

SECTION B

Questions 5 - 7 relate to the **British Geological Survey 1:25,000 geological map extract of Castleton.**

Answer **all** questions in the spaces provided.

This section should take approximately 1 hour to complete.

5. (a) Describe the outcrop distribution of the Apron-Reef (**Rap**), within the Lower Carboniferous, Bee Low Limestones (**BLL**), across the area of the **geological map**. [2]

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- (b) Refer to the geology **north** of gridline **83** on the **geological map**.

Complete the table below by describing the **map evidence** for the relative age of **each** of the following sets of strata:

1. Bee Low Limestone (**BLL**) and Millstone Grit (Edale Shales) (**MG**);
2. Head and landslide deposits.

[2]

Beds/deposits in order of age (oldest at base)		Map evidence for relative age
2	Landslide	•
	Head
1	Edale Shales (MG)	•
	Bee Low Limestones (BLL)

- (c) Along the line of the **cross section**, the Shale Grit (**SG**) of the Upper Carboniferous within grid square **1183** is shown to be dipping very gently.

- (i) Describe the outcrop pattern of the Shale Grit (**SG**) within grid square **1183**. [1]

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- (ii) Evaluate the **map evidence** within grid square **1183** that suggests the Shale Grit (**SG**) is very gently dipping. [2]

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Total 7 marks

6. During the Lower Carboniferous, the area covered by the **geological map** was part of a:

“..shallow-water lagoon, close to the equator, with a deeper water basin to the north. It was associated with small but active volcanic vents producing fluid lava”.

- (a) Outline the evidence that supports these conclusions from the **geological map** and **generalized geological column**. [3]

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- (b) **Figure 5** is a field sketch of a vertical section of Apron-Reef limestone (**Rap**) at **grid reference 134834**. The section is **in situ**.

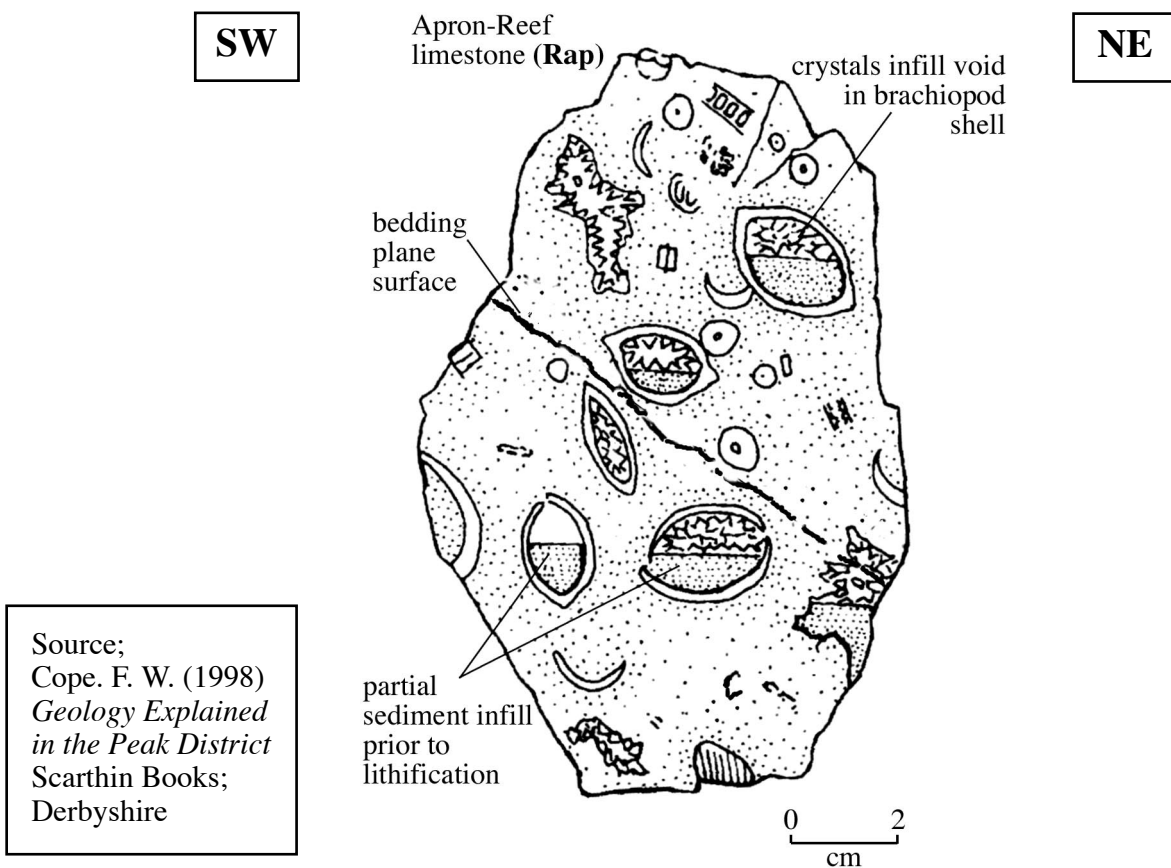


Figure 5

- (i) Complete the chart below by measuring the dip of the limestone in **Figure 5**. [1]

Dip of the limestone in Figure 5	• degrees
Dip of the sediment infilling the shells	Horizontal - 0 degrees

- (ii) Explain how the field data (**Figure 5**) supports the theory that the Apron-Reef limestone (**Rap**) was laid down on a slope rather than being tilted by later folding. [2]

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Total 6 marks

7. The mineral veins (rakes) are interpreted from field evidence as having been formed by

*“hot mineralising fluids ascending along **steeply inclined faults** that appear to **show strike-slip movement** as well as **vertical displacement**”.*

- (a) Refer to the **geological map**.

- (i) Describe the orientation and distribution of the mineral veins. [2]

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- (ii) Describe the **map evidence** to support the hypothesis that mineralisation was along ‘*steeply inclined faults*’. [2]

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- (b) Refer to the Oxlow Rake fault system within grid squares **1280** and **1380** on the **geological map**.

- (i) Measure the **amount** and state the **type** of horizontal displacement along the Oxlow Rake fault system. [2]

Amount (m) Type

- (ii) Explain how **field evidence** might be used to determine the actual direction of movement (slip direction) along the Oxlow Rake fault system. [2]

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- (c) Assess the potential geological problems that might be associated with extraction of the minerals from these veins. [3]

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Total 11 marks

8. **Figure 6** is a section through the Mam Tor landslide along the line A - B on the **geological map**. Continued disturbance and repair of the main A625 road, which crosses the landslide twice, finally resulted in its closure in 1979.

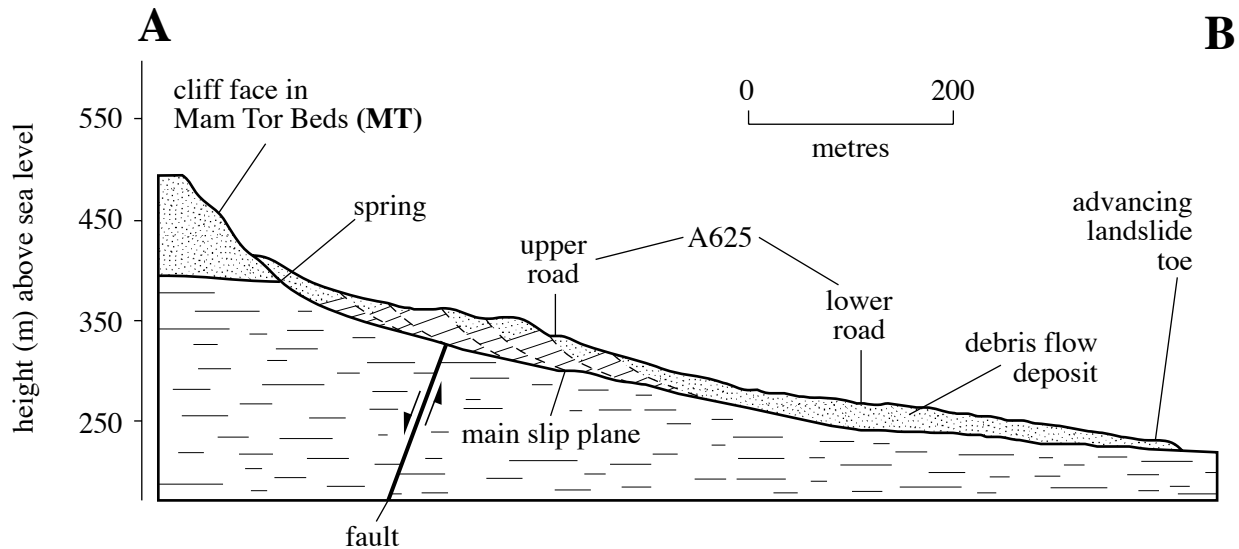


Figure 6

Refer to the Mam Tor landslide (**grid square 1383**) and **Figure 6**.

- (a) (i) Complete the table below to describe the characteristics of the Mam Tor landslide. [3]

Characteristics of the Mam Tor Landslide	
Solid geology of cliff face	Mam Tor Beds (MT) - sandstones
Solid geology beneath slip plane	•
Maximum length (along line A - B)	•
Maximum width (at 90° to line A - B)	550 m
Type of faults produced within the landslide	•
Original hillslope angle that failed.	30 - 35 degrees

- (ii) Using evidence from the **geological map** and **Figure 6**, give a geological explanation for a landslide at this location. [3]

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(iii) Using your knowledge and evidence from the data provided, assess the geological implications of reopening the A625 road to light traffic. You should focus on the measures that might be undertaken to

1. **monitor** the landslide,
2. **stabilise** the slope. Evaluate the likely success of the stabilising solutions. [6]

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Total 12 marks

[illegible]