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## Level 1 Geography, 2016

### 91007 Demonstrate geographic understanding of environments that have been shaped by extreme natural event(s)

9.30 a.m. Wednesday 16 November 2016  
Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate geographic understanding of environments that have been shaped by extreme natural event(s).	Demonstrate in-depth geographic understanding of environments that have been shaped by extreme natural event(s).	Demonstrate comprehensive geographic understanding of environments that have been shaped by extreme natural event(s).

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

**You should attempt ALL the questions in this booklet.**

If you need more room for any answer, use the extra space provided at the back of this booklet.

Check that this booklet has pages 2–12 in the correct order and that none of these pages is blank.

**YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.**

Low  
Merit

TOTAL

15

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**INSTRUCTIONS**

In the box below, name ONE type of **extreme natural event**, and an **environment case study (studies)** in which it has occurred, that you will use to answer ALL of the questions in this booklet.

Extreme natural event: Earthquake

Environment case study (studies): September 2010 Canterbury Earthquake  
February 2011 Christchurch Earthquake

**QUESTION ONE: Natural Processes**

Read the geographic concept below and refer to it when answering this question.

**Geographic Concept**

**Processes** are a sequence of actions, natural and / or cultural, that shape and change environments, places, and societies. Processes vary in time and space, and in magnitude (size) and frequency.

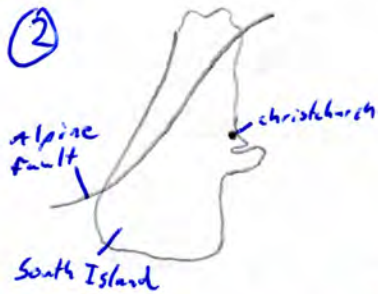
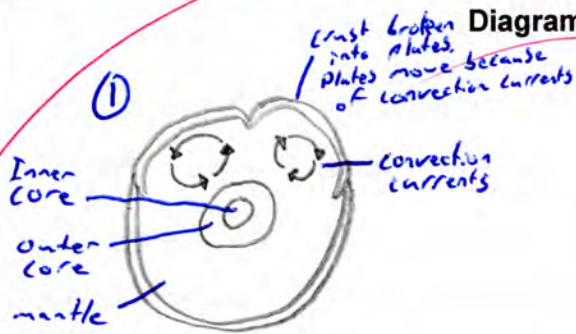
Fully explain the natural processes that operated to produce your chosen extreme natural event named above.

In your answer, include the geographic concept of processes, with integrated detailed supporting evidence from your case study (studies), and relevant supporting diagrams and/or maps.

**PLANNING (OPTIONAL)**

C.C  
Explain  
C.C move plates  
Plate boundaries  
Strike slip fault  
Pressure build up  
Pressure release/seismic waves

## Diagrams and/or maps



Earthquakes are caused by convection currents. Convection currents are the melting and cooling of magma in the Earth's mantle as seen in diagram 1. The magma closer to the core gets heated to higher temperatures than the magma in the outer mantle because the pressure is greater closer to the core and therefore has a higher temperature. This makes the magma less dense and it begins to rise. The magma in the outer mantle is more dense because it is cooler than the rising magma and so the denser magma sinks closer to the core. This is a cyclic process. The convection currents move the crust above in different directions and splits the crust up into plates. The plates ~~are~~ <sup>meet</sup> at ~~these~~ <sup>at</sup> plate boundaries. The ~~these~~ types of plate boundaries



are transform, divergent, and convergent. Earthquakes can be caused by transform or convergent plate boundaries. Convergent plate boundaries either cause an earthquake in a subduction zone where ~~the~~ an denser plate goes under the less dense plate or when ~~two~~ 2 equal density <sup>September</sup> plates collide. A transform plate boundary caused both the <sup>September</sup> 2010 Canterbury Earthquake and the February 2011 Christchurch earthquake. The Alpine fault <sup>runs</sup> ~~runs~~ down the South Island in New Zealand, <sup>as seen in diagram 2</sup> and created the Greendale fault, which caused the <sup>September</sup> 2010 Canterbury Earthquake, and the Port Hills fault, which caused the February 2011 Christchurch earthquake. Both faults are Strike Slip faults. A Strike Slip fault occurs in the plate and in both these cases in the Pacific plate. The collisions between the Indo-Australian plate and the Pacific plate in the transform Alpine fault caused ~~two sides of the Greendale and Port Hills faults to move and they got caught on~~ <sup>this</sup> ~~the~~ <sup>pressure</sup> to build up in the Greendale and Port Hills faults. Convection currents are in a cyclic process and thus never stop so the pressure continued to build and build. When the pressure became too great for the Greendale fault to manage the energy built up was released in the form of seismic waves called an earthquake. ~~The same~~ <sup>this</sup> ~~process~~ The same process happened in the Port Hills fault and the result was an earthquake. These processes are what cause an earthquake.

M5

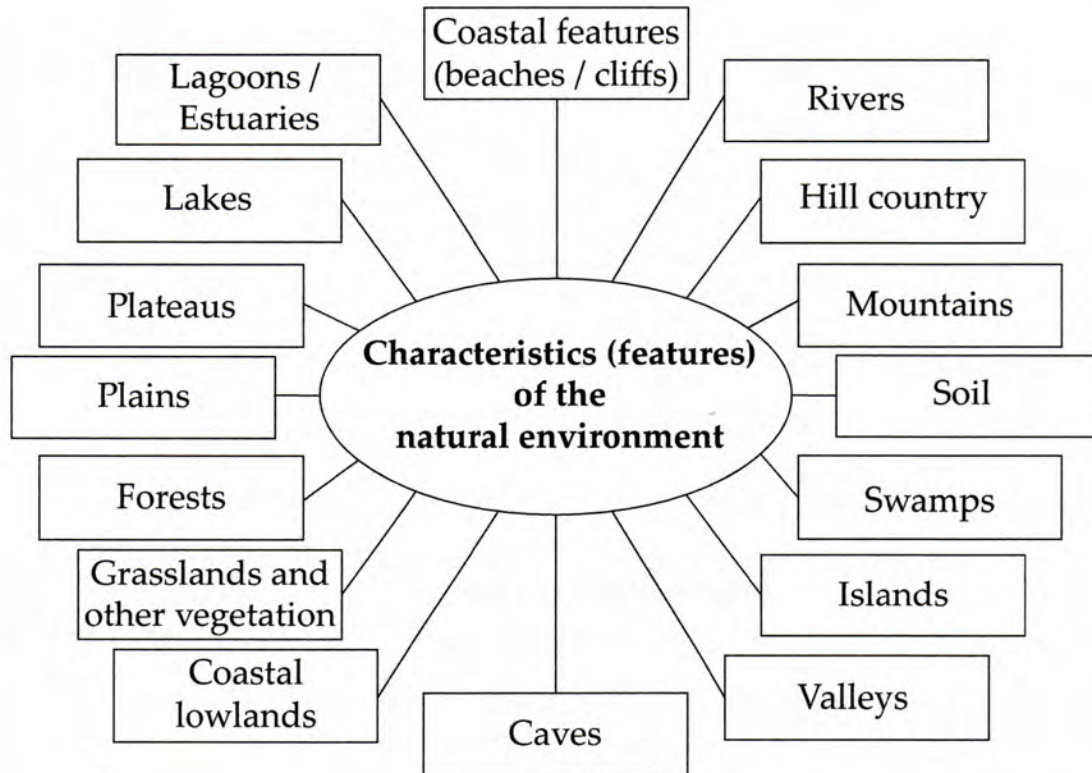
## QUESTION TWO: Effects of Extreme Natural Events on Natural Environments

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Read the geographic concept below and refer to it, as well as the diagram, when answering this question.

### Geographic Concept

**Change** involves any alteration to the natural environment. Change can be spatial and / or temporal. Change is a normal process in the natural environment. It occurs at varying rates, at different times, and in different places.



- (a) Identify TWO characteristics from the diagram above that were affected by your extreme natural event.

Characteristic (1): Soil

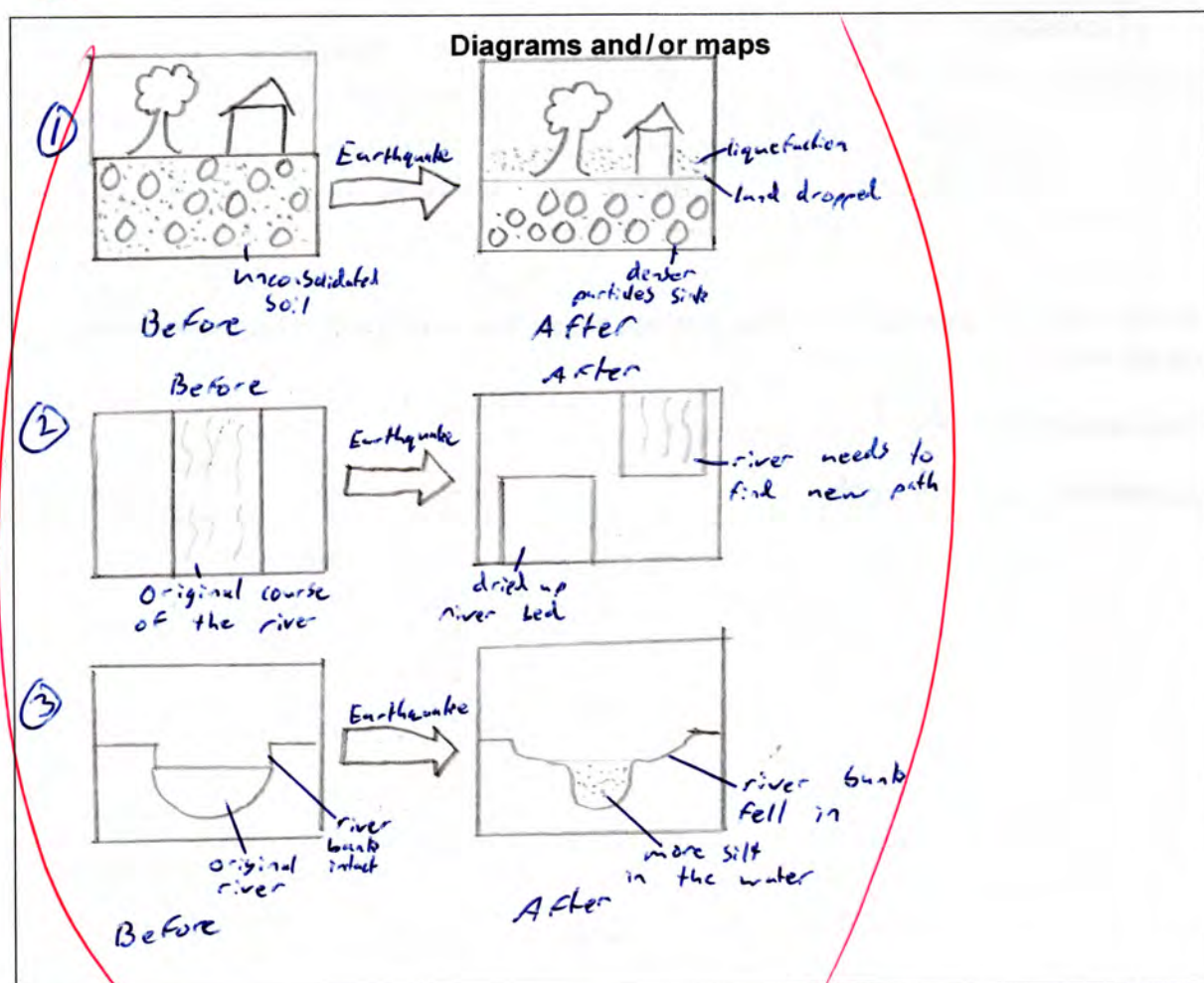
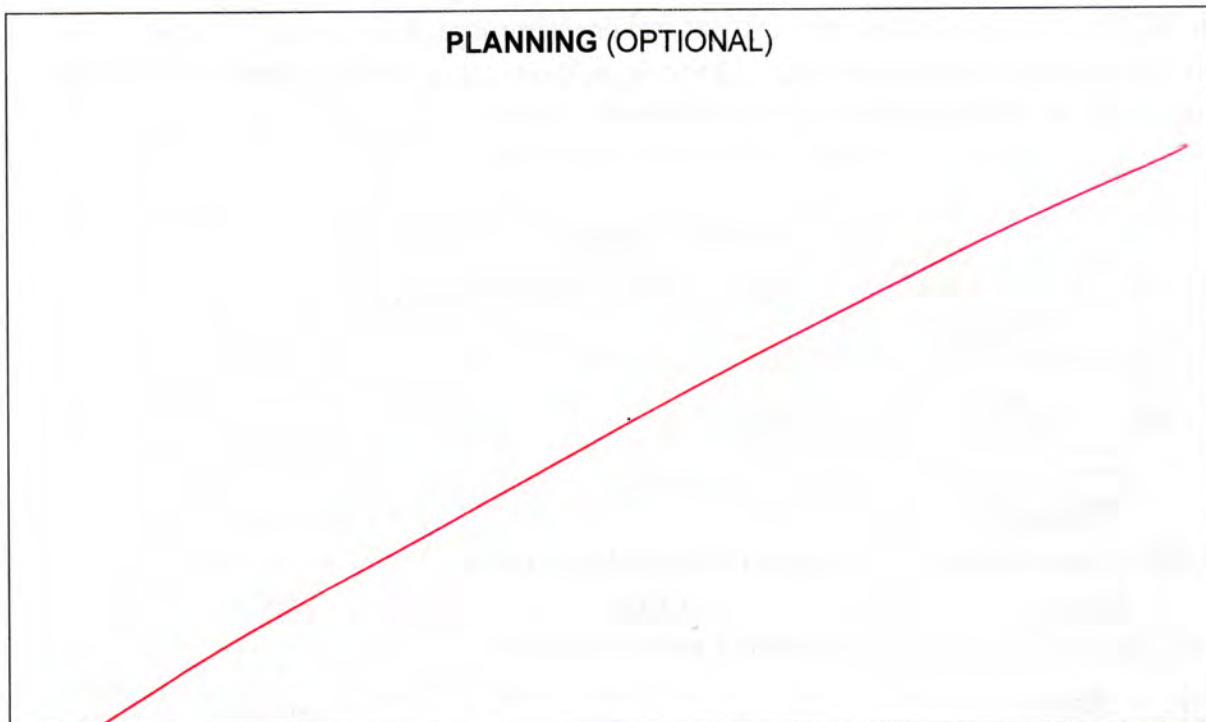
Characteristic (2): Rivers



- (b) Fully explain the effects of your extreme natural event on these two characteristics in your environment case study (studies).

In your answer, include the geographic concept of change, with integrated detailed supporting evidence from your environment case study (studies), and relevant supporting diagrams and/or maps.

### PLANNING (OPTIONAL)



Christchurch was built on unconsolidated soil. The city lay ~~up~~ on top of the soil before the 22 February 2011 Christchurch earthquake. However, the violent shaking that the 6.3 magnitude earthquake caused land to rise and sink in the city. The less dense particles like sand and silt rose up higher in the soil while the denser particles like rocks sank further down in the soil. The ~~earthquake~~ buildings were built on the ~~was~~ unconsolidated soil were reliant on the ~~hard~~ larger particles to support their buildings. The buildings stayed on the denser particles but the less dense particles still rose. This is called liquefaction and effected many areas in Christchurch after the 2011 earthquake. An example of this is the suburb of Bexley which ~~dropped~~ <sup>rose</sup> up to 2m and had heavy liquefaction. ~~The change liquefaction caused~~ This can be seen in diagram 1.

The September 2010 Canterbury earthquake effected many rivers in the rural region because that is where the Greendale fault is. The earthquake moved land so that ~~the~~ <sup>could</sup> rivers no longer flow in their original paths. This caused parts of rivers to dry up and killed much of the life living in those parts of the river. This is shown in diagram 2. The violent shaking also caused the ~~river banks~~ <sup>river banks</sup> to fill into the river narrowing the river and filling it with <sup>more</sup> silt. This is also bad for the life living in the river.

M5



### QUESTION THREE: The Human Response to an Extreme Natural Event

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Read the geographic concept below and refer to it when answering this question.

#### Geographic Concept

**Perspectives** are the way people view and interpret environments. Perspectives and values may be influenced by culture, environment, social systems, technology, economics, and politics. They may influence how people interact with environments, and the decisions and responses that they make.

People respond to the **impact or effects** of an extreme natural event in many different ways.

Circle below TWO time periods, and fully explain how a group of people responded to your extreme natural event during these time periods.

*Note: You should use a different group of people for each time period.*

Before the extreme  
natural event

Immediately after the  
extreme natural event

Days, weeks, or months after  
the extreme natural event

In your answer, include the geographic concept of perspectives, with integrated detailed supporting evidence from your environment case study (studies).

#### PLANNING (OPTIONAL)



Time period (1): Immediately after the Earthquake

Group of people: Residents of Christchurch

How this group of people responded to your extreme natural event during this time period:

Immediately after the <sup>September 2010</sup> 1 earthquake the people ~~got out~~ <sup>most people</sup> got out of bed as they had been sleeping at the time. They would have assessed the damage done to their property to see if there were cracks or if anything had broken. When they knew the ~~it~~ were safe and where they were was safe they would contact friends and family to check if they were alright as well. The ~~most~~ people living in Christchurch were damaged little by the September earthquake because it was located out in the countryside. The most effected people lived in the countryside and some houses had be destroyed. In the February 2011 earthquake the people of Christchurch were much more panicked because the quake was so much closer and more damage had been done. Some families had to swim through liquefaction to get in or out of their homes. Most people however were at work and raced out of buildings to the streets where it was safer.

Question Three continues on the next page



Time period (2): Days/months/weeks after

Group of people: Business owners/Businesses

How this group of people responded to your extreme natural event during this time period:

Days ~~after~~<sup>and</sup> weeks after the February 2011 Christchurch earthquake businesses began to understand the damage done to the work places and their employees. Some businesses buildings were damaged so bad that they couldn't reopen or, like the CTV building, were completely destroyed. If this happened to businesses, months after the ~~end~~<sup>earthquake</sup>, they would begin to rebuild. ~~if the damage~~<sup>This was good for</sup> the construction businesses in Christchurch because they had so many contracts. The increase of jobs needed done made more jobs available to people and so increased the construction industry. During the census following the quake it showed that 1 in 8 employed people in Christchurch worked in construction. Days and weeks after the earthquake businesses also began to know if anyone ~~of~~<sup>of</sup> their ~~to~~ employees were killed or injured. The amount of people available to work for them also affected the businesses decision on ~~what~~<sup>whether</sup> to open. In the CTV building ~~about~~<sup>but was demolished</sup> a large amount of damage was done and it could not reopen ~~at the same time~~<sup>later</sup>. This was the response the owners of the CTV building took ~~and~~<sup>because</sup> of the earthquake and chose to relocate to elsewhere in Christchurch.

M5



**Extra space if required.**  
**Write the part number(s) if applicable.**

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QUESTION  
NUMBER

Extra space if required.  
Write the part number(s) if applicable.

ASSESSOR'S  
USE ONLY

QUESTION  
NUMBER

91007



Low Merit exemplar for Geography 91007 2016			Total score	15
Q	Grade score	Annotation		
1	M5	The candidate attempts to explain the natural processes that operate to produce the extreme natural event within the case study environment. Attempted explanation is quite generic, without integrated supporting evidence (the evidence is tacked on the end). Descriptive in parts, but does demonstrate understanding of the concept of processes at a Merit level.		
2	M5	The candidate shows an understanding of the natural environment as different from the cultural environment, and attempts to explain effects on two characteristics within the named case study environment. Some detailed supporting evidence is included. The diagrams help the attempted explanation and show some understanding of the concept of change.		
3	M5	The candidate attempts to explain how two different groups of people responded at two different time periods. Some information is quite generic and so only some supporting details are provided. No inference or application of the key concept of perspectives.		