Surname	Centre Number	Candidate Number
First name(s)		2

GCE AS/A LEVEL

S24-2110U10-1

2110U10-1

TUESDAY, 14 MAY 2024 – AFTERNOON

GEOGRAPHY – AS unit 1
CHANGING LANDSCAPES

2 hours

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
Either 1 and 2 or 3 and 4	**16**	
	16	
	16	
	16	
5.	**20**	
6.	**26**	
7.	**18**	
Total	**96**	

2110U101
01

ADDITIONAL MATERIALS

Resource Folder.
A calculator.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

You may use a pencil for graphs and diagrams only.

Write your name, centre number and candidate number in the spaces at the top of this page.

Write your answers in the spaces provided in this booklet.

In Section A, answer **either** questions 1 and 2 **or** questions 3 and 4.

Answer **all** questions in Section B.

If further space is required you should use the additional page(s) at the back of this booklet. The question number(s) should be clearly shown.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part-question; you are advised to divide your time accordingly.

This paper requires that you make as full use as possible of appropriate examples and reference to data to support your answers. Sketch maps and diagrams should be included where relevant.

A plain page is available near the back of the booklet for you to add any relevant sketch maps and diagrams you may wish to include. The question number(s) should be clearly shown.

© WJEC CBAC Ltd.

Section A: Changing Landscapes

Answer **either** questions 1 and 2 **or** questions 3 and 4 from your chosen landscape.

Make the fullest possible use of examples and data to support your answers.

Either: Coastal Landscapes

Answer questions 1 **and** 2 if this is your chosen landscape.

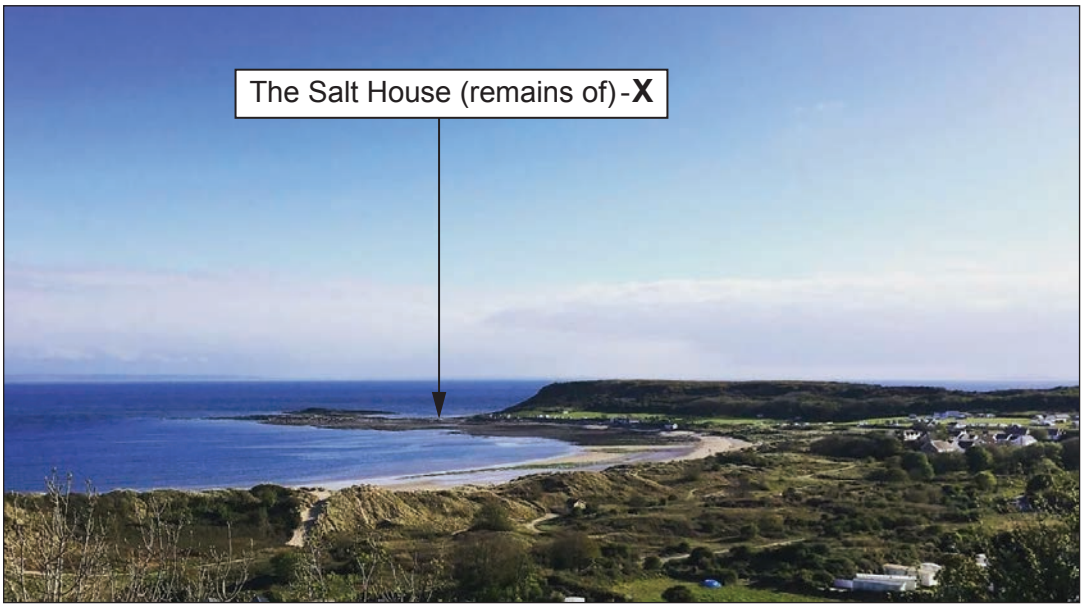
Figure 1a: OS 1:25000 map of Port Eynon, Gower Peninsula

Source: Ordnance Survey

© WJEC CBAC Ltd.

Examiner only

Figure 1b: View of Port-Eynon Point and the remains of the Salt House



Source: https://westernside-cottage-horton-glamorgan.hotelmix.co.uk/

1. (a) (i) Use **Figure 1a** to state the six-figure grid reference of the Salt House (**X**). [1]

.....

(ii) Use **Figure 1a and Figure 1b** to give the direction in which the camera was facing when the photograph was taken. [1]

.....

(iii) Use **Figure 1a** and the **Resource Folder** to describe the characteristics of Port Eynon Beach. [3]

.....

.....

.....

.....

.....

.....

2110U101
03

© WJEC CBAC Ltd.

Turn over.

Examiner only

(iv) Suggest **one** way in which the coastal landscape in **Figures 1a and 1b** could have a positive impact on human activity. [3]

.....

.....

.....

.....

.....

.....

© WJEC CBAC Ltd.

Examiner only

(b) Examine the importance of cliff erosion in the supply of sediment to the coastal system. [8]

Additional space for Question **1**(b) only:

© WJEC CBAC Ltd.

Turn over.

Figure 2: The changing coast at Happisburgh, Norfolk, 1999–2019

Figure 2a: 1999

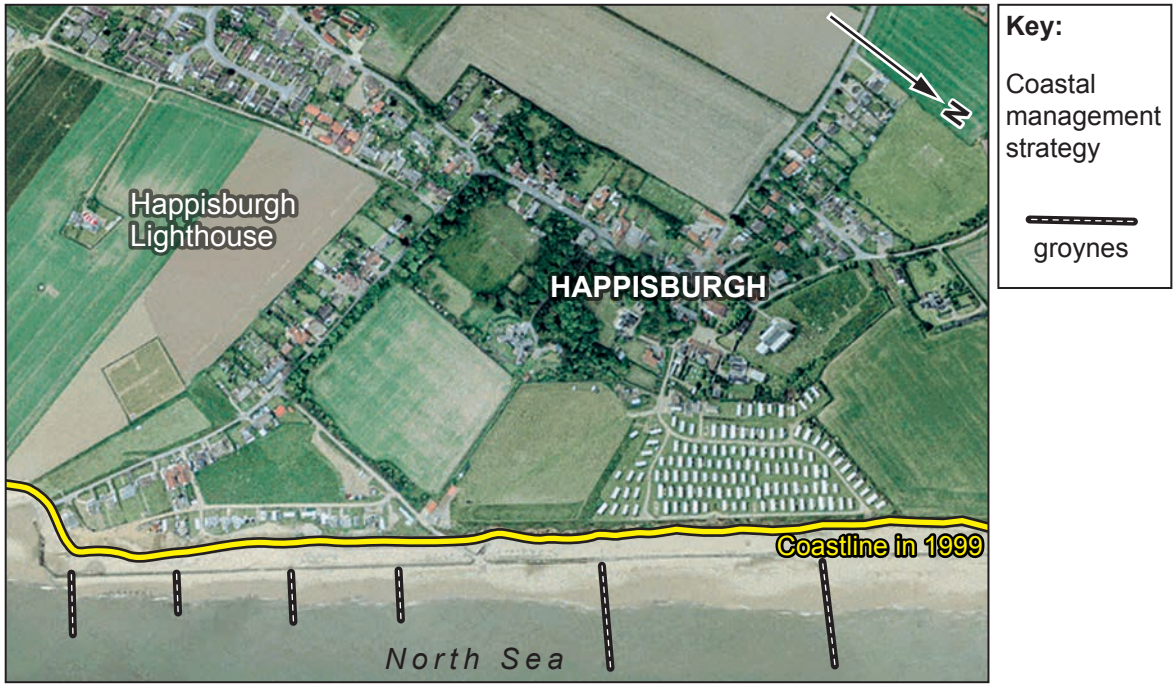
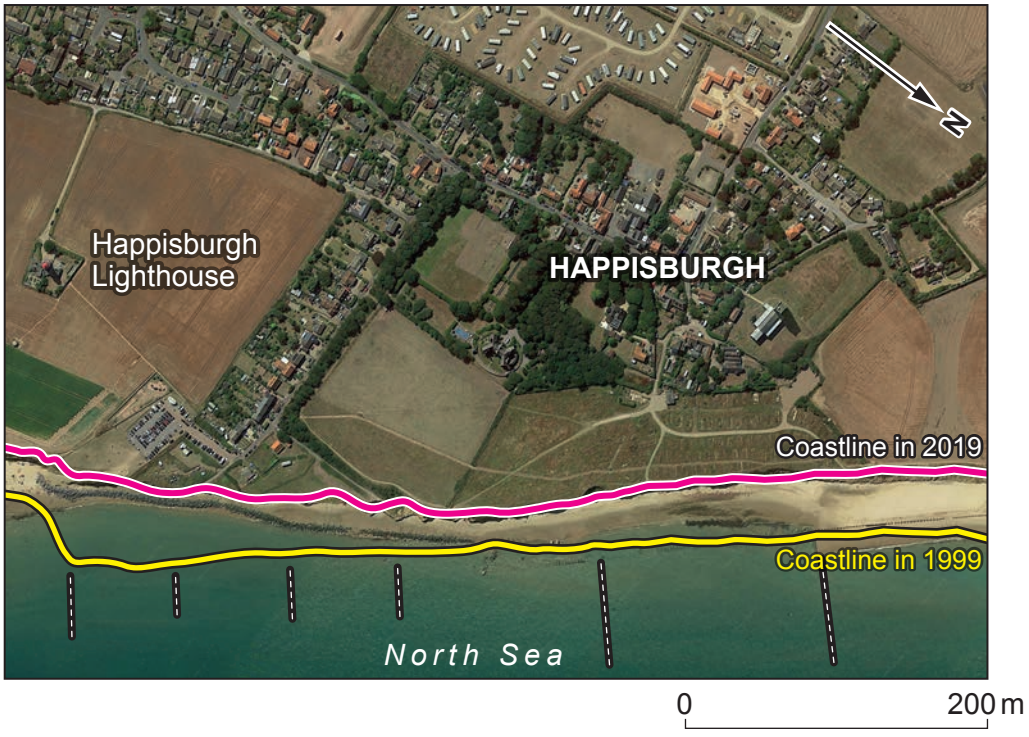


Figure 2b: 2019



Source: Financial Times

© WJEC CBAC Ltd.

Examiner only

2. (a) (i) Use **Figure 2a and Figure 2b** to describe changes in the area shown. [5]

(ii) Suggest why groynes have been constructed in this area. [3]

© WJEC CBAC Ltd.

Examiner only

(b) Examine the role of geological factors in determining the rate of coastal erosion. [8]

Additional space for Question **2**(b) only:

© WJEC CBAC Ltd.

BLANK PAGE

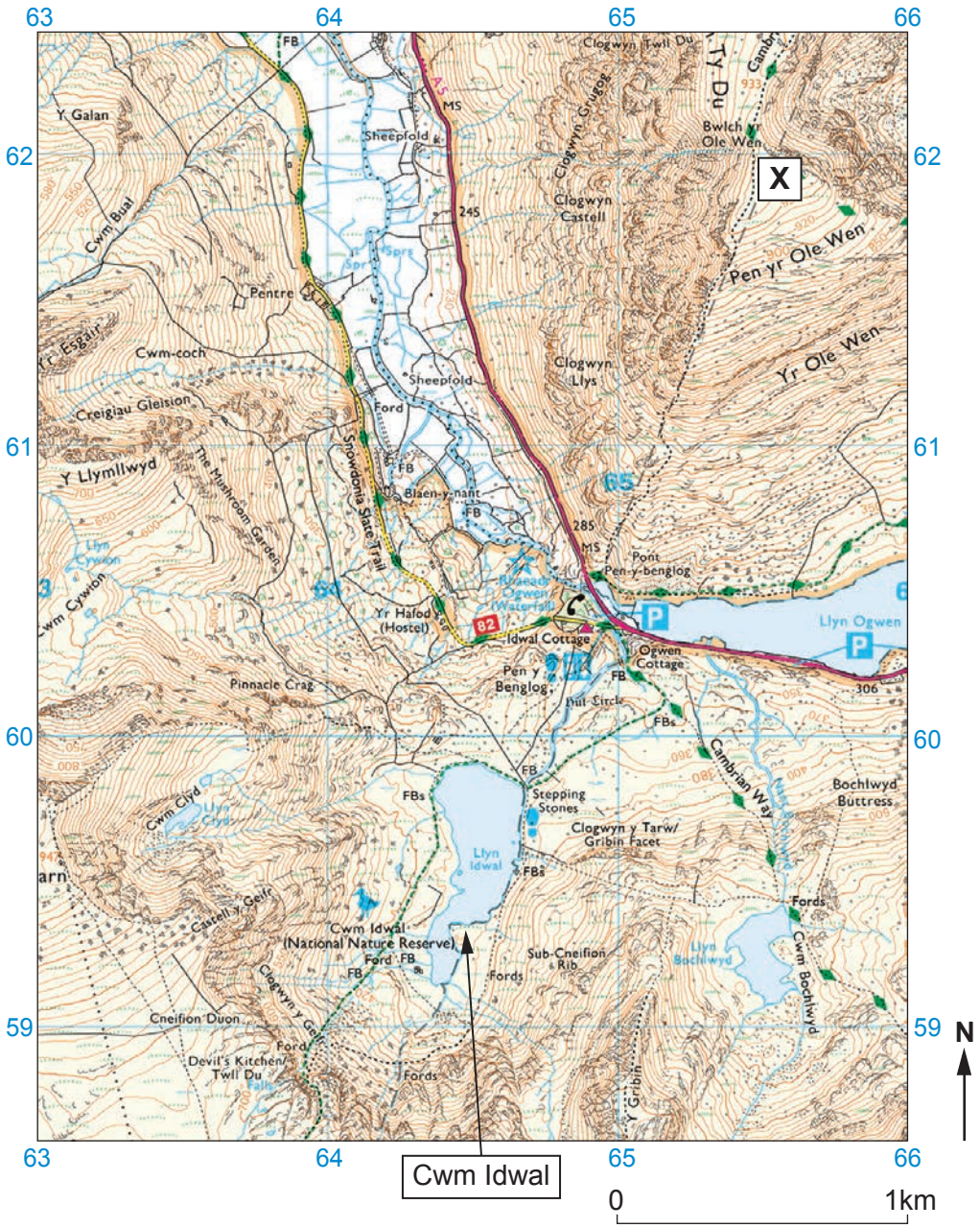
PLEASE DO NOT WRITE ON THIS PAGE

© WJEC CBAC Ltd.

Or: Glaciated Landscapes

Answer questions 3 **and** 4 if this is your chosen landscape.

Figure 3a: OS 1:25 000 map of Cwm Idwal area, Eryri



Source: Ordnance Survey

© WJEC CBAC Ltd.

Examiner only

Figure 3b: View of Pen yr Ole Wen

3. (a) (i) Use **Figure 3a** to state the six-figure grid reference of the summit of Pen yr Ole Wen (**X**). [1]

.....

(ii) Use **Figure 3a and Figure 3b** to give the direction in which the camera was facing when the photograph was taken. [1]

.....

(iii) Use **Figure 3a** and the **Resource Folder** to describe the characteristics of the cirque at Cwm Idwal. [3]

.....

.....

.....

.....

.....

.....

© WJEC CBAC Ltd.

Turn over.

Examiner only

(iv) Suggest **one** way in which the glaciated landscape in **Figures 3a and 3b** could have a positive impact on human activity. [3]

.....

.....

.....

.....

.....

.....

© WJEC CBAC Ltd.

Examiner only

(b) Examine the importance of winter precipitation to mass balance in a glacier system. [8]

Additional space for Question **3**(b) only:

© WJEC CBAC Ltd.

Turn over.

Figure 4: Changes in the Tschierva Glacier, Switzerland, 1935–2022

Figure 4a: 1935

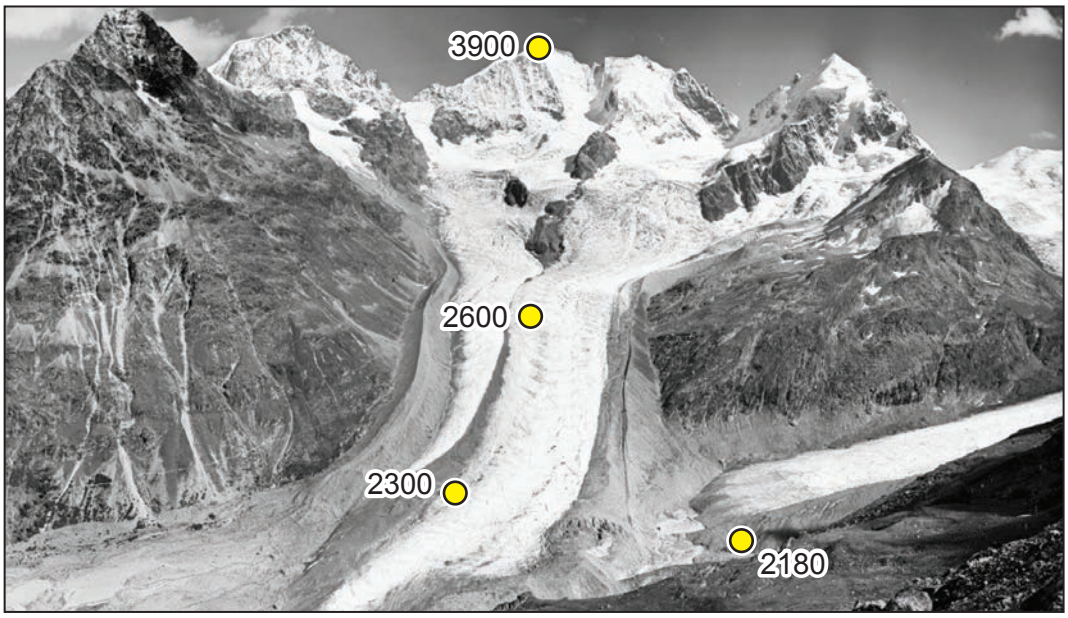
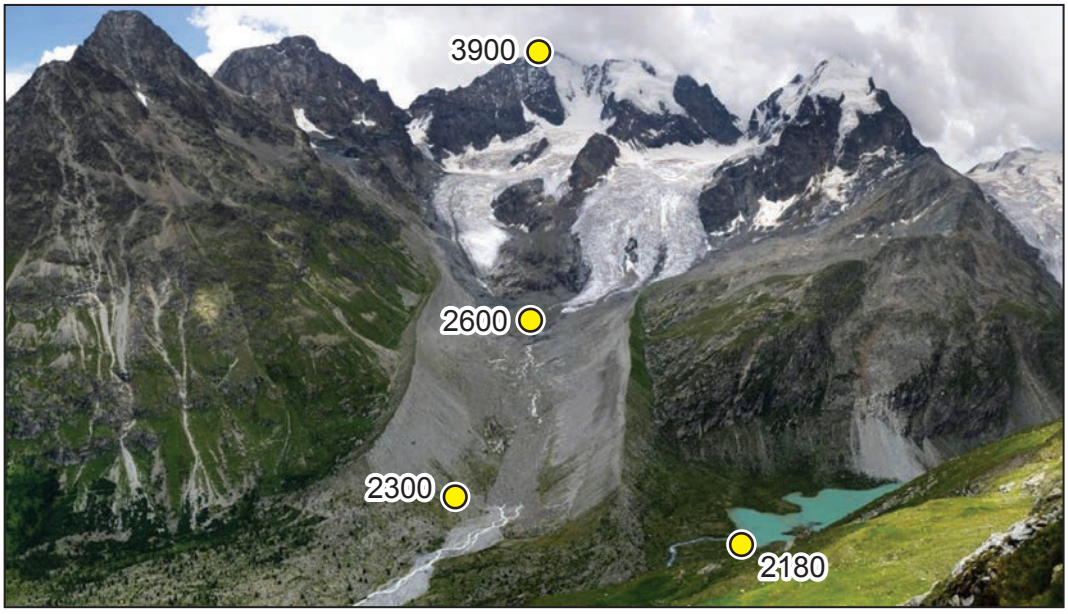


Figure 4b: 2022



Key: ○ height above mean sea level (metres)

Source: https://english.kyodonews.net/news/2022/09/968feda2bb10-swiss-glaciers-shrink-by-half-since-1930s-melting-faster-study.html

© WJEC CBAC Ltd.

Examiner only

4. (a) (i) Use **Figure 4a and Figure 4b** to describe changes in the area shown. [5]

(ii) Suggest why rapid mass movement may occur in this area. [3]

© WJEC CBAC Ltd.

Turn over.

Examiner only

(b) Examine the role of freeze-thaw weathering in the formation of **one or more** periglacial landforms. [8]

Additional space for Question **4**(b) only:

© WJEC CBAC Ltd.

BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE

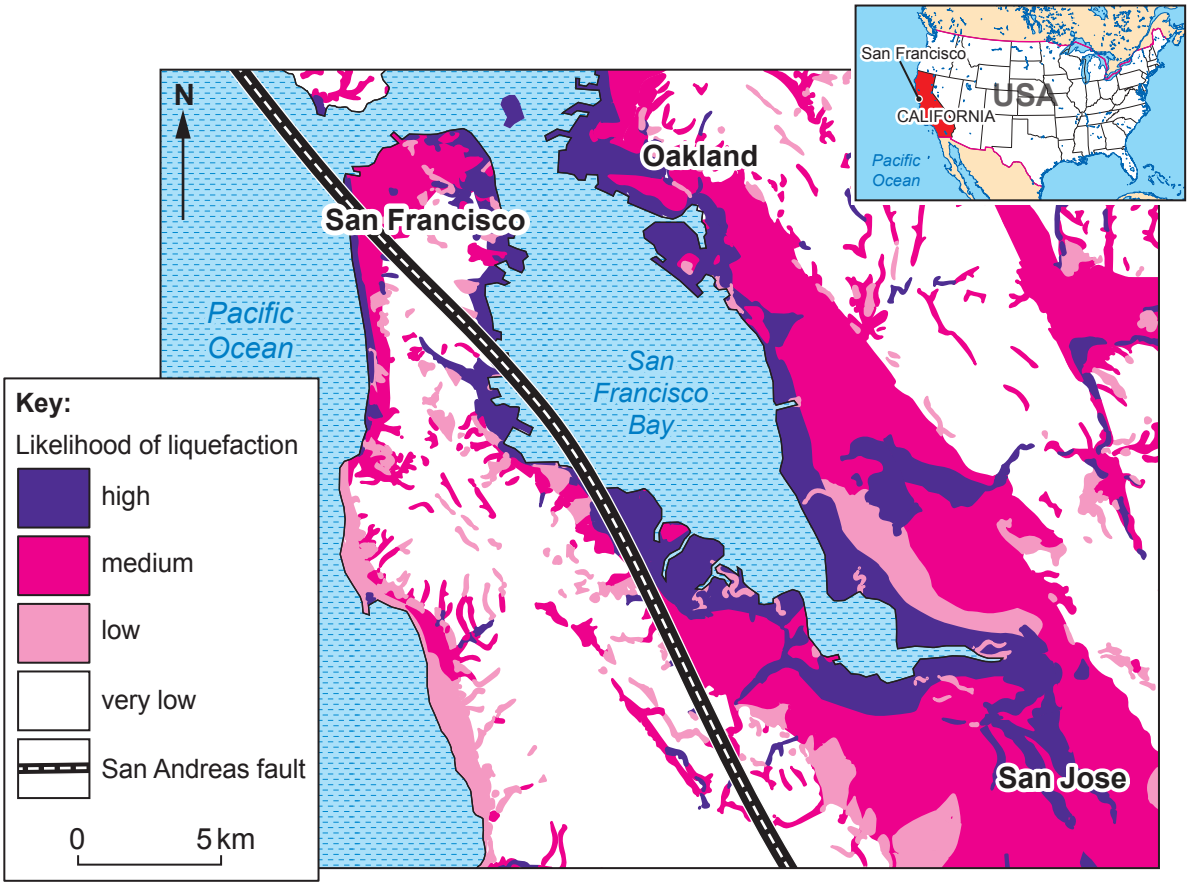
© WJEC CBAC Ltd.

Section B: Tectonic Hazards

Answer **all** questions.

Make the fullest possible use of examples and data to support your answers.

Figure 5a: Map showing likelihood of liquefaction across the San Francisco area, California



Source: USGS

© WJEC CBAC Ltd.

Examiner only

5. (a) Use **Figure 5a** to describe variations in the likelihood of liquefaction. [6]

© WJEC CBAC Ltd.

Examiner only

Figure 5b: A Chi-squared test was used to see whether surface geology in California significantly impacts the intensity of ground shaking.

The **null hypothesis** is: 'There is no significant difference in the intensity of ground shaking in areas of differing surface geology during earthquakes in California.'

	Observed incidences of intense ground shaking (O)	Expected incidences of intense ground shaking (E)	O–E	$(O–E)^2$	$\frac{(O–E)^2}{E}$
Soft sediment	**17**	**9**	**A**	**64**	**7.11**
Soft rock	**7**	**9**	**–2**	**4**	**0.44**
Hard rock	**3**	**9**	**–6**	**B**	**4**
				Total	**11.55**

Chi-squared value = 11.55

Source: adapted from Seismological Society of America

Figure 5c: Critical values for Chi-squared test

Significance (confidence) levels	95% (0.05)	99% (0.01)	99.9% (0.001)
Critical values	5.99	9.21	13.82

(b) (i) Give the values for A and B in **Figure 5b**. [2]

A .....

B .....

© WJEC CBAC Ltd.

Examiner only

(ii) Use **Figure 5b and Figure 5c** to comment on the nature and significance of the result of the Chi-squared test. [4]

(c) Outline the secondary effects of a named earthquake event. [8]

© WJEC CBAC Ltd.

Examiner only

Additional space for Question **5**(c) only: .....

.....

.....

.....

.....

.....

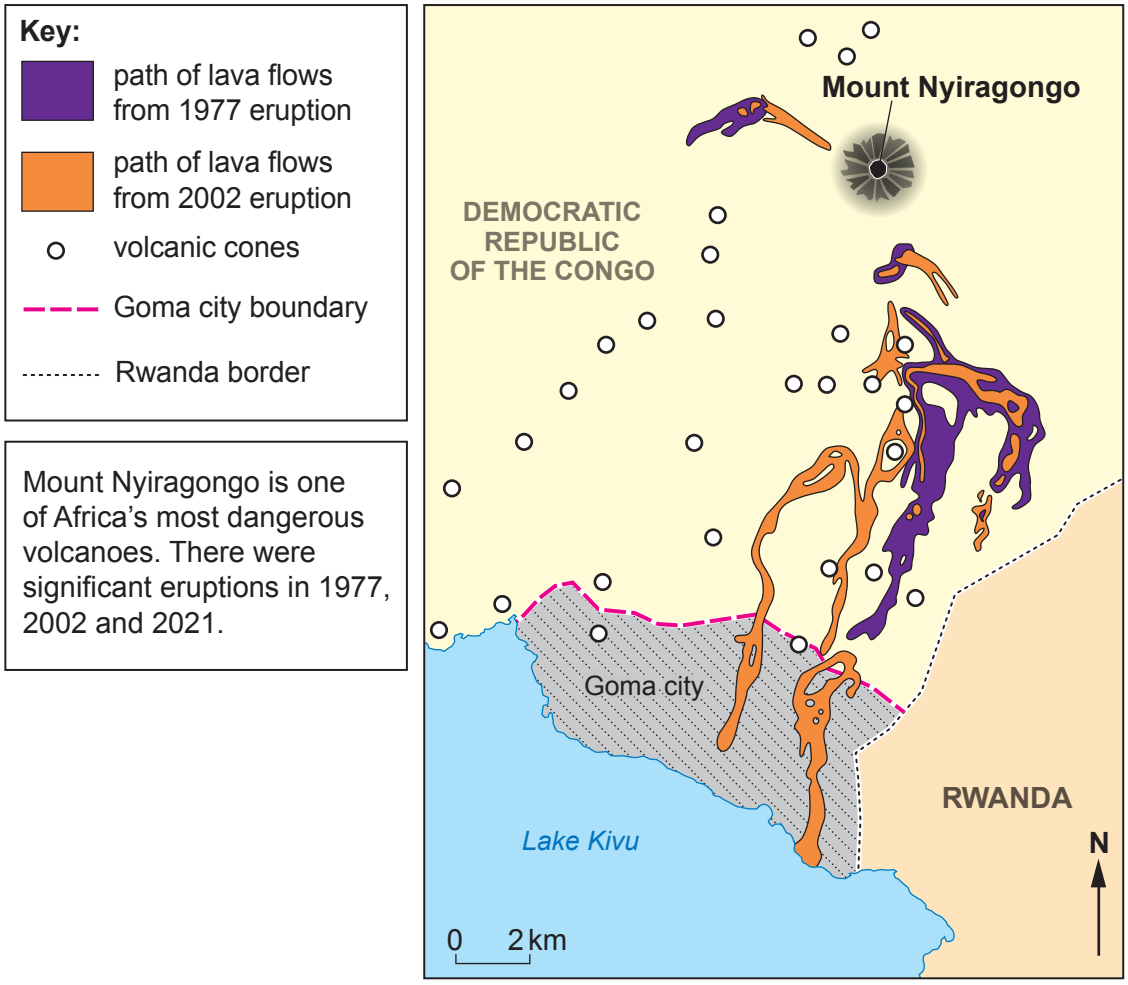
.....

.....

© WJEC CBAC Ltd.

Examiner only

Figure 6a: Map showing paths of lava flows from Mount Nyiragongo, 1977 and 2002



Mount Nyiragongo is one of Africa's most dangerous volcanoes. There were significant eruptions in 1977, 2002 and 2021.

Source: www.sciencenews.org

6. (a) Use **Figure 6a** to describe the path of the 2002 lava flows from Mount Nyiragongo. [2]

.....

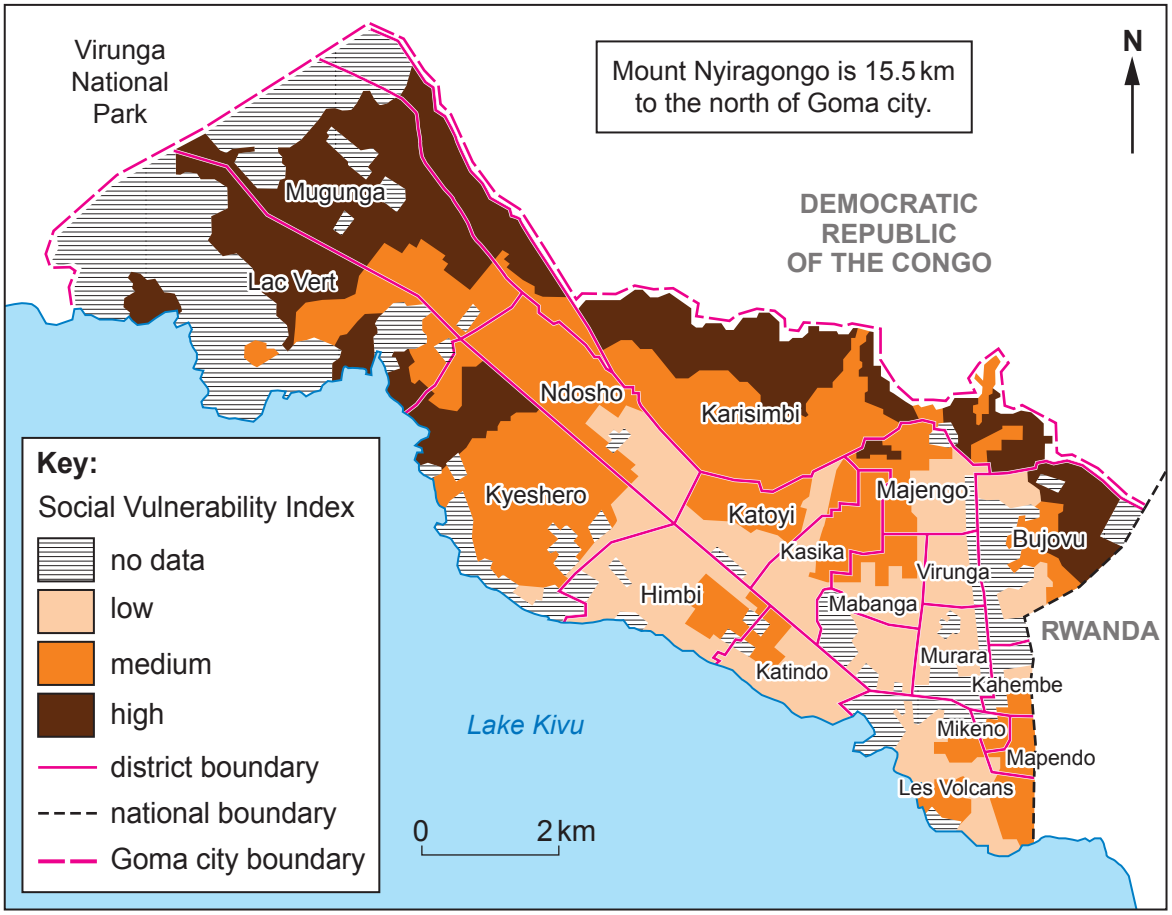
.....

.....

.....

© WJEC CBAC Ltd.

Figure 6b: Social vulnerability to volcanic eruptions in Goma city, Democratic Republic of the Congo



The **Social Vulnerability Index** is based on household income, levels of education and housing quality.

GDP per capita per year in DR Congo is $511.60. In Wales, GDP per capita per year is $31,991.

Source: Science direct

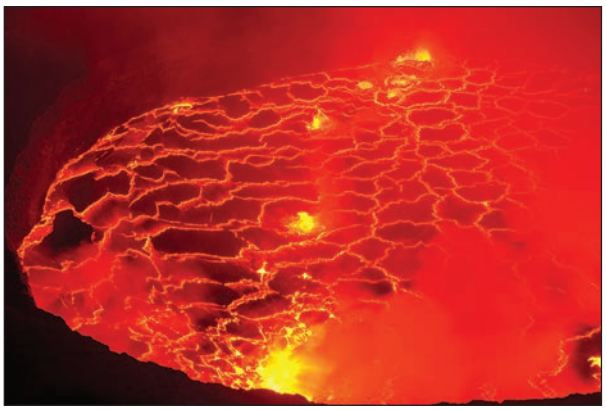
© WJEC CBAC Ltd.

Examiner only

(b) Use **Figure 6b** to describe the distribution of areas of **high** social vulnerability to volcanic eruptions. [5]

© WJEC CBAC Ltd.

Figure 6c: Issues affecting hazard management in Democratic Republic of the Congo



Mount Nyiragongo has a permanent 200-metre-wide lava lake. In 2002, runny lava drained away in a few hours, flowing at 60 kmph. It was 2 metres deep in parts of Goma city. Toxic gases, such as carbon dioxide, were released from fissures and from the crater.

The eruption of 2021 was not predicted and the lava stopped less than 300 metres away from Goma city.

Since 2000, the at-risk population living in the shadow of the volcano has more than doubled to 1.5 million. Refugees from Rwanda added to the population from the mid-1990s.

Civil unrest in the area makes monitoring the volcano dangerous. In 2020, 13 park rangers were killed in an ambush in the nearby Virunga (Albert) National Park. Monitoring equipment has been vandalised or stolen.

© WJEC CBAC Ltd.

Examiner only

(c) Use **Figure 6a and Figure 6c** to suggest **physical** reasons why it is difficult to manage the risk from future eruptions of Mount Nyiragongo. [9]

Additional space for Question **6**(c) only:

© WJEC CBAC Ltd.

Examiner only

(d) Use **Figure 6b and Figure 6c** to examine different **human** factors affecting vulnerability to volcanic eruptions in Goma city. [10]

© WJEC CBAC Ltd.

Examiner only

Additional space for Question **6**(d) only: .....

7. (a) Examine the effectiveness of prediction as a response to volcanic hazards. [8]

© WJEC CBAC Ltd.

Examiner only

Additional space for Question **7**(a) only: .....

(b) Outline the tectonic processes operating at diverging plate margins. [10]

© WJEC CBAC Ltd.

Examiner only

.....

.....

.....

Additional space for Question **7**(b) only: .....

.....

.....

.....

.....

.....

.....

.....

END OF PAPER

© WJEC CBAC Ltd.

Question number	Additional page, if required for diagrams. Write the question number(s) in the left-hand margin.

Examiner only

© WJEC CBAC Ltd.

Question number	Additional page, if required. Write the question number(s) in the left-hand margin.

Examiner only

© WJEC CBAC Ltd.

Question number	Additional page, if required. Write the question number(s) in the left-hand margin.

Examiner only

© WJEC CBAC Ltd.

Question number	Additional page, if required. Write the question number(s) in the left-hand margin.

Examiner only

© WJEC CBAC Ltd.

BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE

© WJEC CBAC Ltd.