Surname	Centre Number	Candidate Number
Other Names		2

GCE A level

1215/02

GEOLOGY - GL5
THEMATIC UNIT 2
GEOLOGY OF NATURAL RESOURCES

P.M. THURSDAY, 14 June 2012

ONE of TWO units to be completed in 2 hours

			Examiner only
Section A	**1.**	**15**	
Section B	**2.**	**25**	
	3.		
	4.		
Total		**40**	

1215
020001

ADDITIONAL MATERIALS

In addition to this and one other examination paper, you may require a calculator.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **question 1** in Section A (15 marks) and **one** question from Section B (25 marks).

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.

You are reminded of the necessity for good English and orderly presentation in your answers.

SECTION A

1.

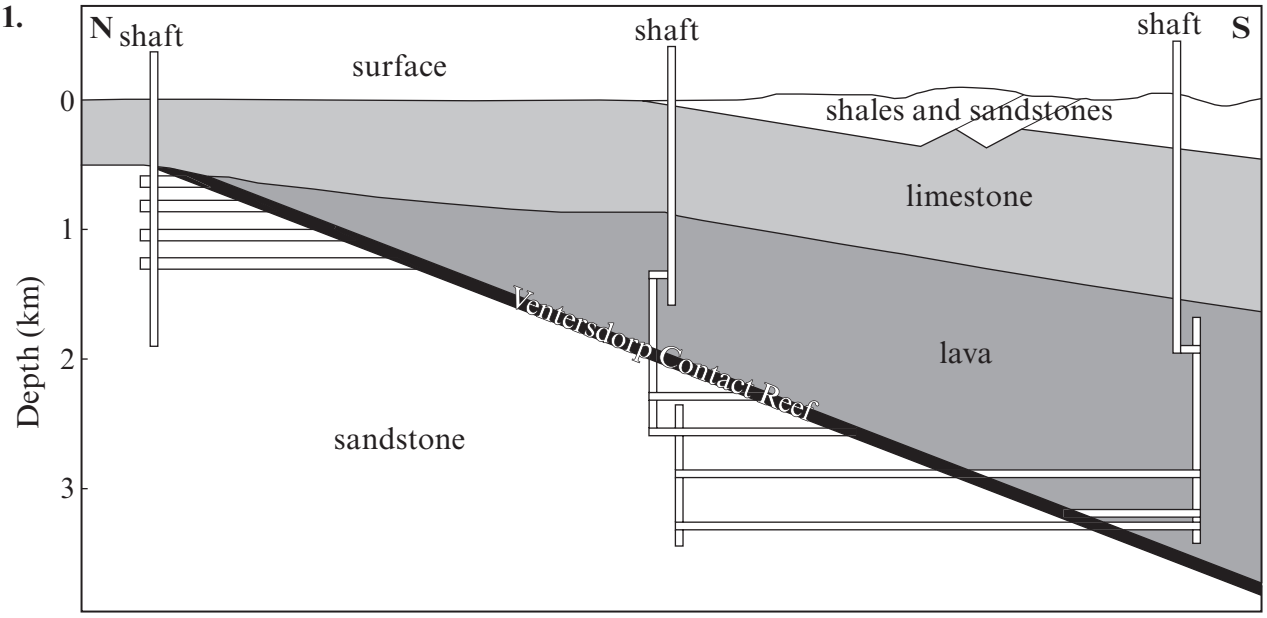

Figure 1a

Geological cross-section through the Driefontein mines in South Africa. Gold deposits occur in the conglomerates of the Ventersdorp Contact Reef. The section shows the true dip of the reef.

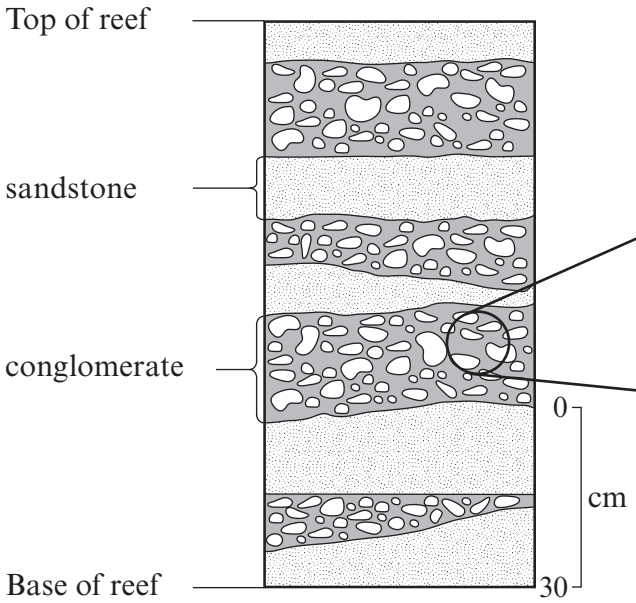

Figure 1b

Section through the Ventersdorp Contact Reef
Vertical scale 1:10

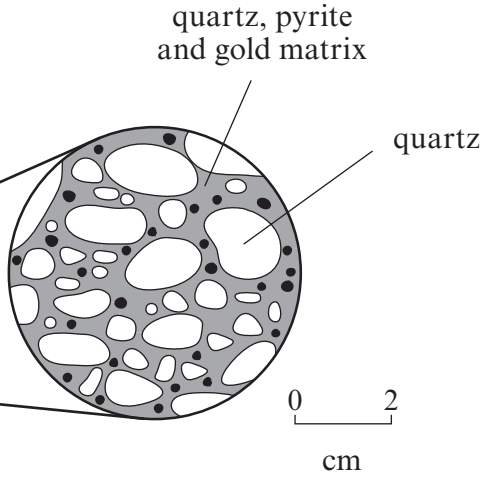

Figure 1c

Gold bearing conglomerate from the Ventersdorp Contact Reef

(a) (i) Using **Figure 1a** state the following characteristics of the Ventersdorp Contact Reef: [3]

Approximate dip angle .....

Dip direction .....

The minimum depth of extraction .....

(ii) Using **Figure 1c** describe the texture of the gold bearing conglomerate from the Ventersdorp Contact Reef. [2]

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(iii) Using **Figures 1b** and **1c** describe a likely sedimentary environment in which the Ventersdorp Contact Reef may have been deposited. [2]

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(iv) Using **Figure 1c** explain why very small particles of gold (less than 0.5 mm) can be found in the same rock as quartz grains over 2 cm in diameter. [2]

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(b) (i) The average content of gold in the Ventersdorp Contact Reef is 15 grams per tonne. Calculate the percentage of gold found in the Ventersdorp Contact Reef. [2]

Show your working.

[1 tonne = 1000 kg]

Examiner only

(ii) Mining at depths greater than 3 km poses a number of challenges both to mining engineers and to the miners themselves. Identify **two** problems they are likely to face at this depth and suggest ways in which these problems may be overcome. [4]

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Total 15 marks

SECTION B

Answer **one** *question only.*

Write your answer in the remaining pages of this booklet.

2. Evaluate the use of **two** of the following techniques in the exploration for mineral and/or energy resources:

drilling and downhole logging;
geophysical surveying;
geochemical prospecting;
geological mapping;
satellite remote sensing. [25]

3. *(a)* Describe the conditions necessary for the formation of large scale coal deposits.

(b) Evaluate the ways in which the environmental impacts of quarrying and mining may be minimised. [25]

4. Describe and evaluate the importance of **two** of the following igneous processes in the formation of mineral and/or energy deposits:

magmatic segregation;
pegmatite formation;
hydrothermal activity. [25]

Turn over.

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Examiner only

Examiner only

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