

SECTION B

Questions 5 - 7 relate to the **British Geological Survey 1:50,000 Geological Map** extract of **Stoke-on-Trent**.

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

This section should take approximately 1 hour to complete.

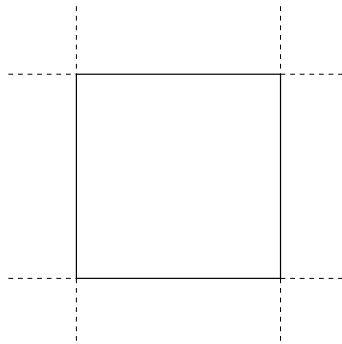
5. The **geological map** shows only the **solid** geology.

(a) State what is meant by the **solid** geology.

[1]

(b) The unconformity at the base of the Triassic Chester Pebble Bed (**CPB**) and Kinnerton Sandstone formations (**KnS**) crops out in the west of the **geological map**. In the grid square below, draw and label the **map evidence** for this unconformity from **any one** appropriate grid square. Carefully label the grid-lines and the position of the unconformity on your map.

[3]



(c) Refer to the **geological map** and generalised **geological column**.

(i) Complete the table below to indicate the local dip in **Box A** on the **geological map** and the order of superposition of the **top two** coal seams to be encountered in the abandoned mine shaft at grid reference (GR) **872511**.

[3]

Direction	Angle of dip (degrees)	Name of coal seam	Age of coal seam
SW	•	•	Youngest
		•	Oldest

- (ii) Briefly suggest a probable reason for the irregular outcrop pattern of Upper Coal Measures (**UCM**) within grid square **8250**. [1]

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- (iii) Explain why the outcrop pattern of Upper Coal Measures (**UCM**) in Box **B** is “v-shaped” towards the SE around GR **840520**. [2]

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Total 10 marks

Turn over.

6. Figure 6 is a sketch of part of the **geological map** showing structural features.

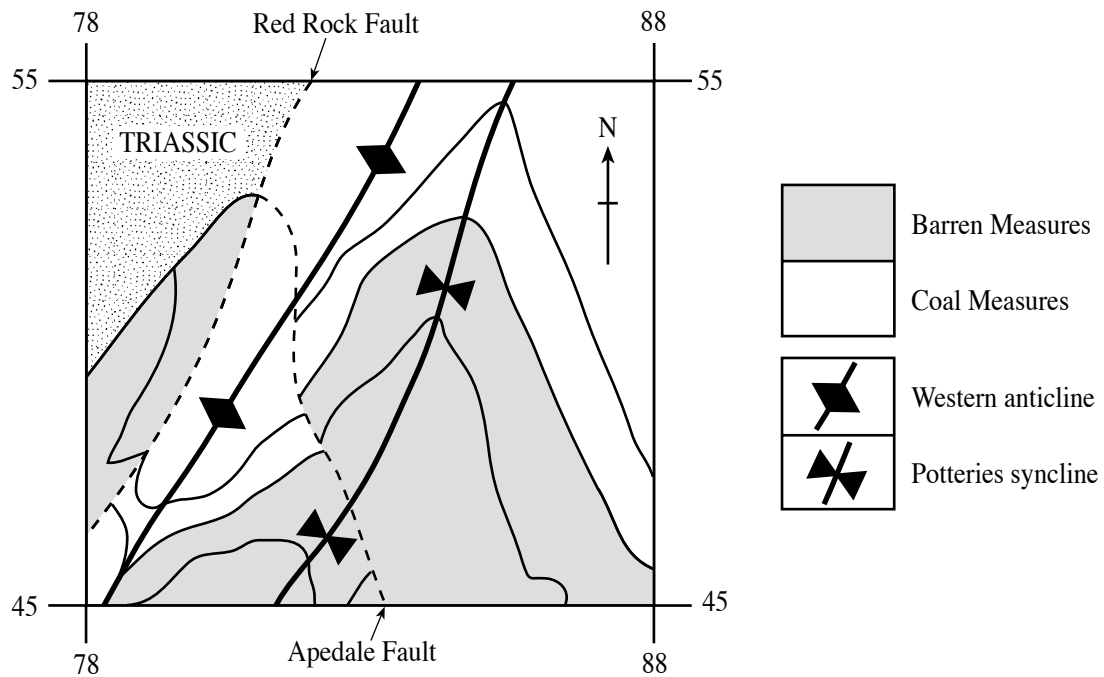


Figure 6

(a) Refer to the **geological map, cross section** and **Figure 6**.

- (i) Complete the table below to identify the characteristics of the following folds:
1. Western Anticline
 2. Potteries Syncline

[3]

Fold characteristics	Western Anticline		Potteries Syncline	
Axial plane trend	BOTH : NNE – SSW			
Axial plane dip angle (degrees) and direction along section.	Angle (degrees)	Direction	Angle (degrees)	Direction
	•	•	~70	NW
Fold symmetry	• Both :			
Orientation (direction) of the maximum principal stress component (σ_{\max})	Both : ESE – WNW			

- (ii) Using the **geological map** and generalised geological **column only**, explain why the Western Anticline is classified as an *anticline*. [2]

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- (iii) On **Figure 6**, mark **both** fold axes with an arrow to show the direction in which each fold plunges. [2]

- (b) (i) The **cross section** (below grid square **8247**) shows the Newcastle Formation (**Ncl**) aligned with the base of the Upper Coal Measures (**UCM**) across the Apedale Fault. Using the generalised **geological column**, calculate the throw (vertical displacement) of the Apedale Fault. Show your working. [2]

Throw (vertical displacement) m

- (ii) Using evidence from the **geological map** and **cross section**, evaluate the following statement taken from a student's analysis of the map.

*'The Red Rock Fault (grid square 8050) and the Apedale Fault are **both**:*

1. **normal** faults,
 2. with **similar** throws,
 3. which result from the **same** principal stresses that formed the Western Anticline and Potteries Syncline folds.'
- [4]

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Total 13 marks

Turn over.

7. **Figure 7a** is a map of the Stoke-on-Trent area (east of **grid line 85**) showing ground subsidence.

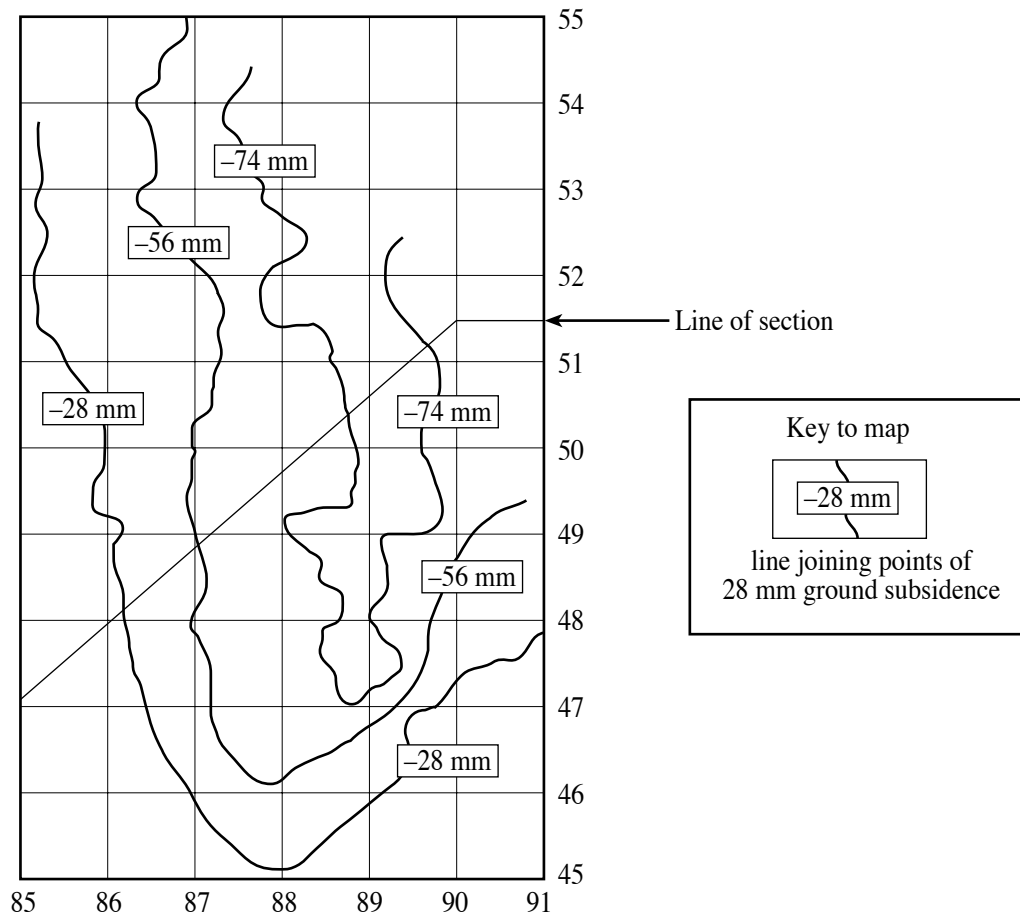


Figure 7a

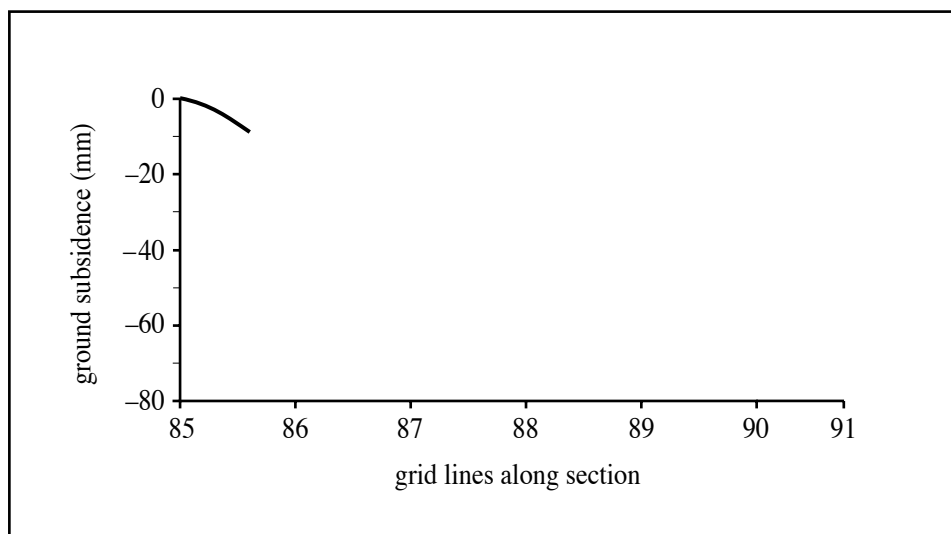


Figure 7b

Refer to **Figure 7a**, the **geological map**, and **cross section** as appropriate.

- (a) (i) Complete the graph in **Figure 7b** to show the variation in ground subsidence along the line of section in the Stoke area. [3]
- (ii) Write a brief account of ground subsidence in the Stoke area. You should describe the distribution and extent of the subsidence in **Figures 7a** and **7b** and suggest a probable human cause. [3]

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- (iii) Give a **geological** explanation for the **variation** in subsidence identified. [2]

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- (b) Using your knowledge and evidence from the **geological map** assess the possible **geological** hazards associated with building a major housing development on Upper Coal Measure strata (UCM) within grid square **8553**. [5]

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Total 13 marks

[illegible]