

Hazardous environments- 2

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: Hazardous environments -2

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
	<p style="text-align: center;">A03 (4 marks)</p> <p>Award 1 mark for the initial point (1) and a further mark for further development (1).</p> <ul style="list-style-type: none">• Advantage: By using field sketches students can get a quick view of the areas they are working recording key features (1) to support recall later (1).• Advantage: By using field sketches students can highlight features (1) that they want to focus on as part of their study (1).• Disadvantage: Because students are often making sketches quickly, they may not record key features correctly (1) leading to inaccuracies later on (1).• Disadvantage: Because students have different perceptions (1) they may over-exaggerate features (1). <p>Accept any other appropriate response.</p>	(4)



Q2.

Question number	Answer
	<p style="text-align: center;">A03 (4 marks)/A04 (4 marks)</p> <p>Marking instructions 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>Indicative content guidance 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>A03</p> <ul style="list-style-type: none">• Some countries in the world that experience earthquakes have a high level of economic development so can afford to spend more money on improving the country's infrastructure, e.g. earthquake-proof buildings, warning systems and rescue services, than countries at a lower level of development.• Countries that, with effective warning systems, rescue services, medical services, education systems and building design, tend to have less damage from an earthquake.• Countries that are less economically developed cannot afford to spend as much money to protect themselves from earthquakes, so it is likely that these areas will have a higher death toll, even if the magnitude of an earthquake is the same as the magnitude in a more-developed country.
	<ul style="list-style-type: none">• More-developed countries can afford to spend money on prediction methods, such as GPS satellite (when data is sent from satellites to computers with information such as plate movement and changes in the earth's surface). In the developing world, communication systems may be underdeveloped, so the population may not be well educated about what to do in the event of an earthquake.• Construction standards tend to be poorer in less-developed countries. Homes and other buildings suffer serious direct damage when the disaster occurs. Buildings collapsing result in high death tolls. Evacuation and other emergency plans are also difficult to put into action due to limited funds and insufficient resources. Clearing up can be difficult. There may not be enough money to rebuild homes quickly and safely, which leads to many people being forced to live in emergency housing or refugee camps – which can increase the death toll.



A04

- Figure 3c shows that the earthquake in China had a much larger magnitude (7.9) compared with Haiti (7.0). Italy's earthquake had the smallest magnitude (6.3) and the lowest number of deaths (295). This suggests that there might be a relationship between magnitude and deaths.
- Figure 3c shows that, despite having a smaller magnitude than China, the earthquake in Haiti led to the largest number of deaths (230 000) – more than double that experienced in China (87 476).
- Figure 3c shows that Italy's earthquake had both the smallest amplitude and magnitude, whereas China had both the largest amplitude and magnitude.
- Figure 3c shows many collapsed buildings, with almost total devastation in Haiti and China as a result of the earthquakes. On the other hand, the photograph for Italy does show some buildings still standing and rescue services on the scene, which may explain the smaller number of deaths in that region.
- Figure 3c shows that Italy has the highest GDP per capita, which could be used to explain why it had so few deaths from the earthquake. China has a higher GDP per capita than Haiti, which might explain why, despite a large earthquake, there were fewer deaths.



Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1–3	<ul style="list-style-type: none">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 that are supported by limited evidence. (AO3)Uses some geographical skills to obtain information with limited relevance and accuracy, which supports few aspects of the argument. (AO4)
Level 2	4–6	<ul style="list-style-type: none">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)Uses geographical skills to obtain accurate information that supports some aspects of the argument. (AO4)
Level 3	7–8	<ul style="list-style-type: none">Applies understanding to deconstruct information and provide 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)Uses geographical skills to obtain accurate information that supports all aspects of the argument. (AO4)



Q3.

Question number	Answer indicative content	Mark (8)
	<p style="text-align: center;">A03 (4 marks) A04 (4 marks)</p> <p>Marking instructions Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the level-based mark scheme below.</p> <p>Indicative content guidance 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.</p> <p>This question is about analysing the different strategies that can be used for preparing for earthquakes factors that can affect flood risk in different places. Candidates will need to be able to identify why different factors are important.</p> <p>A03</p> <ul style="list-style-type: none">• There are a range of ways countries can prepare for earthquakes.• It is important to educate the potential population that could be affected so that they know how to respond in the event of an earthquake. This has the potential to reduce the number of deaths and injuries.• Some countries may try to have a warning system that informs people at risk when seismic activity is detected. But this relies on people having access to a phone/signal etc.• Some countries try to prepare by ensuring buildings are more resistant to ground movement from earthquakes, but this requires a high level of investment and will not be accessible for everyone.	



	<p>AO4</p> <ul style="list-style-type: none">• Fig 3c show how in Japan education is used to prepare for what to do in case of an earthquake.• Figure 3c indicates a way to prepare is through strengthening buildings.• Figure 3c shows how there are large number of high magnitude earthquakes spread across Japan.• Figure 3c shows how evacuation plans could be used as a way to prepare for an earthquake and could be useful for emergency services.
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Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1-3	<ul style="list-style-type: none">• 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 that are supported by limited evidence. (AO3)• Uses some geographical skills to obtain information with limited relevance and accuracy, which supports few aspects of the argument. (AO4)
Level 2	4-6	<ul style="list-style-type: none">• 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)• Uses geographical skills to obtain accurate information that supports some aspects of the argument. (AO4)
Level 3	7-8	<ul style="list-style-type: none">• Applies understanding to deconstruct information and provide 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)• Uses geographical skills to obtain accurate information that supports all aspects of the argument. (AO4)



Q4.

Question number	Indicative Content
	<p style="text-align: center;">AO3 (4 marks) AO4 (4 marks)</p> <p>Marking instructions</p> <p>Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the level-based mark scheme below.</p> <p>Indicative content guidance</p> <p>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.</p> <p>This question is about analysing the pattern of vulnerability to tropical cyclones.</p> <p>AO3</p> <ul style="list-style-type: none">• Vulnerability to tropical cyclones is affected by the conditions that are needed for tropical cyclone formation.• Countries will be vulnerable at different times of year, depending on their location.• Climate change has been linked with higher frequency of tropical cyclones, and for a shift in where they are taking place. This means that there is the potential for a greater proportion of the world's population to be at risk.• Hazard risk is a combination of the hazard (and its severity) and vulnerability. Many of the coastal areas in zone which have a high probability of a high intensity tropical storm have dense populations which increases the hazard risk.



- Hazard frequency, and even intensity does not necessarily create high hazard risk. For example, those areas in the Pacific Ocean which do not have islands, the risk is low, compared to around the Philippines which have high population density and high probability of a storm up to 5 on the Saffir Simpson scale mean that hazard risk is high.

AO4

- Fig 3c shows how tropical storms can vary in intensity from 1-5 on the Saffir-Simpson scale.





		<ul style="list-style-type: none">• Figure 3c shows area where there is a 10% probability of a storm striking, and the predicted intensity.• Figure 3c shows how there are large areas of South East Asia and Oceania which are highly vulnerable to tropical storms.• Figure 3c shows how the vulnerability is linked to seasonal changes for example in Bangladesh September to May being storm season.
Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1-3	<ul style="list-style-type: none">• 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 that are supported by limited evidence. (AO3)• Uses some geographical skills to obtain information with limited relevance and accuracy, which supports few aspects of the argument. (AO4)
Level 2	4-6	<ul style="list-style-type: none">• 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)• Uses geographical skills to obtain accurate information that supports some aspects of the argument. (AO4)



Level 3	7-8	<ul style="list-style-type: none">• Applies understanding to deconstruct information and provide 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)• Uses geographical skills to obtain accurate information that supports all aspects of the argument. (AO4)
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Q5.

Question number	Answer indicative content
	<p>AO3 (4 marks) AO4 (4 marks)</p> <p>Marking instructions</p> <p>Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the level based mark scheme below.</p> <p>Indicative content guidance</p> <p>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.</p> <p>This question is about investigating the issue of why hazard mapping can be useful in managing earthquake risk. Candidates could explore the use of hazard mapping before, during and after an earthquake event.</p> <p>Use of both resources needed for level 3</p>



A03

- Hazard/vulnerability/risk maps can be used in a variety of ways before, during and after a hazardous event.
- Candidates should examine how the use of Hazard maps can impact against impacts
- Road structures identified through hazard maps could be used to enable emergency aid to get to an earthquake zone more quickly enabling the relief effort to start.
- Hazard maps shared with all support agencies can enable a more coordinated relief effort ensuring resources are not wasted /deployed in the wrong area.
- Using hazard maps can help plan in the short term where services were before and where they can be built afterwards

A04

- Fig 3c shows stages in the process of hazard mapping
- Fig 3c data can be collected on hazard events to help develop strategies to reduce the impact of earthquakes, for example understanding areas where they happen frequently
- Fig 3c data can be presented and shared across a wide variety of organisations to help them plan better for hazard events
- Fig 3c assessments can be made to identify trends and patterns in hazard data and present in the form of vulnerability and risk maps
- Fig 3c data can be used to inform land zoning
- Fig 3d shows Hazard, vulnerability and risk
- Fig 3d shows there is a positive correlation between the three maps
- Fig 3d shows that as the hazard risk rises so does vulnerability generally
- Fig 3d shows that in some cases even though risk is high vulnerability is only moderate



Question number	Answer	
Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1-3	<ul style="list-style-type: none">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 that are supported by limited evidence. (AO3)Uses some geographical skills to obtain information with limited relevance and accuracy, which supports few aspects of the argument. (AO4)
Level 2	4-6	<ul style="list-style-type: none">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)Uses geographical skills to obtain accurate information that supports some aspects of the argument. (AO4)
Level 3	7-8	<ul style="list-style-type: none">Applies understanding to deconstruct information and provide 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)Uses geographical skills to obtain accurate information that supports all aspects of the argument. (AO4)



Q6.

Question number	Answer	Mark
(i)	<p>A01 (1 mark)</p> <p>B (Satellite technology to track development of storms) (1). The answer cannot be A (related to earthquakes), C (a response to address the impact not to plan for cyclones), or D (related to tectonic hazards).</p>	(1)

Question number	Answer	Mark
(ii)	<p>A01 (1 mark)</p> <p>Award 1 mark for any of the following.</p> <ul style="list-style-type: none">• Family ties mean they want to stay (1)• Unaware of the risk (1)• No ability to move (1)• Fertile soils (1)• Lack of ability to move (1) <p>Accept any other appropriate response.</p>	(1)

Question number	Answer	Mark
(iii)	<p>A01 (1 mark)/A02 (1 mark)</p> <p>Award 1 mark (AO1) for identification of correct impact and a further mark for explanation (AO2) up to a maximum of two marks.</p> <ul style="list-style-type: none">• Closure of businesses/job loss (1) means loss of income (1).• Increased government debt (1) due to funds needed for emergency responses (1).• Damage to infrastructure (1) cost money to repair (1).• Loss of income from tourism (1) due to closure of airports/hotels (1). <p>Accept any other appropriate response.</p>	(2)



Q7.

Question number	Answer	Mark
(i)	<p style="text-align: center;">AO1 (1 mark)</p> <p>Award 1 mark for any of the following:</p> <ul style="list-style-type: none">• Mercalli scale (1) <p>Also accept:</p> <ul style="list-style-type: none">• Moment Magnitude scale / MM / MMI / MMS (1)• Richter scale (1) <p>Do not accept:</p> <ul style="list-style-type: none">• seismograph / seismometer• impacts of earthquakes e.g. damage to buildings, deaths etc.	(1)



Question number	Answer	Mark
(ii)	<p style="text-align: center;">AO1 (1 mark)</p> <p>Award 1 mark for any of the following:</p> <ul style="list-style-type: none">• lava (1)• ash clouds (1)• gas emissions (1)• lava bombs (1)• earthquakes / tremors (1)• pyroclastic flow (1)• mudslide / mass movement (1) <p>Accept any other appropriate response.</p>	(1)



Question number	Answer	Mark
(iii)	<p>AO1 (1 mark)/AO2 (1 mark)</p> <p>Award 1 mark (AO1) for a point about a cause of an earthquake and 1 mark (AO2) for further explanation, up to a maximum of 2 marks.</p> <p>A sudden tremor of the earth's crust (1) caused by tectonic activity at plate margins and faults (1)</p> <p>Earthquakes are caused by built up pressure inside the earths' crust (1) which is released when tectonic plates move (1)</p> <p>Accept any other appropriate response, including those referring to fracking, nuclear testing and volcanic eruptions.</p>	(2)

Q8.



Question number	Answer indicative content
	<p style="text-align: center;">AO3 (4 marks) AO4 (4 marks)</p> <p>Marking instructions</p> <p>Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the level-based mark scheme below.</p> <p>Indicative content guidance</p> <p>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.</p> <p>This question is about the candidates making a judgement of the value of their data presentation techniques in achieving the overall aims of their study.</p> <p>This will depend on what data presentation techniques they used. Candidates are expected to make a judgement on more than one technique. Candidates should identify strengths, weaknesses, and alternative resources which would support them in planning the enquiry.</p> <p>For level 2 responses candidates will need to link the evaluation to the purpose of the study directly.</p> <p>For level 3 responses there should be a greater depth of evaluation.</p>



Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1-3	<ul style="list-style-type: none">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 that are supported by limited evidence. (AO3)Uses some geographical skills to obtain information with limited relevance and accuracy, which supports few aspects of the argument. (AO4)
Level 2	4-6	<ul style="list-style-type: none">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)Uses geographical skills to obtain accurate information that supports some aspects of the argument. (AO4)
Level 3	7-8	<ul style="list-style-type: none">Applies understanding to deconstruct information and provide 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)Uses geographical skills to obtain accurate information that supports all aspects of the argument. (AO4)

Q9.



Question number	Answer	Mark
	<p style="text-align: center;">A02 (3 marks)</p> <p>Award 1 mark for identification of an impact and 2 marks for development through further explanation, up to a maximum of 3 marks.</p> <ul style="list-style-type: none">• People can be killed by pyroclastic flows (1) as they travel so fast that people cannot outrun them (1) and so they are burnt to death or choke to death (1).• Pyroclastic flows damage/destroy buildings, roads, crops, stock (animals) and woods (1), which could lead to the long-term evacuation of an area (1) and, therefore, to a decline in the local economy (1).• Mudflows (lahars) often cause a lot of damage to the environment (1) as a result of the boulders/logs carried within them crushing everything in their path (1). People caught in the path of a lahar have a high risk of death from severe crush injuries, drowning or asphyxiation (1).• Lava flows burn or bury everything they come across (1). They may also start fires, which are a lot more dangerous for the environment around the volcano (1), and kill more people than the lava flow itself (1).• Ash falls can cause houses and buildings to collapse (1). People and animals may die due to a lack of oxygen (1). Huge problems are created for the aviation industry (1). <p>Accept any other appropriate response.</p>	(3)

Q10.



Question number	Answer	Mark
	<p style="text-align: center;">AO1 (1 mark)/AO2 (3 mark)</p> <p>Award 1 mark for initial point (AO1), and 3 further marks (AO2) for the extension of this point up to maximum of 4 marks.</p> <ul style="list-style-type: none">• Earthquakes occur at plate margins (1) as the plates move together it is known as a destructive plate margin (1) one of the plates is destroyed as it gets pushed beneath the other plate (1) this process is called subduction (1).• Two plates moving in opposite directions (1) get stuck and pressure builds up (1) and when the plate slips (1) pressure is released and causes the ground to shake (1). <p>Accept any other appropriate response.</p>	(4)

Q11.



Question number	Answer	Mark
	<p style="text-align: center;">AO2 (2 marks)/AO3 (2 marks)</p> <p>Award 1 mark (AO3) for identification of any reason and a further mark for explanation of the reason (AO2) up to a maximum of two marks each.</p> <ul style="list-style-type: none">• Serious eruptions may be considered to be rare (1) and so not considered a serious threat by residents (1).• Slopes of the volcano are very fertile (1) so many people remain to be involved in agriculture (1).• With so many settlements present people may have family connections (1) which they do not want to leave despite the risks (1).• Farming communities (typical in small settlements) as crops grow well (1) because soil is very fertile (1).	
	<ul style="list-style-type: none">• People may have no choice (1) as house prices might be cheaper (1). <p>Accept any other appropriate response.</p>	(4)



Q12.

Question number	Answer	Mark
	<p style="text-align: center;">AO2 (2 mark)/AO3 (2 mark)</p> <p>Award 1 mark (AO3) for identification of any idea from fig 3a and a further mark for explanation of the reason (AO2) up to a maximum of two marks each.</p> <p>There is good weather (1) so this is a benefit which people believe balances the risk (1)</p> <p>People don't live right next to the sea (there are tennis courts etc) (1) and can afford to rebuild after an event / are insured (1)</p> <p>The buildings can withstand storms (1) and therefore people don't need to move (1)</p> <p>There is a coastal vegetation buffer / big beach (1) which means that it reduces the energy / impact of the storm (1)</p> <p>Accept any other appropriate response.</p>	(4)

Q13.

Question number	Answer	Mark
	<p style="text-align: center;">AO3 (1 mark)</p> <p>Award 1 mark for any of the following.</p> <ul style="list-style-type: none">• Fertile soils/high crop yield/growing crops (1)• Beautiful scenery (1)	(1)



Q14.

Question number	Answer	Mark
	<p style="text-align: center;">AO2 (2 mark)/AO3 (2 mark)</p> <p>Award 1 mark (AO2) for the identification of an idea from the map in fig 3a and a further mark (AO3) for further development, shown on Figure 3a, Candidates should respond with one cause and one direction.</p> <p>Cause</p> <p>Warm sea temperatures (1) Tropical cyclones tend to develop where temperatures are above 27 degrees (1)</p> <p>Low air pressure (1) which pulls water high as the cyclone gathers speed (1)</p> <p>Direction</p> <p>Tropical cyclones move in the direction of the prevailing wind (1) these are common wind directions caused by convection currents / earth's rotation / Coriolis Effect / Trade Winds (1)</p> <p>Accept any other appropriate response.</p>	<p>(4)</p>

Q15.



Question number	Answer	Mark
	<p style="text-align: center;">A02 (2 marks)/A03 (2 marks)</p> <p>Award 1 mark (A03) for identification of any reason from Fig 3a and a further mark for explanation of the reason (A02) up to a maximum of two marks each.</p> <ul style="list-style-type: none">• Location on a coastline (1) which means they are closer to where a tropical cyclone could hit land (1).• Location within the latitudes where tropical cyclones are most frequent (1) therefore risk is higher of cyclone reaching the population (1).• Some countries may have higher population at risk (1) therefore the potential damage is higher (1).• India has between 1001 – 10000(1000's) people at risk (1) because of a low level of development (1) <p>Accept any other appropriate response.</p>	(4)