



GEO.PH1 Natural Hazards and Hazard Risk

AQA 8035 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

1 State what is meant by each of these key terms.

(a) Hazard (1)

(b) Natural hazard (1)

(c) Disaster (1)

(d) Hazard risk (1)

(Total for Question 1 is 4 marks)

2 Natural hazards can be grouped into types. For each event below, state whether it is best classed as a GEOPHYSICAL, ATMOSPHERIC or HYDROLOGICAL hazard.

(a) A volcanic eruption (1)

(b) A tropical storm (1)

(c) A river flood (1)

(d) An earthquake (1)

(Total for Question 2 is 4 marks)

3 Name ONE named example of a hazard event for each type below.

(a) A geophysical hazard (1)

(b) An atmospheric hazard (1)

(c) A hydrological hazard (1)

(Total for Question 3 is 3 marks)

- 4 Table 1 shows illustrative, hypothetical figures for the estimated number of people affected worldwide by four types of natural hazard over a ten-year period. These figures are for practice only and are not real global statistics.

Type of hazard	Estimated people affected (millions)
Flood	500
Drought	300
Storm	250
Earthquake	50

- (a) Using Table 1, state which type of hazard affected the most people. (1)
- (b) Calculate the total number of people affected across all four hazard types shown in Table 1. (2)
- (c) Calculate the percentage of the total in Table 1 who were affected by flooding. Give your answer to one decimal place. (3)
- (d) Suggest one reason why flooding might affect far more people globally than earthquakes do, even though earthquakes can be very destructive locally. (2)

(Total for Question 4 is 8 marks)

- 5 Explain TWO factors that can affect a country's vulnerability to a natural hazard.

(Total for Question 5 is 4 marks)

6 State one difference between a hazard and a disaster.

(Total for Question 6 is 2 marks)

7 Explain how a country's level of development can affect its capacity to cope with a natural hazard.

(Total for Question 7 is 3 marks)

8 Explain TWO reasons why the number of people recorded as affected by natural hazards has generally increased over recent decades.

(Total for Question 8 is 4 marks)

9 Give TWO ways that monitoring technology can help to reduce hazard risk.

(Total for Question 9 is 2 marks)

10 A region has a population of 3,600,000 people. A hazard event affects 450,000 of them. Calculate the percentage of the region's population that was affected.

(Total for Question 10 is 2 marks)

- 11** Explain how rapid population growth and urbanisation in hazard-prone areas can increase the level of risk from natural hazards.

(Total for Question 11 is 4 marks)

- 12** Other than a country's level of development, give THREE factors that can affect how severe a specific hazard event turns out to be for the people it affects.

(Total for Question 12 is 3 marks)

- 13** Suggest why hazard risk maps, produced using GIS, are useful to town and city planners.

(Total for Question 13 is 3 marks)

- 14** Two countries are each hit by a natural hazard of similar magnitude. Explain, using a range of factors, why the level of disaster impact could be very different in the two countries.

(Total for Question 14 is 5 marks)

15 Use your knowledge of hazard risk and any named hazard case studies you have learned about to answer this question.

'A country's level of development is the most important factor affecting its risk from natural hazards.' Assess the extent to which you agree with this statement.

(Total for Question 15 is 8 marks)

Mark scheme · GEO.PH1 Natural Hazards and Hazard Risk

Question 1

- (a) **B1** a natural event that has the potential to threaten life or property, oe
- (a) **Answer: A natural event that has the potential to threaten life or property.**
- (b) **B1** a natural process or event that has the potential to cause loss of life, damage to property or disruption to human activity, oe
- (b) **Answer: A natural process or event that has the potential to cause loss of life, damage to property or disruption to human activity.**
- (c) **B1** the realisation of a hazard, when the event actually happens and overwhelms a community's ability to cope, oe
- (c) **Answer: When a hazard event actually happens and overwhelms a community's ability to cope.**
- (d) **B1** the probability or chance that people will be negatively affected by a hazardous event, oe
- (d) **Answer: The probability that people will be negatively affected by a hazardous event.**

Question 2

- (a) **B1** geophysical
- (a) **Answer: Geophysical.**
- (b) **B1** atmospheric
- (b) **Answer: Atmospheric.**
- (c) **B1** hydrological
- (c) **Answer: Hydrological.**
- (d) **B1** geophysical
- (d) **Answer: Geophysical.**

Question 3

- (a) **B1** any correctly named geophysical hazard event, e.g. the Nepal (Gorkha) earthquake, 2015, oe
- (a) **Answer: For example, the Nepal (Gorkha) earthquake, 2015.**
- (b) **B1** any correctly named atmospheric hazard event, e.g. Hurricane Katrina, 2005, oe
- (b) **Answer: For example, Hurricane Katrina, 2005.**
- (c) **B1** any correctly named hydrological hazard event, e.g. the Cumbria floods (Storm Desmond), 2015, oe
- (c) **Answer: For example, the Cumbria floods (Storm Desmond), 2015.**

Question 4

- (a) **B1** flood
- (a) **Answer: Flood.**
- (b) **M1** $500 + 300 + 250 + 50$ seen, oe
- (b) **A1** 1100 million cao
- (b) **Answer: 1,100 million.**
- (c) **M1** $500 / 1100$ seen, oe
- (c) **M1** answer x 100, oe
- (c) **A1** 45.5% (accept 45.4-45.5%) cao
- (c) **Answer: 45.5%.**
- (d) **B1** floods happen more frequently than major earthquakes, oe
- (d) **B1** floods can affect very large, densely populated areas such as river floodplains and low-lying coastal areas, whereas a single earthquake's damage is usually more localised around the epicentre, oe
- (d) **Answer: Floods happen more frequently than major earthquakes, and a single flood event can affect a very large, densely populated area such as a river floodplain, whereas earthquake damage is usually more localised around the epicentre.**

Question 5

- **B1** factor 1, e.g. the country's level of development, oe
- **B1** linked detail, e.g. lower-income countries often have fewer resources for early warning systems, building codes and emergency services, oe
- **B1** factor 2, e.g. population density in the hazard-prone area, oe
- **B1** linked detail, e.g. a densely populated area in the path of a hazard is likely to see more people affected than a sparsely populated one, oe
- **Answer: For example: level of development, since lower-income countries often have fewer resources for early warning systems, building codes and emergency services; and population density in the hazard-prone area, since a densely populated area is likely to see more people affected.**

Question 6

- **B1** a hazard is a potential threat, oe
- **B1** a disaster is when the hazard event actually happens and overwhelms a community's ability to cope, oe
- **Answer: A hazard is a potential threat, whereas a disaster is when the hazard event actually happens and overwhelms a community's ability to cope.**

Question 7

- **B1** higher-income countries can usually afford better building design, monitoring and early warning technology, oe
- **B1** they typically have better-resourced emergency services and can organise search, rescue and aid delivery more quickly, oe
- **B1** they usually have insurance and government funds available, which speeds up recovery and rebuilding, oe
- **Answer: Higher-income countries can usually afford better building design, monitoring technology and early warning systems, have better-resourced emergency services for a faster response, and have insurance and government funds available to speed up recovery.**

Question 8

- **B1** reason 1, e.g. rapid population growth, oe
- **B1** linked detail, e.g. more people now live in hazard-prone areas (e.g. floodplains, coastlines, near active plate boundaries) than in the past, so more people are exposed when an event occurs, oe
- **B1** reason 2, e.g. improvements in monitoring, communication and reporting, oe
- **B1** linked detail, e.g. events in remote areas that would once have gone unrecorded are now measured and reported, so recorded totals have risen even where the underlying hazard frequency has not, oe
- **Answer: For example: rapid population growth means more people now live in hazard-prone areas such as floodplains and coastlines than in the past, exposing more people when an event occurs; and improved monitoring, communication and reporting mean events that would once have gone unrecorded are now measured, raising the recorded totals.**

Question 9

- **B1** way 1, e.g. satellites can track the position and strength of a developing storm, oe
- **B1** way 2, e.g. GIS (Geographic Information Systems) can be used to map areas at greatest risk, helping planners target preparation and evacuation, oe
- **Answer: For example, satellites can track the position and strength of a developing storm, and GIS mapping can identify the areas at greatest risk to target preparation and evacuation.**

Question 10

- **M1** $450000 / 3600000 \times 100$ seen, oe
- **A1** 12.5% cao
- **Answer: 12.5%.**

Question 11

- **B1** as populations grow, cities often expand into areas that are more exposed to hazards, e.g. steep slopes, floodplains or coastal land, because safer land is already built on, oe
- **B1** this puts more people and property directly in the path of a future hazard event, oe
- **B1** rapid, unplanned urban growth (e.g. informal settlements) often means housing is built quickly and cheaply, without hazard-resistant design, oe
- **B1** high housing density in informal settlements means a single event can affect very large numbers of people at once, oe
- **Answer: As populations grow, cities often expand into more exposed land such as floodplains, steep slopes or coastal areas, putting more people and property in the path of a future hazard; rapid, unplanned growth also often means housing is built quickly without hazard-resistant design, so a single event can affect very large numbers of people living close together.**

Question 12

- **B1** the magnitude (size/strength) of the event, oe
- **B1** the distance of the event from a densely populated area, oe
- **B1** how predictable the event was, or how much warning time was available before it struck, oe
- **Answer: The magnitude of the event; the distance of the event from a densely populated area; and how predictable the event was, or how much warning time was available.**

Question 13

- **B1** they show clearly which areas are at greatest risk from a hazard, oe
- **B1** planners can use this to avoid approving new housing or key infrastructure (e.g. hospitals) in the highest-risk zones, oe
- **B1** resources for hazard preparation (e.g. shelters, evacuation routes, stronger building codes) can be targeted at the highest-risk areas rather than spread evenly, oe
- **Answer: Hazard risk maps show clearly which areas are at greatest risk, so planners can avoid approving new housing or key infrastructure there, and can target resources for preparation, such as shelters, evacuation routes and stronger building codes, at the highest-risk areas rather than spreading them evenly.**

Question 14

- **B1** development level, e.g. a lower-income country is likely to have less resistant building stock and fewer resources for emergency response, oe
- **B1** population density, e.g. if the hazard strikes a more densely populated area in one country, more people are exposed, oe
- **B1** preparedness, e.g. one country may have invested more in early warning systems, evacuation planning and public education, oe
- **B1** accessibility/terrain, e.g. if the affected area is remote or has poor infrastructure, rescue and aid delivery is slower, worsening the impact, oe
- **B1** an overall linking point, e.g. hazard risk therefore depends on more than just the physical size of the event; vulnerability and capacity to cope are just as important, oe
- **Answer: The two countries could differ in development level (affecting building resistance and emergency resources), population density in the affected area (affecting how many people are exposed), preparedness (early warning and evacuation planning), and accessibility (remote, poorly connected areas see slower rescue and aid). This shows that disaster impact depends on vulnerability and capacity to cope, not just the physical size of the hazard.**

Question 15

- **Level 4** (7-8): A detailed, well-balanced assessment that uses accurate reference to hazard risk factors (development, population density, preparedness, magnitude, predictability), ideally supported by named examples; reaches a clear, justified conclusion about the extent to which development is the dominant factor, while acknowledging other relevant factors.
- **Level 3** (5-6): A clear assessment that considers development alongside at least one other relevant factor; a conclusion is reached, though the balance of the argument may be less developed or use less named detail.
- **Level 2** (3-4): Some relevant points about factors affecting hazard risk are made, with limited development or generalised detail; a simple conclusion is given with little justification.
- **Level 1** (1-2): One or two isolated relevant points about hazard risk are made, with little or no comparison of factors.
- **Level 0** (0): No relevant content.
- **Indicative content:**
 - Supports the statement: lower-income countries typically have less resistant building stock, fewer resources for early warning and emergency response, and less capacity to fund rapid recovery, so a similar-sized hazard often causes a far higher death toll and slower recovery than in a higher-income country.
 - Challenges the statement: the magnitude, type and predictability of the hazard event itself also matter enormously; an extremely large or completely unpredicted event can overwhelm even a well-developed country's defences.
 - Population density and exposure matter independently of development: a hazard striking a densely populated area causes a bigger disaster than the same event striking a sparsely populated one, regardless of income level.
 - Preparedness and governance can differ even between countries at similar development levels, e.g. strict enforcement of building codes, public education and evacuation planning can reduce impact more than income level alone would predict.
 - Accessibility and terrain affect how quickly help can reach those in need, which can worsen outcomes in remote or mountainous areas even within a wealthier country.
 - A well-supported conclusion should weigh development against these other factors (magnitude, population density, preparedness, accessibility) before reaching a judgement, and may argue that development is a major factor but rarely acts alone.