

SECTION B

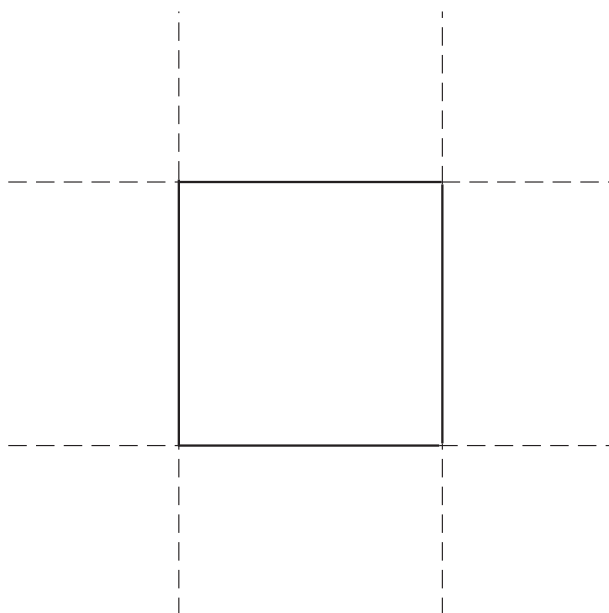
Question 5-7 relate to the British Geological Survey 1:50 000 geological map extract of Monmouth.

*Answer all questions in the spaces provided.
This section should take approximately 1 hour to complete.*

5. (a) State the age range of the solid geology on the geological map. [2]

Oldest Period Youngest Period

- (b) The **generalised Geological Column** indicates an unconformity at the base of the Upper Coal Measures which is not obvious on the cross section.
In the blank 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 **cross section (P – Q)**.

- (i) Complete the **Table 5a** below to indicate:

1. the local dip in **Box A** and
2. the order of superposition of the two named coal seams to be first encountered on descending the abandoned mine shaft at grid reference **(GR) 632083**. [3]

Dip direction	Angle of dip (degrees)	Name of coal seam	Relative age of coal seam
West	•	•	youngest
		•	oldest

Table 5a

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(ii) Complete **Table 5b** below by calculating the width of outcrop of the Pennant Sandstone (**d^{6b}**) between the **Brazilly** (BRY) and **Yorkley** (Y) coal seams along the line **P – Q** on the **Geological Map** (between **GR 639100** and **GR 646102**). Show your working. [2]

[illegible]

(iii) Give **two** possible reasons for the variation in outcrop widths identified in **Table 5b**. [4]

Turn over.

6. **Figure 6a** is a sketch of part of the **Geological Map** showing structural features.

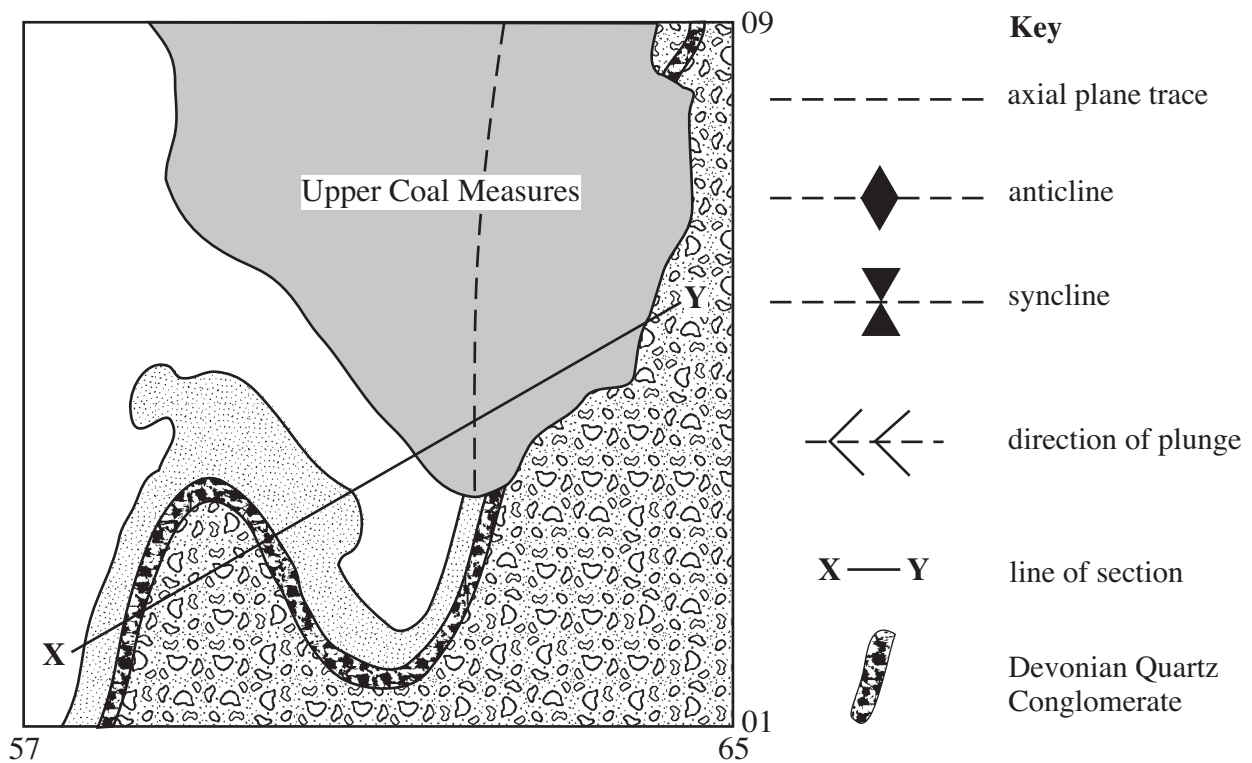
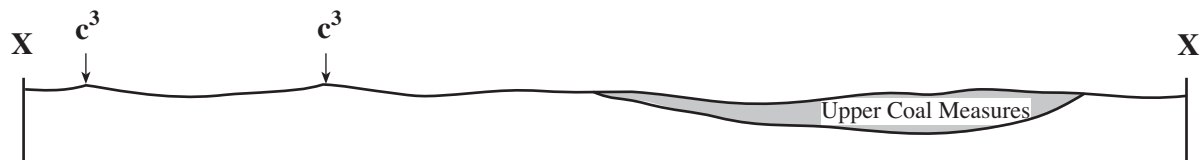


Figure 6a

- (a) (i) The axial plane trace of a plunging fold in the Upper Coal Measures is marked on **Figure 6a**. Using the appropriate symbols from the key, indicate on **Figure 6a**
1. the type of fold,
 2. the direction of plunge.
- [2]
- (ii) On **Figure 6a**, mark in the axial plane traces of **two** plunging folds formed **before** the Upper Coal Measures. Use the symbols in the key to indicate the direction of plunge of **each** fold.
- [2]

- (b) **Figure 6b** is a partially complete sketch section along the line of section **X-Y** on the **Geological Map**. Complete the section by sketching the probable fold structure of the Devonian Quartz Conglomerate (c^3) along **X-Y**. Project the boundaries of this bed above the surface where appropriate. [3]



c^3 = outcrop of Devonian Quartz Conglomerate

Figure 6b

- (c) With reference to **Figure 6a**, **Figure 6b**, the **Geological Map** and the **generalised Geological Column**, explain the evidence for the following correct statement taken from a student's analysis of the data.

"At least two separate phases of folding have affected the Carboniferous strata both resulting from principal stresses in the same direction." [3]

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Total 10 marks

7. (a) Using the **Geological Map** and **cross section (P – Q)**, describe the structure and extent of the Cannop Fault belt which crosses the Upper Coal Measures around **GR 610090**. [3]

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- (b) Using **all** the available data, assess the potential geological problems of mining coal from the Upper Coal Measures. [5]

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Total 8 marks

(454-01)