Uva Wellassa University, Sri Lanka
Faculty of Science and Technology
Mineral Resources and Technology Degree Programme
2nd Semester Examination – September/October 2013

MRT 432-2 Geophysical Methods for Water Resources

Uva Wellassa University

Number of questions : Four (04)
Answer all questions
Time allocation : Two (02) hours
Marks allocation : Total 100 marks
Illustrate your answers with sketches/diagrams where necessary

1.

a. Define the following terms (6 marks)

i. Conductivity

ii. Resistivity

iii. Apparent resistivity

b. Write down the expression used for calculating apparent resistivity from geo electrical measurements using the four electrode array (Slumberger). Include a sketch to define all items. (10 marks)

c. Describe how would you carry out a ressistivity sounding and describe the different geoelectrical seqtions (up to four layers). (14 marks)

2.

a. What are different survey techniques in resistivity method used for subsurface investigations? Explain the importance of these techniques? (10 marks)

b. The measured apparent resistivity values (Wenner array, electrode separation = 15 m) along AB straight line is given in following table. The distance between A and B is 1000 m. During the field survey, it was noted that top soil along AB line is almost the same. Describe the subsurface hydrogeologtical conditions using sketches.

(20 marks)

Distance from A to B (m)	100	200	300	400	500	600	700	800	900	1000
Apparent resistivity(Ohm-m)	60	62	59	61	80	160	420	400	410	400

c. If we conducted electromagnetic survey (EM 31 or EM 34) along AB line, explain the expected results using sketches. (10 marks)

3. Describe the following two topics including concept, and advantages and disadvantages. (20 marks)

a. Active and passive geophysical survey methods

b. Gravity method

c. Selfpotential method

4. Describe the induce polarization method including advantages and disadvantages for investigation of groundwater resources. (10 marks)