

## Fragile environments and climate change-3

Name: \_\_\_\_\_

Class: \_\_\_\_\_

Date: \_\_\_\_\_

Time:

Total Marks Available:

Total Marks Archived:

Level: IGCSE Mathematics A

Subject: Geography

Exam Board: Edexcel IGCSE Geography- it is however suitable for use by mathematics student of other boards

Topic: Fragile environments and climate change-3

Type: Mark Scheme

To be used by all students preparing for Edexcel IGCSE Geography- Students of other Boards may also find this useful



## Mark Scheme

Q1.

Question number	Answer	Mark
(i)	<p style="text-align: center;"><b>A01 (1 mark)</b></p> <p>A period of time with abnormally low rainfall (1).</p> <p>B, C, and D are all incorrect as they are not referring to the meaning of drought.</p>	<b>(1)</b>

Question number	Answer	Mark
(ii)	<p style="text-align: center;"><b>A01 (2 marks)</b></p> <ul style="list-style-type: none"><li>• The spread of desert conditions (1) and decline of soil quality (1).</li><li>• Degradation of land/drying out of land (1) as a result of human activities/climate change (1).</li></ul> <p>Accept any other appropriate response.</p>	<b>(2)</b>

Question number	Answer	Mark
(iii)	<p style="text-align: center;"><b>A01 (1 mark)</b></p> <p>C Install water storage devices.</p> <p>A, B and D are all incorrect as they are not methods to manage the impacts of desertification.</p>	<b>(1)</b>



Q2.

Question number	Indicative content
	<p style="text-align: center;"><b>AO2 (4 marks), AO3 (4 marks), AO4 (4 marks)</b></p> <p><b>Marking instructions</b> Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below.</p> <p><b>Indicative content guidance</b> The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include:</p>





**AO2**

- Responses to climate change are many and varied.
- Responses can be shorter-term as well as longer term and they can be mitigate (reduce cause) or adaptation (live with impacts)
- Responses can be localised, e.g. managing traffic, more sustainable buildings and heating systems.
- Responses can be based round “polluter pays” principle or more of an incentivised solution, e.g. FITs to encourage green energy technology.

**AO3**

- Countries, places and regions which have the greatest carbon footprints do not always have the most robust solutions in terms of responses.
- Cutting of CO<sub>2</sub> emissions is complex, controversial and politically difficult, especially taken as a long-term objective where growth and development might be at risk.
- In order for mitigation responses to be effective, many would argue that they need top be global, rather than country or even regionally-based.
- Some places might see adaptation as the best responses as they have the resources and technical capability to withstand shorter and longer-term climate change shocks and impacts.
- The development pathways to secure money for climate change responses going from the richest nations to the poorest to counter the most significant drivers is seen as a good approach.

**AO4**

- Figure 7a shows “hotspots” in China, India and USA especially as well as much of Europe if taken as a region in itself.
- Figure 7a shows some countries and regions have made very little contribution to carbon emissions, e.g. parts of Sub- Saharan Africa.



Question number	Indicative content	
	<ul style="list-style-type: none"><li>• Figure 7b shows a range of different drivers which are all linked to human activity and climate change.</li><li>• Figure 7b shows causes that can operate at different geographical scales.</li><li>• Figure 7b shows that deforestation can be linked to agricultural land conversion e.g. livestock farming.</li></ul>	
Level	Mark	Descriptor
	0	No acceptable response.
Level 1	1–4	<ul style="list-style-type: none"><li>• Demonstrates isolated elements of understanding of concepts and the interrelationship between places, environments and processes. (AO2)</li><li>• Attempts to apply understanding to deconstruct information but understanding and connections are flawed. An unbalanced or incomplete argument that provides limited synthesis of understanding. Judgements are supported by limited evidence. (AO3)</li><li>• Uses some geographical skills to obtain information with limited relevance and accuracy, which supports few aspects of the argument. (AO4)</li></ul>
Level 2	5–8	<ul style="list-style-type: none"><li>• Demonstrates elements of understanding of concepts and the interrelationship between places, environments and processes. (AO2)</li><li>• Applies understanding to deconstruct information and provide some logical connections between concepts. An imbalanced argument that synthesises mostly relevant understanding, but not entirely coherently, leading to judgements that are supported by evidence occasionally. (AO3)</li><li>• Uses geographical skills to obtain accurate information that supports some aspects of the argument. (AO4)</li></ul>



Level 3	9–12	<ul style="list-style-type: none"><li>• Demonstrates accurate understanding of concepts and the interrelationship of places, environments and processes. (AO2)</li><li>• Applies understanding to deconstruct information and provides logical connections between concepts throughout. A balanced, well-developed argument that synthesises relevant understanding coherently, leading to judgements that are supported by evidence throughout. (AO3)</li><li>• Uses geographical skills to obtain accurate information that supports all aspects of the argument. (AO4)</li></ul>
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Q3.

Question number	Indicative content
	<p>AO2 (4 marks), AO3 (4 marks), AO4 (4 marks)</p> <p><b>Marking instructions</b> Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below.</p> <p><b>Indicative content guidance</b> The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include:</p>





	<p><b>AO2</b></p> <ul style="list-style-type: none"><li>• Climate change is the increasing temperatures associated with average weather conditions or longer-term average conditions.</li><li>• Ecosystems and places are affected by water and drought stress linked to climate change.</li><li>• Low lying places will be threatened by rising sea levels caused by climate change.</li><li>• Biodiversity will be threatened by animals migrating because they cannot easily / quickly adapt to the changing climate of their current habitat.</li><li>• Climate change will affect global atmospheric circulation systems thereby affecting many places.</li></ul> <p><b>AO3</b></p> <ul style="list-style-type: none"><li>• Figure 7a shows that China, India and USA are the worse emitters, and to some extent they will suffers the effects of climate change although they may be able to adapt especially in the richest parts of those nations.</li><li>• Perhaps the worst impact will be felt by the people and nations who do not emit, e.g. parts of Africa, small island states (SIDs) etc. Sea level rise for the latter is especially significant especially as they often don't have a voice on the global stage.</li><li>• 7a shows emissions for a whole country; arguably a more useful measure are emission per capita.</li><li>• Changes in farming, through adaptation, may mitigate against the risks of climate change. So, the evidence in Figure 7c may not be reliable and conclusions not valid.</li><li>• Overall the view is likely to be broadly correct, with exceptions.</li></ul>
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	<p><b>AO4</b></p> <ul style="list-style-type: none"><li>• Figure 7a shows China, India and USA as the biggest emitters (total CO<sub>2</sub>).</li><li>• Figure 7a shows that a large number of nations, especially in the southern hemisphere have a low total CO<sub>2</sub> output.</li><li>• Figure 7a shows a good deal of variability between countries and global regions.</li><li>• Figure 7c shows nine different climate change impacts.</li><li>• Figure 7c shows that the climate change impacts are grouped into three categories: ocean, land and atmosphere.</li><li>• Figure 7c shows a selected range of climate change impacts.</li></ul>
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Level	Mark	Descriptor
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Level 1	1–4	<ul style="list-style-type: none"><li>• Demonstrates isolated elements of understanding of concepts and the interrelationship between places, environments and processes. (AO2)</li><li>• Attempts to apply understanding to deconstruct information but understanding and connections are flawed. An unbalanced or incomplete argument that provides limited synthesis of understanding. Judgements are supported by limited evidence. (AO3)</li><li>• Uses some geographical skills to obtain information with limited relevance and accuracy, which supports few aspects of the argument. (AO4)</li></ul>
Level 2	5–8	<ul style="list-style-type: none"><li>• Demonstrates elements of understanding of concepts and the interrelationship between places, environments and processes. (AO2)</li><li>• Applies understanding to deconstruct information and provide some logical connections between concepts. An imbalanced argument that synthesises mostly relevant understanding, but not entirely coherently, leading to judgements that are supported by evidence occasionally. (AO3)</li><li>• Uses geographical skills to obtain accurate information that supports some aspects of the argument. (AO4)</li></ul>
Level 3	9–12	<ul style="list-style-type: none"><li>• Demonstrates accurate understanding of concepts and the interrelationship of places, environments and processes. (AO2)</li><li>• Applies understanding to deconstruct information and provides logical connections between concepts throughout. A balanced, well-developed argument that synthesises relevant understanding coherently, leading to judgements that are supported by evidence throughout. (AO3)</li><li>• Uses geographical skills to obtain accurate information that supports all aspects of the argument. (AO4)</li></ul>

Q4.





Question number	Indicative content
	<p style="text-align: center;"><b>A02 (4 marks)/A03 (4 marks)/A04 (4 marks)</b></p> <p><b>Marking instructions</b> Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below.</p> <p><b>Indicative content guidance</b> The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include the following.</p> <p><b>A02</b></p> <ul style="list-style-type: none"><li>• The term climate change can be defined in a range of ways, often to suit different arguments.</li><li>• Climate change will have an impact on soil, temperature, rainfall and weather events.</li><li>• Climate change could threaten fragile environments, e.g. tropical rainforests or coral reefs, in terms of structure, function and biodiversity.</li><li>• Fragile environments may be threatened by rising sea levels caused by climate change; ecosystem biodiversity could be threatened by animals migrating because they cannot adapt to the changing climate of their current habitat.</li><li>• Responses may be either based around adaptation or mitigation.</li></ul>



**A03**

- Attempts to mitigate against climate change threats, e.g. through sustainable management, can vary significantly for different fragile environments (judgements will depend on case studies).
- A specific ecosystem's natural ability to adapt to climate change can vary, which means impacts of climate change will be 'threats' only to ecosystems that cannot adapt.
- A main cause of climate change is greenhouse gas emissions – and the challenge is to reduce these emissions. This can be done by reducing fossil fuel consumption, finding alternative energy sources, reducing deforestation, e.g. in tropical rainforests, and developing carbon capture technologies. However, different groups of people have different opinions about which strategy is the best/most effective.
- The challenge of climate change crosses international boundaries and, therefore, international cooperation is crucial, e.g. Kyoto, 1997. However, arriving at agreement is never a straightforward process.
- The development of alternative energy sources, such as wind farms, nuclear power, HEP and solar panels will reduce fossil fuel consumption, but the development of each type of source has its own advantages and disadvantages.

**A04**

- Figure 7a shows rapid increases in temperature and CO<sub>2</sub>.
- Figure 7c shows an overall increase in all types of climate disasters during the period 1980–2011.
- Figure 7c shows that the most significant rises have been in storms and floods: up to 100 storms and around 50–200 floods per year.
- Droughts and extreme temperatures show some variability per year but storms and floods show much higher variability.
- Figure 7c indicates that there is only a moderate increase in both droughts and floods over the 1908–2011 period.



Level	Mark	Descriptor
	0	No acceptable response.
Level 1	1–4	<ul style="list-style-type: none"><li>• Demonstrates isolated elements of understanding of concepts and the interrelationship between places, environments and processes. (AO2)</li><li>• Attempts to apply understanding to deconstruct information but understanding and connections are flawed. An unbalanced or incomplete argument that provides limited synthesis of understanding. Judgements are supported by limited evidence. (AO3)</li><li>• Uses some geographical skills to obtain information with limited relevance and accuracy, which supports few aspects of the argument. (AO4)</li></ul>
Level 2	5–8	<ul style="list-style-type: none"><li>• Demonstrates elements of understanding of concepts and the interrelationship between places, environments and processes. (AO2)</li><li>• Applies understanding to deconstruct information and provide some logical connections between concepts. An imbalanced argument that synthesises mostly relevant understanding, but not entirely coherently, leading to judgements that are supported by evidence occasionally. (AO3)</li><li>• Uses geographical skills to obtain accurate information that supports some aspects of the argument. (AO4)</li></ul>
Level 3	9–12	<ul style="list-style-type: none"><li>• Demonstrates accurate understanding of concepts and the interrelationship of places, environments and processes. (AO2)</li><li>• Applies understanding to deconstruct information and provides logical connections between concepts throughout. A balanced, well-developed argument that synthesises relevant understanding coherently, leading to judgements that are supported by evidence throughout. (AO3)</li><li>• Uses geographical skills to obtain accurate information that supports all aspects of the argument. (AO4)</li></ul>



Q5.

Question number	Answer	Mark
	<p style="text-align: center;"><b>A01 (2 marks) / A02 (2 marks)</b></p> <p>Award 1 mark (A01) for identification of effect and a further mark (A02) for an explanation of the reason, up to a maximum of 2 marks per idea:</p> <ul style="list-style-type: none"><li>• [Mexico] In Yaqui Valley farmers genetic improvement in wheat, maize and oilseeds to increase drought tolerance and disease resistance (1) in the face of higher temperatures, increasing water scarcity, and more severe expected pest and disease outbreaks (1)</li><li>• [Peru] In Mantaro Valley, a mountainous region farmers invested in integrated watershed management (1) so that they could sustain the scarce local water resources (1).</li><li>• [Yemen] Irrigation technologies have been used (1) to increase the areas resilience against future threats by improving water resource management in the low-lying areas (1)</li></ul> <p>Accept any other appropriate response.</p>	<b>(4)</b>



Q6.

Question number	Answer	Mark
	<p style="text-align: center;"><b>AO1 (2 marks) /AO2 (2 marks)</b></p> <p>Award 1 mark (AO1) for identification of ways to manage rainforests and a further mark (AO2) for an explanation, up to a maximum of 2 for each way explained.</p> <ul style="list-style-type: none"><li>• Selective logging and replanting (1) to ensure areas affected by deforestation have tree replacement programmes to reduce overall loss (1).</li><li>• Agroforestry to combine using trees and crops (1) to reduce the number of trees being removed for agriculture (1).</li><li>• Increasing community involvement in forest conservation projects (1) to increase potential for sustainable management (1).</li><li>• Creation of a biosphere reserve (1) in order to protect biodiversity (1).</li><li>• Government regulations to conserve rainforest (1) limiting activities that can take place there (1).</li></ul> <p>Accept any other appropriate response.</p>	<b>(4)</b>





Q7.

Question Number	Answer	Mark
	<p style="text-align: center;"><b>AO1 (2 marks) / AO2 (2 marks)</b></p> <p>Award 1 mark (AO1) for identification of a management method and a further mark (AO2) for an explanation, up to a maximum of 2 marks per method.</p> <ul style="list-style-type: none"><li>• Selective logging (1) which involves strict planning of which trees can be cut down, and involves replacing trees cut down (1).</li><li>• International agreements (1) to ensure particular areas of rainforests are protected from logging or construction (1).</li><li>• Increased education about rainforests (1) to ensure people recognise their value and therefore are less likely to cause damage (1).</li><li>• Ecotourism (1) to increase awareness of the rainforest and how it needs to be protected (1).</li></ul> <p>Accept any other appropriate response.</p>	<b>(4)</b>





Q8.

Question number	Answer	Mark
	<p style="text-align: center;"><b>A01 (2 marks)</b></p> <p>Award 1 mark for each characteristic identified:</p> <ul style="list-style-type: none"><li>• High annual rainfall (1)</li><li>• High average temperature (1)</li><li>• Nutrient poor soil (1)</li><li>• High levels of biodiversity (1)</li><li>• Dense shrub layer and canopy (1).</li></ul> <p>Accept any other appropriate response.</p>	<b>(2)</b>

