THIS IS A LEGACY SPECIFICATION

OCR
RECOGNISING ACHIEVEMENT

ADVANCED GCE

GEOLOGY

Geological Skills

2836/01

OCE/12451

Candidates answer on the question paper

OCR Supplied Materials:
- Insert (inserted)

Other Materials Required:
- Protractor
- Ruler (cm/mm)

Thursday 24 June 2010
Morning

Duration: 1 hour 15 minutes

2836 01

Candidate Forename		Candidate Surname	

Centre Number						Candidate Number				

INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.

INFORMATION FOR CANDIDATES

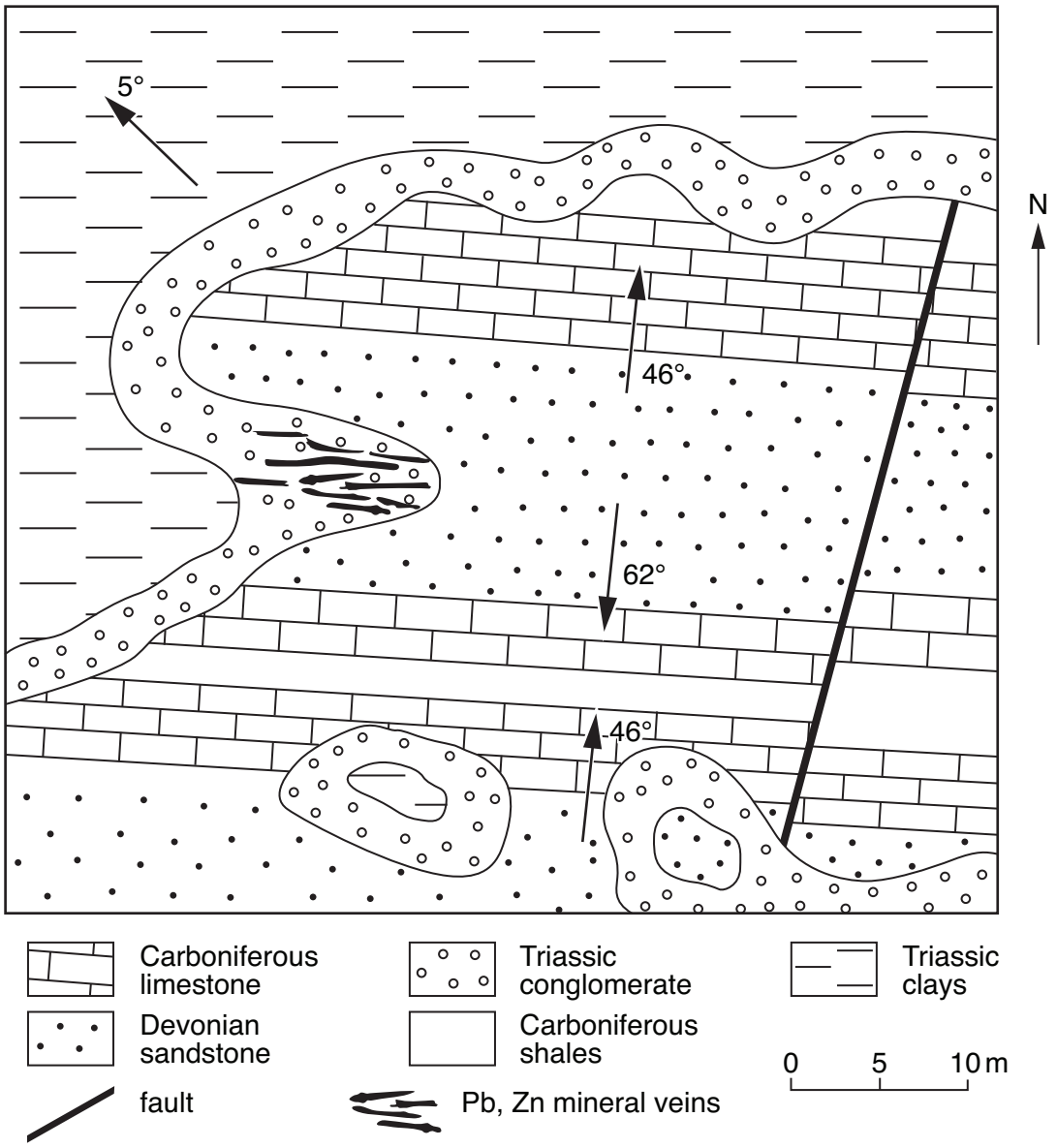
- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- The total number of marks for this paper is **60**.
- You will be awarded marks for the quality of written communication where this is indicated in the question.
- This document consists of **12** pages. Any blank pages are indicated.

For Examiner's Use			
1			
2			
3			
4			
5			
Total			

OCR is an exempt Charity

Answer **all** the questions.

1 A sequence of Devonian, Carboniferous and Triassic rocks is shown on the map below.



(a) (i) Label
- the edge of the unconformity
- an outlier.

[2]

(ii) Draw a sill within the Devonian sandstone near the centre of the map. **[1]**

(iii) Which side of the fault has been downthrown? Give a reason for your answer.

downthrow side .....

reason .....

..... **[1]**

(b) (i) Draw on the map the axial plane traces of the folds. **[1]**

(ii) Give the types of folds and describe them using technical terms and directions.

fold in centre of map .....

.....

fold in south of map .....

..... **[2]**

(iii) State the age relationship of the folds to the unconformity and the fault.

youngest .....

.....

oldest ..... **[1]**

(iv) Describe the method that you used to determine the age relationships.

.....

..... **[1]**

(c) (i) The mineral veins have been mined for lead (Pb) and zinc (Zn). State the ore minerals in which these metals occur.

lead ..... zinc .....**[2]**

(ii) Other minerals are found with the ore minerals. Identify the white mineral in the photograph **Fig. 1**, on the insert, using the information below.

The white mineral has:
- three cleavages
- hardness 3.

The mineral is ..... **[1]**

(iii) Referring to the photograph, explain the sequence of events that formed the mineral vein.

.....

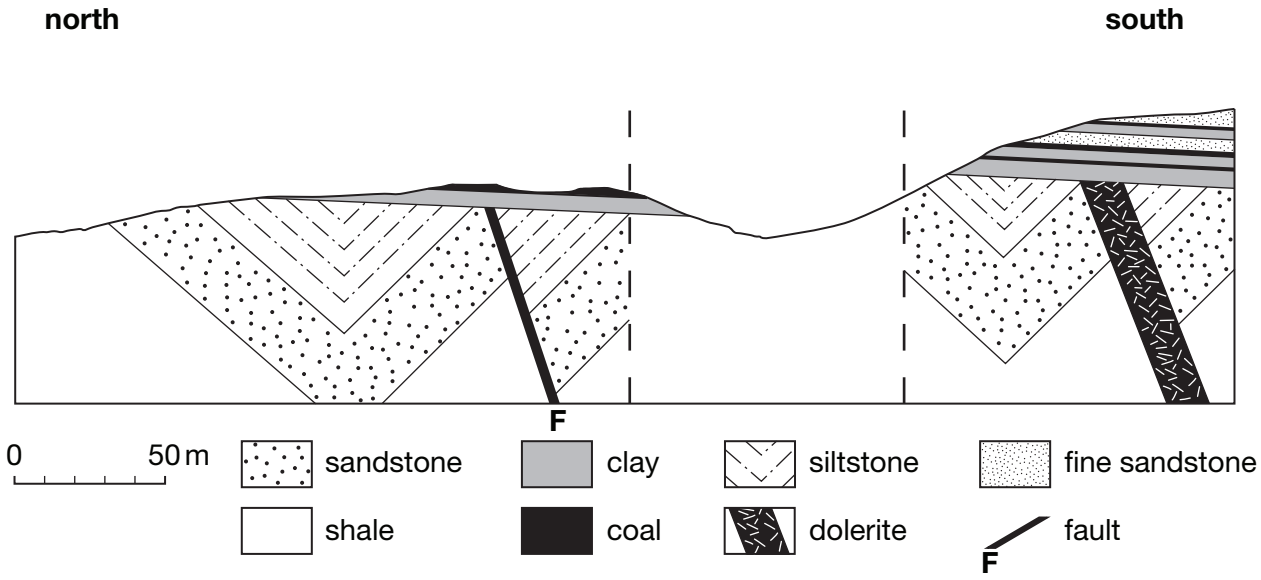
.....

.....

..... **[2]**

[Total: 14]

2 **(a)** The geological cross section below shows a series of sedimentary and igneous rocks.



(i) Measure

- the angle of dip of the northern limb of the sandstone bed ..... °
- the throw of the fault **F**. ..... m **[2]**

(ii) Complete the geological cross section, both above and below the surface, to interpret the geology of the area between the dashed lines. **[2]**

(iii) Label the area where landslips are **most likely** to occur. **[1]**

(iv) Explain why the area that you have labelled is the most likely to slip.

.....

..... **[1]**

In this question, one mark is available for the quality of written communication.

(b) Describe the sequence of events that produced the geology shown on the cross section. Start with the earliest event and describe fully using technical terms.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... **[7]**

Quality of Written Communication [1]

[Total: 14]

3 (a) (i) Complete the table below to identify the igneous rocks.

rock	description	rock name
A	• light grey colour • fine crystals • flow banding texture	
B	• black colour • conchoidal fracture • glassy with no crystals visible	
C	• black green colour • coarse crystals • composed of augite and plagioclase feldspar	

[3]

(ii) Sketch flow banding texture and conchoidal fracture.

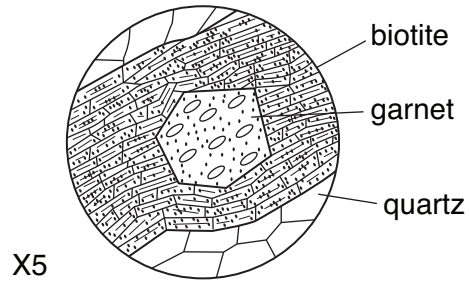
flow banding texture	conchoidal fracture

[2]

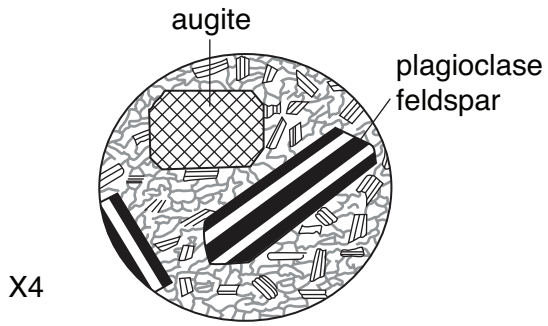
(b) Metamorphic and igneous textures are sometimes confused by students.

(i) Label on the thin section diagrams a phenocryst and a porphyroblast.

texture D



texture E



[1]

(ii) Describe the features that help you to distinguish between how textures **D** and **E** formed.

.....

.....

.....

.....

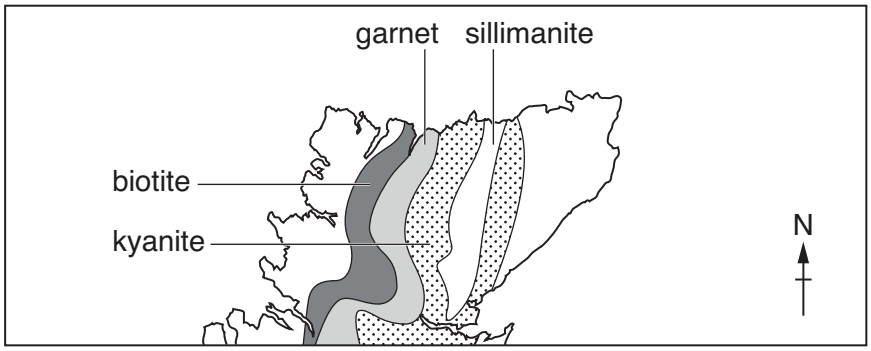
..... **[2]**

(iii) Identify rocks **D** and **E**.

D ..... **E** .....**[2]**

In this question, one mark is available for the quality of written communication.

(c) The map below is a simplified geological map of the metamorphic zones in Northern Scotland. Explain why this sequence of minerals forms when the parent rocks are shales.



.....

.....

.....

.....

.....

.....

.....

.....

.....

..... **[5]**

Quality of Written Communication [1]

[Total: 16]

BLANK PAGE

TURN OVER FOR QUESTION 4

PLEASE DO NOT WRITE ON THIS PAGE

4 Graptolites are commonly used to zone the Silurian.

(a) Draw and label a uniserial Silurian graptolite.

[2]

(b) The table below shows graptolite zones for part of the Lower Silurian. The youngest zone is 10.

zones	ranges of graptolite fossil species												
10													
9													
8													
7													
6													
5													
4													
3													
2													
1													
	Climacograptus normalis	*Climacograptus medius*	*Diplograptus longissimus*	*Coronograptus cirrus*	*Atavograptus atavus*	*Glyptograptus sinuatus*	*Coronograptus gregarius*	*Petalograptus concinnus*	*Monograptus fimbriatus*	*Diplograptus magnus*	*Orthograptus insectiformis*	**fossil G**	**fossil H**

(i) Fossil **G** first appeared at the start of zone 9 and the last appearance was at the top of zone 10. Draw in the range for fossil **G**. **[1]**

(ii) Fossil **H** is the worst zone fossil of all those shown. Draw in a possible range for fossil **H**. **[1]**

The fossils are found in fossil assemblages at different localities.

assemblages	graptolite fossil species
J	*Climacograptus normalis* *Climacograptus medius* *Diplograptus longissimus* *Coronograptus cirrus*
K	*Atavograptus atavus* *Glyptograptus sinuatus* *Coronograptus gregarius* *Petalograptus concinnus*
L	*Climacograptus normalis* *Diplograptus magnus* *Orthograptus insectiformis*

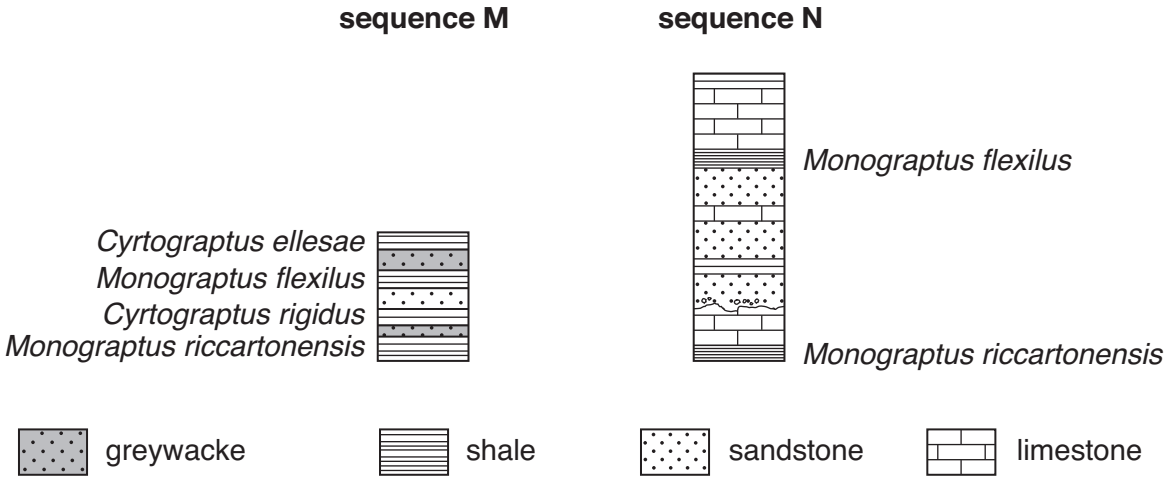
(iii) Identify the zones to which each assemblage belongs.

J ..... **K** ..... **L** ..... **[2]**

(c) (i) State the best method of correlation used in sequences of rock that contain graptolites.

..... **[1]**

The two sequences of Silurian rocks shown below were laid down in different environments about 50 km apart.



(ii) Correlate the two sequences by joining beds of the same age. **[2]**

(iii) Suggest the environments in which each sequence formed.

M .....

.....

N .....

..... **[2]**

[Total: 11]

5 The photograph **Fig. 2**, on the insert, shows several geological features on part of a cliff face.

Draw a **fully labelled** sketch with appropriate dip measurements to show the geological structures on the photograph. Fully describe the fold structure shown on the photograph.

.....

.....

.....

.....

..... **[5]**

[Total: 5]

END OF QUESTION PAPER