UNIVERSITY OF MINES AND TECHNOLOGY, TARKWA

FIRST SEMESTER EXAMINATION, APRIL 2023

COURSE NO: MA 471
COURSE NAME: INTRODUCTION TO GEOPHYSICS
CLASS: MA IV **TIME:** 3 HOURS

Name: _____ Index Number: _____

Section A: Answer All Questions

1. You are to conduct a seismic geophysical survey on the new UMaT Park opposite K.T. Hall.

   a) List all the equipment you will need to carry out your investigation.

   b) Using a well labelled sketch show how the overburden and underlying phyllites will be detected.

   c) Construct a travel time curve to a distance of 60 m for the park; assume the top overburden is 10 m thick soil layer with P-wave velocity 500 m/s over a phyllite layer 20 m thick with P-wave velocity 1500m/s. What is the crossover distance?

   d) Calculate the critical angle and the critical distance.

   e) Calculate the intercept time T_i using the equation: $T_i = \frac{2Z\sqrt{V_2^2 - V_1^2}}{V_2 V_1}$

   (25 marks)

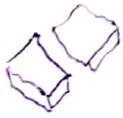
2. A real estate developer is interested in developing a land at Accra. He intends to have a residential facility with its source of water from groundwater. The waste from this new community will be transported to a land fill site to be located about 50km in a nearby town. What geophysical methods will you recommend for all the projects and why? ***(15 marks)***

Section B: Answer Any Two (2) Questions

3. With a well labelled diagram, show the internal structure of the earth based on its physical and chemical properties. ***(10 marks)***

4. Sketch and label the three main plate boundaries and using a table, compare the Earth's plate boundaries. ***(10 marks)***

5. Briefly explain the gravitational methods for geophysical exploration and with a well labelled diagram, show the magnetic susceptibility of at least five different rock types. ***(10 marks)***



6. Briefly explain the following terms as used in rock magnetism: a) Induced magnetism b) Thermoremanent magnetization c) Diamagnetism d) Para-magnetism e) Ferromagnetism ***(10 marks)***

DR A. ASANTE-ANNOR/ Assoc Prof A. Ewusi