

Oxford Revise | Geography | Answers

Chapter 5 How can tectonic movement be hazardous?

All exemplar answers given are worth full marks.

1

(a) Earthquakes

Many buildings will be destroyed. Large numbers of people may be killed or injured by collapsing buildings.

Volcanoes

Crops may be damaged by lava or ash. Buildings may catch fire because of the heat of the lava.

- (b)** the severity of the event; The time of day determines where the people were at the time of the tectonic hazard.
- (c)** The communications are poor, so aid has difficulty in getting through or getting people to hospital. Poorer people might live in houses which have not been built to withstand the effects of the tectonic hazard. The governments of emerging and developing countries may not have developed a good management plan to cope with a tectonic hazard.
- (d)**
- (i)** A
- (ii)** The cost of the damage is greater than for Hazard B.
- (iii)** In ACs, even if a person injured by a tectonic hazard is taken to hospital, their injuries may prove to be so severe that they eventually die. The secondary effects of hunger and homelessness due to the poor quality of welfare and medical services in EDCs mean people may eventually die long after the event. The hazard may have damaged the sewage and water infrastructure, leading to a lack of a safe water supply, which leads to the spread of diseases which eventually kills people.
- (e)** Many people in EDCs may live in houses which are not robust enough to protect them during a tectonic hazard. The effect of the tectonic hazard may be felt in these countries for longer because the countries' governments do not have the finance or technological expertise to cope with both the primary and secondary effects.
- (f)** Primary effects of a tectonic hazard are those which happen directly because of the event. These would include immediate deaths and injuries and collapsed, burning, or flooded buildings. Secondary effects are the indirect events which happen or continue long after the event, such as diseases caused by contaminated water. They may be also events triggered by the hazard, such as earthquakes causing landslides, avalanches, fires, and tsunamis.

(g) This question is level-marked:

Level	Marks	Description
3	6–8	<ul style="list-style-type: none"> • Thorough knowledge, understanding or analysis of the issue, process or concept. • Uses well-developed ideas and line of reasoning is clear and logically structured. • Information presented is relevant and substantiated.
2	3–5	<ul style="list-style-type: none"> • Reasonable knowledge, understanding or analysis of the issue, process or concept. • Uses developed ideas and line of reasoning with some structure. • Information presented is mostly relevant and supported by some evidence.
1	1–2	<ul style="list-style-type: none"> • Basic knowledge, understanding or analysis of the issue, process or concept. • Uses simple ideas with no developed points made. • Information is basic, unstructured, and supported by limited evidence.
	0	No response or no response worth of credit.

Example answer: Nepal earthquake, April 2015

Nepal is a mountainous LIDC that was hit by an earthquake in April 2015 which was the most powerful to hit Nepal in over 80 years. Nepal is in the Himalayas, on the boundary of the Indo-Australian and Eurasian Plates. The shallow-focus 7.8 magnitude earthquake was caused by a sudden thrust, or release of built-up stress along this major fault line. Aftershocks continued in the days and weeks that followed. The direct consequences were severe. 9 000 people were killed, 20 000 injured, and three million were left homeless. There was widespread destruction of buildings and infrastructure, and power, water, sanitation, and communications were cut. An estimated US\$5 billion damage was caused. Secondary consequences, experienced in the following days and weeks, were also severe. Communities were cut off by landslides and avalanches. This hampered relief efforts. Avalanches on Mount Everest killed at least 19 people. An avalanche in the Langtang region left 250 people missing. Flooding threatened following a landslide blocking the Kali Gandaki River, and many people had to be evacuated.

2

(a)

(i) It is rich and able enough to design and build earthquake-resistant buildings and sea walls to protect against tsunamis on the coasts.; The population are likely to be well educated about hazard risks because of public education campaigns on TV, in schools, and through social media telling people what to do when a hazard occurs.

(ii) Earthquakes

Earthquake-resistant designs are likely to include rolling weights on the roofs of high buildings to act like a pendulum and so reduce sway. They are built with strong, cross-braced steel frames, and deep foundations to withstand an earthquake. Automatic shutters on all buildings would prevent broken glass falling, and open areas for evacuation could be planned in all built-up areas.

Volcanic eruptions

Buildings with resistant designs are likely to have extra strengthened roofs, so they do not collapse under the weight of ash from the volcano. Sealed windows with shutters stop the ash getting indoors. Concrete lava bomb shelters have been built near active volcanoes.

(iii) Earthquakes

It is important that there is efficient planning in place before the earthquake. There needs to be regulations to make sure buildings are earthquake-proof. The building should have rolling weights on the roofs to reduce sway and be built with strong, cross-braced steel frames, and deep foundations so they can withstand the shock waves. Preparations in Japan include ensuring that all households and businesses have emergency supply kits. Practice drills are held regularly for emergency professionals, schools, and the public. There are well-published warning systems, evacuation routes, and safe refuges so people are aware of what to do when an earthquake occurs. However well prepared a country is, it is crucial that the supply of emergency medicine, food, water, and temporary shelters are available in the months after an event, particularly in LIDCs which will be less equipped to help themselves.

Volcanic eruptions

It is important that there is efficient planning in place before the eruption. Special structures can be built to reduce the effects of the eruption on people. These include extra strengthening of roofs, so they do not collapse from the weight of the ash on them, and sealed windows with shutters, so that the ash does not get indoors. Concrete lava bomb shelters could also be built, like those around Sakurajima in Kagoshima Bay, Japan. Preparations in Japan include ensuring that all households and businesses have emergency supply kits. Practice drills are held regularly for emergency professionals, schools, and the public. There are well-published warning systems, evacuation routes, and safe refuges so people are aware of what to do when an eruption occurs. However well prepared a country is, it is crucial that the supply of emergency medicine, food, water, and temporary shelters are available in the months after an event, particularly in LIDCs which will be less equipped to help themselves.

(b) There are four main forms of tectonic hazard management. They are monitoring, prediction, protection, and planning.

(c) using embankments to divert lava flows; sea walls built along tsunami-prone coastlines

(d) Earthquakes

Accurate prediction of earthquakes is not always possible due to a lack of clear warning signs sometimes. If an area is known to be prone to earthquakes, then there is more likely to be some long-term plans in place. Prediction plans will need an effective monitoring system. These could include a network of seismometers or tsunami monitoring systems to detect early tsunami waves following an earthquake.

Volcanoes

The monitoring of active volcanoes allows more accurate prediction of a volcanic eruption taking place. If there are no warning signs, then accurate prediction of the timing of the eruption is more difficult. This monitoring uses hi-tech equipment like seismometers to detect earthquakes, which often occur just before a volcano erupts. Tiltmeters monitor ground deformation as the magma rises. Gravity meters measure changes in density and there are instruments to measure gas emissions and changes in the chemistry of underground water.

Questions referring to previous content
3

- (a) Short-term relief is aimed at the primary consequences of a tectonic hazard. This involves getting all the injured people to safety and providing them with medical care. All dead bodies must be found and removed so that they do not cause a health hazard. Temporary shelter has to be provided for people who have been made homeless by the tectonic event.
- (b) This question is level-marked:

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Example answer:

Earthquakes

The impacts of an earthquake are reduced if there is effective immediate emergency relief and that there are preparation plans which can be readily put in place. If earthquake-proof buildings are built, then the impact will be reduced. This is most likely to be in rich ACs which are prone to earthquakes and have the necessary finance and technical know-how to build such structures. The general population must be made fully aware of what to do when an earthquake occurs. All households and businesses should have emergency supply kits. The emergency services will be well trained and have full knowledge of the warning systems, evacuation routes, and refuge places of safety. Public education and public awareness campaigns through TV and social media, in schools, and in businesses will encourage the use of practice drills to ensure the inhabitants are fully aware of what to do in an emergency. There should be a supply of emergency medicine, food, water, and temporary shelters available in the months after the event. This is particularly important in EDCs, which are less able to help themselves.

Volcanic eruption:

The impacts of volcanic eruption are reduced if there is effective immediate emergency relief and there are preparation plans which can be readily put in place. If volcano-proof buildings are built, then the impact will be reduced. This is most likely to be in rich ACs which are prone to volcanoes and have the necessary finance and technical know-how to build such structures. The general population must be made fully aware of what to do when an eruption happens. All households and businesses should have emergency supply kits. The emergency services will be well trained and have full knowledge of the warning systems, evacuation routes, and refuge places of safety. Public education and public awareness campaigns through

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