

Uva Wellassa University, Sri Lanka
Faculty of Science and Technology
Mineral Resources and Technology Degree Programme
1st Semester Examination – March/April 2013



**Uva Wellassa
University**

MRT 431-2 – Mineral and Gem Exploration Methods

Instructions to candidates

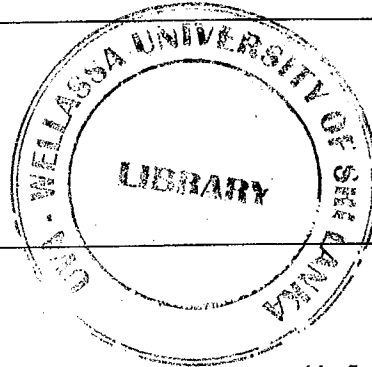
Number of question: Five (05)

Answer **all** questions

Time allocation: **Two (02)** hours

Total marks allocation: **100** (each question carries 20 marks)

Illustrate your answers with sketch diagrams where necessary



1. Write illustrated notes on,

(4×5=20 marks)

- a. Gem Exploration
- b. Petroleum exploration
- c. Gold exploration
- d. Magnetic and sulphide mineral exploration
- e. Oceanic mineral exploration

2. Under the Uma Oya Multi-Purpose Development Project, rural land area belonging to Uva Province will be developed. Once the project is completed most part of the land will be covered by the reservoir and its infrastructure. You are given the task of identifying and exploring for all mineral resources in the area and extract them before the commencement of the project. Explain how you would carry out the exploration work assuming that you have access to all the required data, facilities and equipment.

(20 marks)

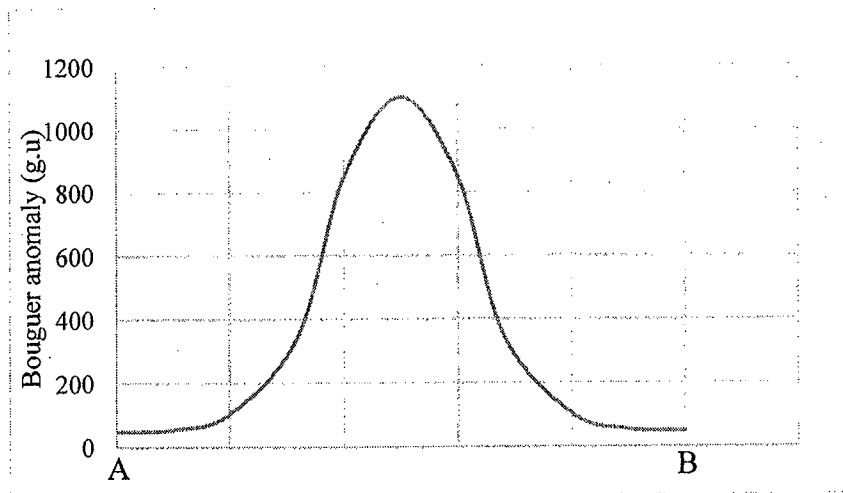
3.

- a. Briefly describe how you would choose the most suitable geophysical exploration technique for a given exploration programme depending on the target.

(6 marks)

- b. List four (4) geophysical exploration techniques and briefly explain the theory and the important applications of each. (8 marks)

- c. Results of a gravity survey over an area (between point A and B) are shown below.



Explain how you could precisely determine the depth and the thickness of ore body without drilling.

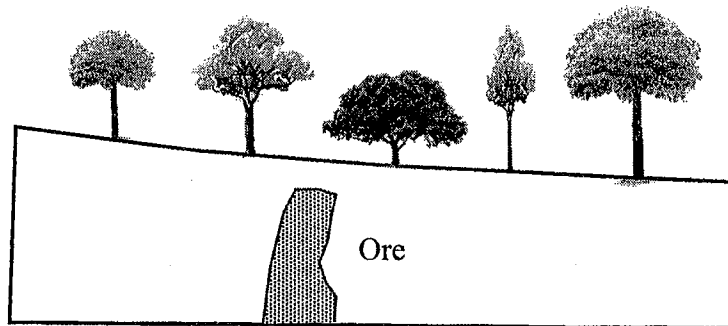
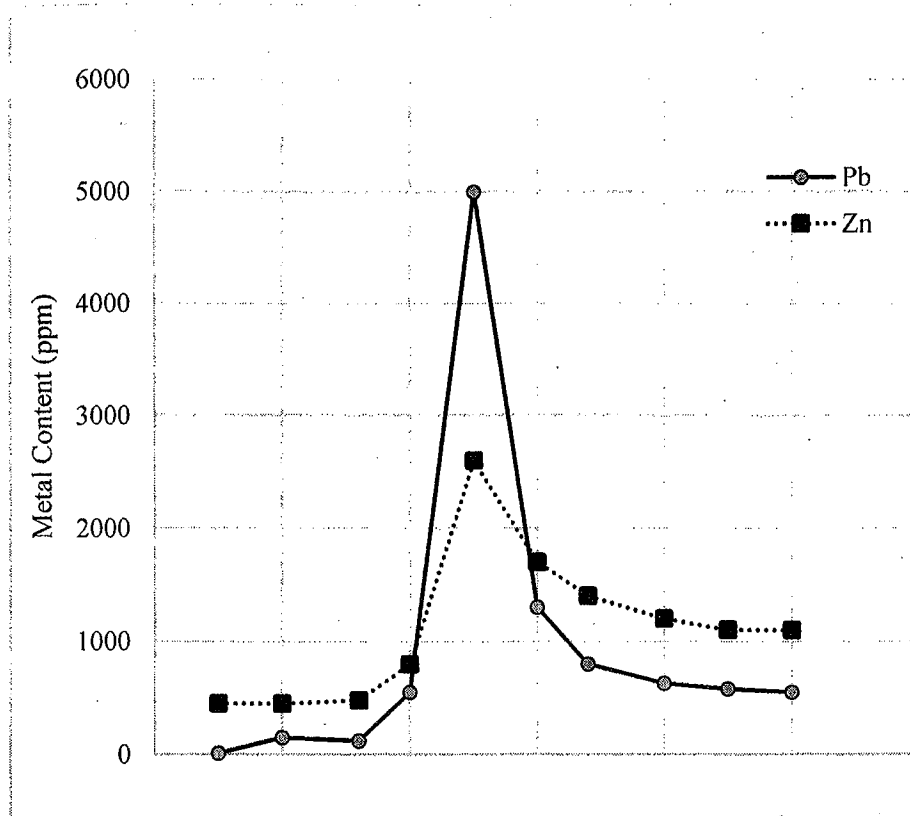
Assume that the land has a flat and smooth topography.

(6 marks)

4.

- a. What are pathfinder elements, target elements and geochemical haloes? Describe their significance in mineral exploration. (8 marks)
- b. How can we classify geochemical elements based on their affinity environment? Explain its significance in selecting sample medium for geochemical exploration. (6 marks)

c. Zn and Pb concentration of several soil samples collected over an ore-bearing area is shown below



Explain all possible causes for the following observations.

(3×2 = 6marks)

- i. Higher Zn concentrations compared to the Pb concentration (even though maximum Zn concentration is much lower)
- ii. Higher concentration of both elements on the right hand side of the image.-

5. Write illustrated notes on,

(5×4=20 marks)

- a. Importance of remote sensing in mineral explorations
- b. Importance of structural and/or geological maps in mineral explorations
- c. Role of the secondary geochemical environment
- d. Sampling and analysing river sediments