



Uva Wellassa University, Sri Lanka  
End Semester Examination – March 2011  
MRT 301-1 Bio Mineral Processing



Time: One (01) hour

This paper consists of two parts, Part A and Part B.

Answer two (02) questions from Part A.

Answer two (02) questions from Part B including the question number 04.

Part A

- 01)
- i. Define "bioleaching". (02 marks)
  - ii. Compare direct and indirect leaching mechanisms. (04 marks)
  - iii. Explain characteristics of direct leaching model. Use illustrations wherever applicable. (10 marks)
  - iv. Illustrate four (04) direct attachment geometries formed by coccoidal shape bacteria on hematite surface using only diagrams. (06 marks)
  - v. List three (03) microbiological parameters of bioleaching environment. (03 marks)
- 02)
- i. Write a brief account on contaminants in potable water. (05 marks)
  - ii. Explain the theory behind the ion-exchange softener. (05 marks)
  - iii. How can ion-exchange softener be regenerated? (03 marks)
  - iv. List two methods used to remove microorganism in waste water. (02 marks)
  - v. Explain one of the methods listed in above (iv). (10 marks)

03) Write short notes on any three (03) of following topics.

- i. Heap leaching mechanism
  - ii. Bioliberation of gold
  - iii. Benefits and limitations of reverse osmosis and applications
  - iv Winkler method
- (25 marks)

**Part B**

04)

- i. A group of researchers in Mexico University found a fossil from an ancient multi cellular marine organism while they were at a field survey. They took the fossil sample into their Molecular Biology Laboratory for further analysis.
  - a. Discuss a method they would use to preserve the DNA of that fossil. (06 marks)
  - b. Briefly describe how to sequence the above DNA. ( imagine that the gene quality is very poor) (14 marks)
- ii. How can you synthesis the DNA sequence form the m-RNA sequence? (05 marks)

05)

- i. Why do modern agriculturists recommend applying in-vitro developed biofilmed biofertilizers rather than applying compost directly? (04 marks)
- ii. How can biofilmed biofertilizers be developed for non leguminous plants? (06 marks)
- iii. Discuss the main steps of compost processing (use suitable diagrams). (15 marks)

06)

- i. What are metal- leaching microorganisms? Give at least three examples. (04 marks)
- ii. State the difference between bioaugmentation and ex-situ bioremediation. (06 marks)
- iii. Write an account on bioremediation of marine ecosystem with examples. (15 marks)