to the pattern of the Jet stream increase in zonal flow and more accentuated Rossby waves bringing increased anticyclonic weather and more unseasonal weather.<br><br>Higher level answers may be able to quote instances and relate to the jet stream pattern. They may also suggest how complex the atmospheric system is and that because it is subject to so many factors the future is difficult to predict.<br><br>Lower level answers will struggle with the evaluative aspect and may not see the significance of air masses beyond Tm and Pm air. Often the anticyclonic weather is largely ignored so that Level 3 is the maximum level of achievement. | **15** |