

SECTION B

Questions 5-8 relate to the **British Geological Survey 1:25 000 geological map**
extract of **Usk-Cwmbran**

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

This section should take approximately 1 hour to complete.

5. (a) Alluvium is the main type of superficial (drift) deposit on the **geological map**. Describe the outcrop **pattern** of this deposit. [2]

.....

.....

.....

- (b) Account for the “v shape” in the outcrop pattern of the Upper Bringewood (limestone) beds (**b^{7b}**) in **grid square 3600**. [2]

.....

.....

.....

- (c) **Figure 5** is a surface profile along the line **P-Q** in **grid square 3300**, showing the outcrop of the surface geology. A spring is associated with the Wenlock Limestone (**b^{6c}**).

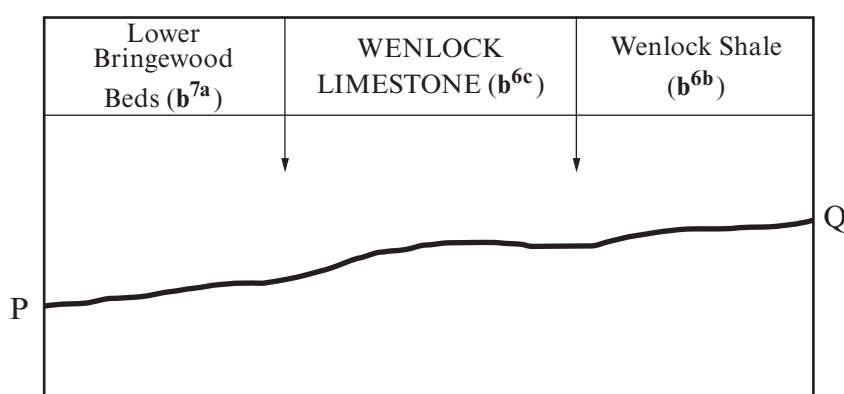


Figure 5

- (i) Complete **Figure 5** by **sketching** in the upper and lower boundaries of the Wenlock Limestone (**b^{6c}**). [1]
- (ii) Draw in the following on **Figure 5**:
1. an arrow (labelled **S**) to mark the most likely location of a spring;
 2. the position of a water table associated with the spring. [2]



6. **Figure 6** is a simplified sketch of structural features on the **geological map**.

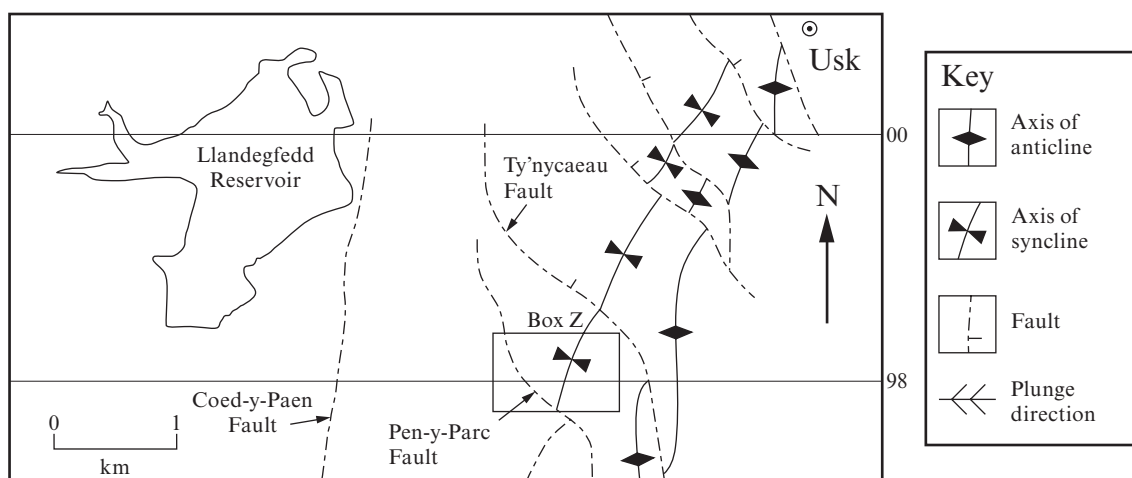


Figure 6

The axial plane traces of two plunging folds, offset by faults, are marked on **Figure 6**.

(a) (i) Complete **Table 6** below by stating the **evidence** from the **geological map alone** that the Silurian strata in **Box Z** show the following fold characteristics:

1. a synform
2. a syncline
3. a plunge to the SSW.

[3]

Fold in Box Z	Evidence
1. a synform	•
2. a syncline	•
3. a plunge to the SSW	•

Table 6

(ii) On **Figure 6**, draw in the axial plane trace of **another** major plunging anticline. Use the symbol in the key to indicate the direction of plunge of this fold.

[2]



- (b) The **geological map** and **cross section** show that the Ty'nycaeau Fault has been downthrown towards the east. Further research suggests that:

"..the faulting is complicated by reactivation. Initially it was probably a strike-slip fault with a later dip-slip movement".

- (i) Give **two** pieces of evidence from the **geological map alone** to support the statement that the Ty'nycaeau Fault has been downthrown towards the east. [2]

1.

2.

- (ii) The **cross section** shows the upper surface of the Wenlock Limestone (**b^{6c}**) on the west of the fault is approximately aligned with the base of the Downton Castle Sandstone (**c¹**) across the Ty'nycaeau Fault.

Using the generalised **geological column** only, calculate the throw (vertical displacement) of the Ty'nycaeau Fault. Show your working. [2]

Throw =m

- (iii) Describe the evidence from **Figure 6** that the Ty'nycaeau Fault may have also been affected by strike-slip movement. [1]

.....

.....

- (iv) A student suggested that *"..slickensides could be used as field evidence to confirm the initial strike-slip direction of movement of the Ty'nycaeau Fault"*. Critically evaluate this statement. [2]

.....

.....

.....



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

Both the *Coed-y-paen* and *Ty'nycaeu* faults are:

1. *normal faults*
2. *of similar throws*
3. *the result of the same principal stresses that formed the major folds.* [4]

1.

.....

2.

.....

3.

.....



7. **Figure 7a** is a photograph of a true dip section of a typical exposure of Wenlock Limestone (**b^{6c}**) in the quarry at locality 24 (**grid square 3498**).



hammer for
scale – 30 cm

Figure 7a

- (a) With reference to the **geological map** and **Figure 7a**, complete the table below. [2]

estimation of the exposed height of the section	•	m
direction in which the camera was pointing	•	

- (b) Annotate **Figure 7a** to show **two** geological features. [2]

- (c) With reference to **Figure 7a**, the **geological map** and **cross section**, assess the suitability of the Wenlock Limestone (**b^{6c}**) as an aquifer for the accumulation and storage of groundwater. In your assessment you should consider:

- rock characteristics (texture and structures)
- thickness and surface outcrop exposure
- fold structures

[3]

.....

.....

.....

.....

.....



- Dip (angle and direction) of beds
- Fluvial processes
- Faulting

[5]

- (b) (i) Suggest a probable geological explanation for the choice of location of the Llandegfedd Reservoir (**GR 330995**). [2]



- (ii) Explain **three** geological factors that may have limited the final size of the Llandegfedd Reservoir during its design stage. [3]

1.

.....

2.

.....

3.

.....

END OF PAPER



[illegible]

[illegible]

[illegible]