GCE A level

# 1215/02

# GEOLOGY – GL5

## Thematic Unit 2

## Geology of Natural Resources

**A.M. TUESDAY, 16 June 2015**

**ONE of TWO units to be completed in 2 hours plus your additional time allowance**

**Surname** _____

**Other Names** _____

**Centre Number** _____

**Candidate Number** 2 _____

| | For Examiner's use only | | |
|---|---|---|---|
| | Question | Maximum Mark | Mark Awarded |
| Section A | 1. | 15 | |
| Section B | 2. | 25 | |
| | 3. | | |
| | 4. | | |
| | Total | 40 | |

## ADDITIONAL MATERIALS

**In addition to this and one other examination paper, you will need a calculator.**

## INSTRUCTIONS TO CANDIDATES

**Use black ink, black ball-point pen or your usual method.**

**Write your name, centre number and candidate number in the spaces on the front cover.**

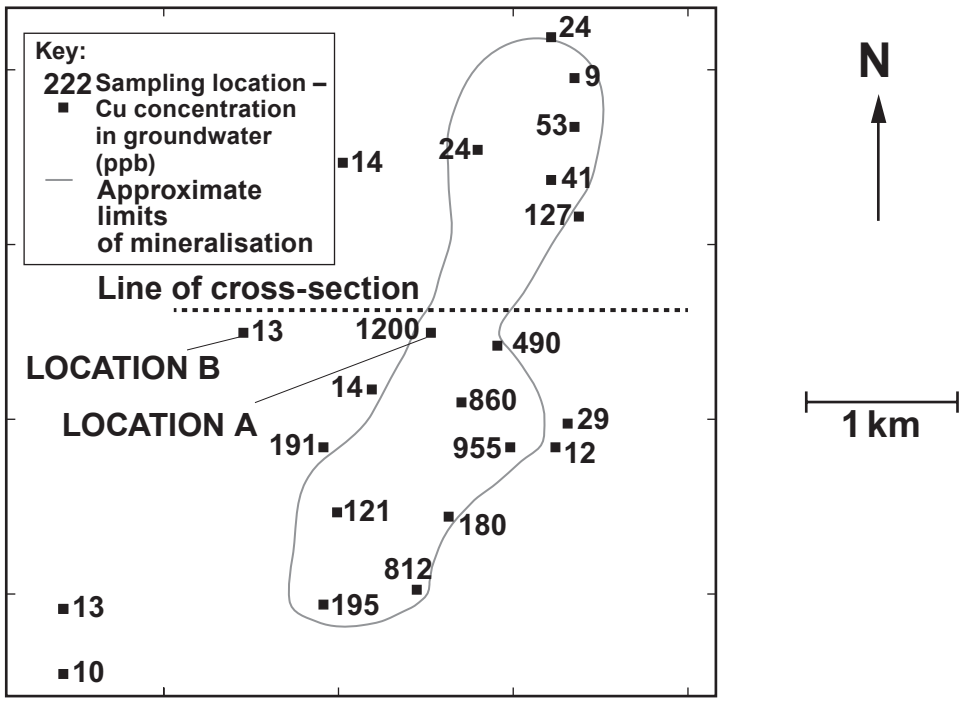
**Answer QUESTION 1 in Section A (15 marks) and ONE question from Section B (25 marks).**

## INFORMATION FOR CANDIDATES

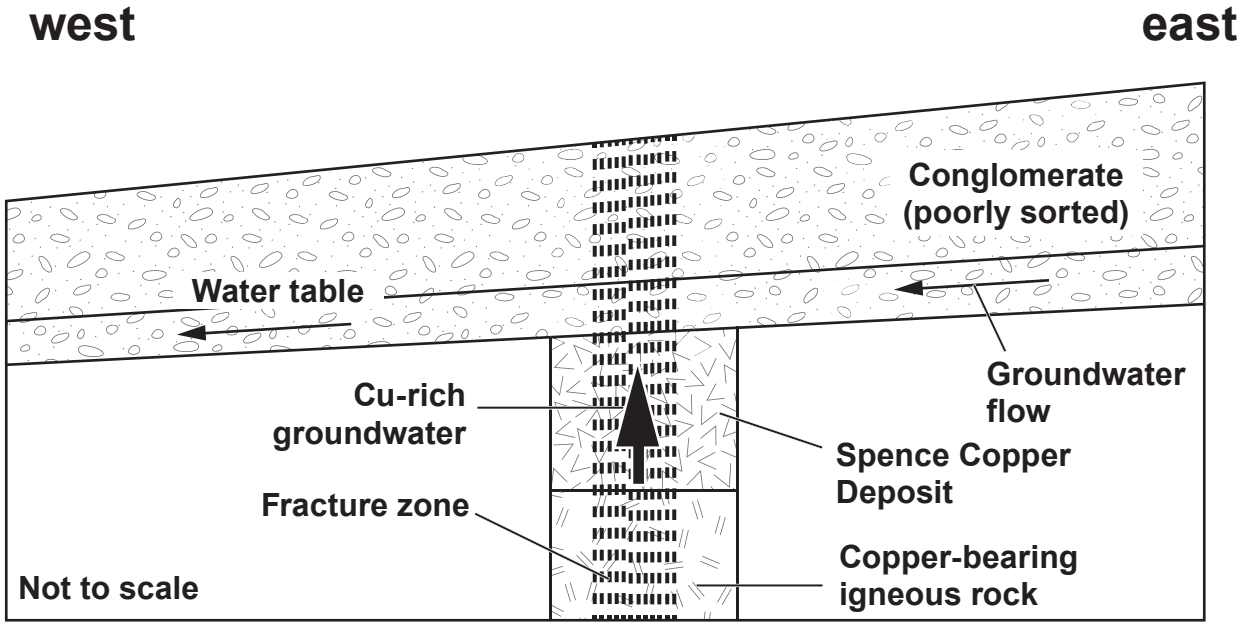
**The number of marks is given in brackets at the end of each question or part-question.**

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

# FIGURE 1a




# FIGURE 1b



## SECTION A

**1.** **FIGURE 1a opposite is a map of the Spence Copper Deposit in the Nevada desert, U.S.A., showing the concentration of copper (Cu) taken from groundwater samples in parts per billion (ppb). FIGURE 1b shows a model of the Spence Deposit along the line of cross-section shown on FIGURE 1a.**

**(a)** **The Spence Deposit has been estimated to have recoverable reserves of 231 million tonnes (Mt) of sulphide copper (Cu) ore at an average concentration of 1.18 % Cu.**

**(i)** **Calculate the maximum amount of recoverable copper (Cu) in tonnes (Mt) from this deposit. Show your working. [2]**

_____ **Mt**

**1(a) (ii)** **For ONE environmental problem that might be caused by the extraction of the Spence Deposit:**

**1. Describe the problem.**

**2. Suggest a suitable planning control that could be used to limit the adverse effects of this problem. [4]**

**1(b) The Spence Deposit was located by geochemical prospecting of groundwater.**

**Refer to FIGURES 1a and 1b.**

**(i) Explain why the groundwater in the conglomerate on FIGURE 1b flows to the west. [1]**

**(ii) Explain why the copper concentrations in groundwater are anomalously high at LOCATION A on FIGURE 1a. [2]**

**1(b) (iii)** **Explain the low concentration of copper in groundwater at LOCATION B on FIGURE 1a, despite the groundwater flow in the conglomerate being towards the west.**

**[3]**

**(c)** **Explain why prospecting techniques other than a geochemical groundwater survey were considered to be less effective in locating the Spence Deposit.**

**[3]**

8

15

**SECTION B**

**Answer ONE question only.**

**Write your answer in the remaining pages of this booklet.**

**2(a)** **Describe the geological factors that favour the formation and accumulation of large scale oil and gas reserves.**

**(b)** **Evaluate the use of seismic surveying techniques to identify potential traps for hydrocarbons (oil and natural gas). [25]**

**3(a)** **Describe the formation of coal deposits.**

**(b)** **Evaluate the use of the following techniques in the exploration of mineral and/or energy resources.**

**(i)** **Geological mapping**

**(ii)** **Satellite remote sensing [25]**

**4.** **"Sedimentary processes can produce metalliferous ores and non-metallic minerals of economic value."**
**Evaluate this statement with reference to the processes of formation of these resources. [25]**

**END OF PAPER**

## ACKNOWLEDGEMENTS

**Adapted from: Society of Economic Geologists Newsletter, No. 63 October 2005**