The Challenge of Natural Hazards – MARK SCHEME

1 (a) A plate margin is the boundary / location where two slabs of earth's crust meet. This may be the meeting of crust of the same type or different types – such as oceanic and continental.

2 × 1 per simple point, 1 + 1 for an elaborated point

AO1 = 1
AO3 = 1

(b) A constructive plate margin occurs where two plates move apart, whereas plates move together at a destructive plate margin. New crust is created at a constructive plate margin where it can be melted and destroyed at a destructive plate margin. Contrasting landforms occur at the different margins with fold mountains being found at destructive margins together with ocean trenches and composite volcanoes instead of mid-ocean ridges and shield volcanoes and rift valleys at constructive margins. Eruptions are more violent and earthquakes more severe at destructive plate margins.

Allow 1 mark for separate accounts.

3 × 1 per simple point, 1 + 1 for an elaborated point +1

AO1 = 1
AO2 = 1
AO3 = 1

[Total 5 marks]

2 Oceanic crust is generally less than 200 million years old – some is much newer – a million years old in Iceland. It is dense and can sink beneath continental crust. Oceanic crust can be renewed at constructive plate margins and destroyed at subduction zones. The characteristics may be described in a comparative way with reference to continental crust.

1 mark for a list of 2 characteristics.

3 × 1 per basic point, 1 + 1 per elaborated point + 1 any combination.

AO3 = 1

[Total 3 marks]

3 One mark for the correct answer:

(a) C. There are many active volcanoes around the edge of the Pacific Ocean.

No credit if two or more statements are selected.

AO4 = 1

(b) This question requires application of knowledge to the source.

- Plates are coming together / converging / colliding.
- One plate is pushed (subducted, sinks) under the other.
- The ocean floor is moving under the continental plate.

No credit for explanations of plate movement or for stating destructive margin.

AO3 = 1

[Total 2 marks]

4 Any valid point such as they form over warm, tropical seas (1) with a temperature of over 26.5 / 27°C (1) in summer when seas are warmest (1) at latitudes more than 5°N and S of the Equator (1) so that the 'spin' can develop (1). In these areas storms are joining together (1) due to the instability of the air (1).

AO1 = 2
AO2 = 1

[Total 3 marks]

5 (a) Credit use of direction, starting point, distances, dates and named locations.
E.g.

Hurricane had a change of direction (1) of W/WNW initially, then N/NNW (1)

Its movement was in a W/WNW/NW direction (1)

It passed to the north of Puerto Rico / Dominican Republic / Cuba (1)

It reached landfall over Florida and moved towards Georgia (1)

Max 1 mark for list of countries / places

No credit for changes in intensity.

AO4 = 2

(b) The wind reduced (1)

It fell from a category 5 (1)

It dropped from over 252 km per hour.(1)

The wind speed halved in this time (1)

Wind speed remained very high then reduced (1)

AO4 = 1

[Total 3 marks]

6 Two separate primary effects should be stated, based on evidence in the photograph

E.g. Roofs of many houses blown away / destroyed (1)

Much damage to buildings, with some completely destroyed / liable to collapse (1)

Many people made homeless. (1)

Damage to infrastructure such as pathways / roads. (1)

No credit for longer term or secondary effects, or for effects not observable in the photograph.

AO4 = 2

[Total 2 marks]

7 There should be recognition of a worldwide change for 1 mark and reference to increasing or decreasing temperatures, rainfall patterns for the second mark.

Both components of the answer must be addressed for 2 marks. 2 × 1

AO1 = 2

[Total 2 marks]

8 Any two (2 × 1 marks) from; power stations; factories; transport; animals.

AO2 = 2

[Total 2 marks]

9 (a) One mark for idea of steady increase followed by rapid rise in CO_2 levels / exponential rise.

Second mark for use of data shown on graph or for data manipulation, e.g. CO_2 concentration increased by almost 100 ppm in 150 years.

No credit for increase in CO_2 levels without qualification.

AO4 = 2

(b) Credit **one** reason only. Valid developed point awarded 2 marks.

One mark for appropriate reason, e.g.

- burning of fossil fuels (1)
- manufacturing of products like cement (1)
- deforestation (1).

Allow natural factors such as volcanic activity (1).

Second mark for developed reason, e.g.

- thermal power stations burn fossil fuels which release gases including carbon dioxide which build up in the atmosphere (2).

AO2 = 2

[Total 4 marks]

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Level	Marks	Description
2 (Clear)	3 – 4	AO1 Demonstrates accurate knowledge about long-term climate change. AO2 Shows a clear understanding of the natural factors that help to account for long-term changes in climate. Explanations are developed.
1 (Basic)	1 – 2	AO1 Demonstrates limited knowledge about long-term climate change. AO2 Demonstrates some understanding of the natural factors that help to account for long-term changes in climate. Explanations are partial and limited in scope.
	0	No relevant content.

Indicative content

- **Level 2** responses will be developed explanation(s) or linked statements about the natural factors affecting long term climate change, with some accurate use of geographical terms
- **Level 1** responses are likely to be simple random statements, with little development, sequence or explanation. Limited subject vocabulary used.
- The command word is “explain” which requires an account as to how and why natural factors may contribute to climate change
- Knowledge of long term changes in climate since start of Quaternary period. Patterns of alternating cold periods (glacials) and warm periods (interglacials). Up to 10 glacial periods in past million years. Ice age continued until 12000 years before present.
- Understanding the effects of orbital Changes. Changes from a circular to an oval orbit can affect the amount of sunlight the earth receives. It takes 100,000 years for the Earth’s orbit to change from being more circular to an ellipse and back

again. This eccentricity cycle coincides closely with the alternating cold (glacial) and warm (inter-glacial) periods in the Quaternary period. These changes are called Milankovitch Cycles. The Earth wobbles on its axis leading to changes in its tilt. When the Earth is more upright, it receives a greater amount of energy from the sun and experiences higher temperatures.

- Understanding of the effects of volcanic activity. Volcanoes can release large amounts of ash. This can reflect the Sun's rays causing the planet to cool. Over time however, eruptions can release large quantities of greenhouse gases e.g. Carbon dioxide. These gases can trap the Sun's rays causing the planet to warm.
- Expect both factors to be explained for top of Level 2, but a well-developed explanation of one factor gains access to low Level 2.
- Reject human causes such as the enhanced greenhouse effect / global warming.

AO1 = 2
AO2 = 2

[Total 4 marks]