Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Science and Technology
300 Level 2nd Semester Examination – December 2017
MRT 385-2 Groundwater Exploration Methods

Uva Wellassa University

Instructions
Duration: 02 hours
Number of questions: 04
Number of questions to be answered: 04
Mark allocation: 100
Illustrate your answers with sketches/diagrams where necessary

Index Number:-

1.

a. Discuss the importance of geophysical techniques in groundwater exploration. (5 mark)

b. Among the conventional geophysical techniques, Resistivity technique is the widely used in groundwater exploration. Discuss above statement. (5 mark)

c. Explain the principle of Nuclear Magnetic Resonance method. (5 mark)

d. Discuss the ability of measuring following parameters using Nuclear Magnetic Resonance and 1D Resistivity methods.

i. Water Content
ii. Hydraulic Conductivity
iii. Direct detection of water
iv. Depth penetration (10 mark)

(Total 25 mark)

2.

a. In Nuclear Magnetic Resonance technique, different signal parameters relate with the different hydrogeological parameters. Write the hydrogeological parameters that relate to the following signal parameters.

i. Signal Amplitude
ii. Signal decay time
iii. Signal phase (6 mark)

b. Explain the dead time in Nuclear Magnetic Resonance resultant signal.

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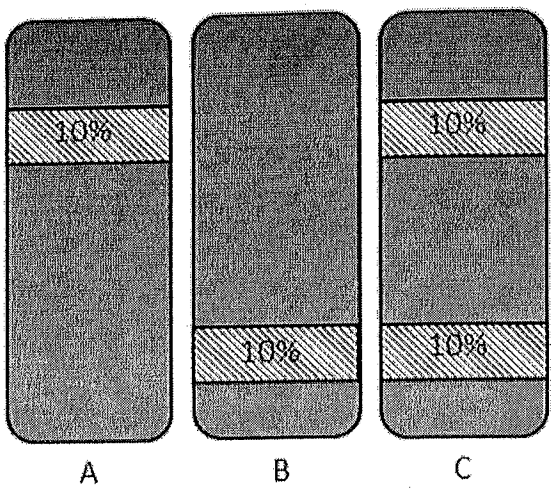
(4 mark)

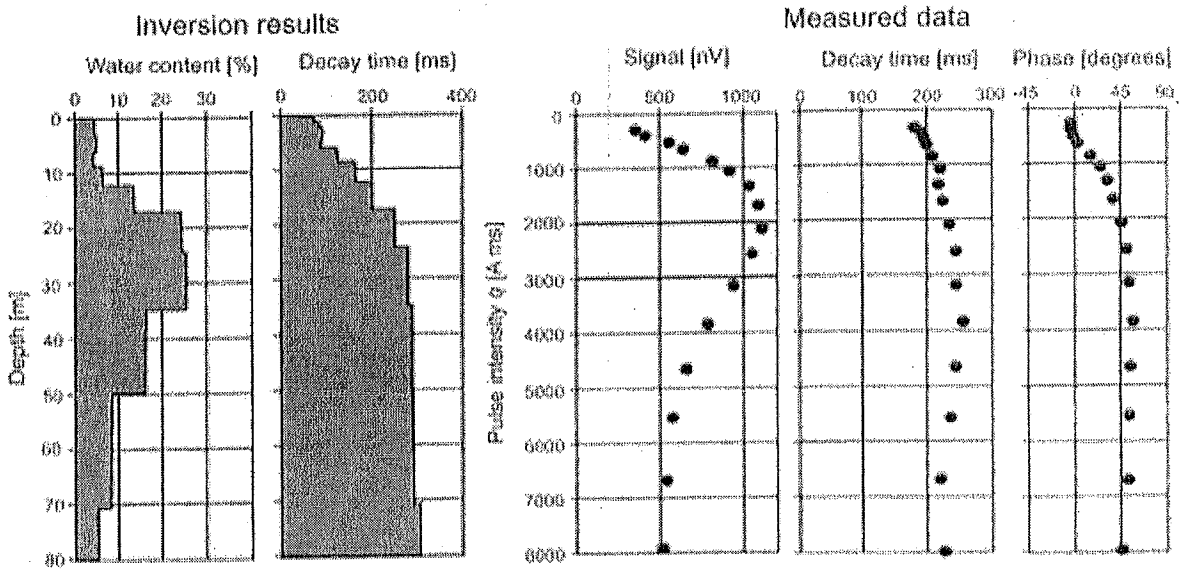
(Total 10 mark)

3.

a. Draw properly labeled shapes of NMR sounding curves for following 3 subsurface structures and justify your answer (10% is the water content of the water bearing layer) (20 mark)



b. Discuss the Following Nuclear Magnetic Sounding results. (20 mark)



(Total 40 mark)

4.

a. Draw the electrode configuration of Schlumberger array and derive geometric constant for Schlumberger array configuration. (10 mark)

b. Discuss the advantages of using Schlumberger array over other electrode configurations in resistivity technique for ground water exploration. (5 mark)

c. Discuss the adverse ground conditions that hinder the usability of 1D resistivity technique and how to overcome such ground conditions. (10 mark)

(Total 25 mark)

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