



ELIZADE UNIVERSITY
FACULTY OF BASIC AND APPLIED SCIENCES

DEPARTMENT: PHYSICAL AND CHEMICAL SCIENCES

PROGRAMME: APPLIED GEOPHYSICS EXAM TITLE: DEGREE EXAMINATION

COURSE CODE & TITLE: AGP 417 – Engineering Geophysics

TIME ALLOWED: 2 hrs

SEMESTER/SESSION: FIRST / 2020/2021

INSTRUCTIONS: Write your matriculation number on the cover page of the exam booklet.

Answer QUESTIONS 2 AND 4, and any OTHER ONE question.

HOD's SIGNATURE

1. (a) Give a historical account of the development of engineering geophysics.
(b) Explain the concept of engineering geophysics.
(c) Highlight **four (4)** considerations in the selection of geophysical method(s) in engineering site investigation.
(16 marks)
2. (a) The Table below shows a seismic refraction data along a proposed Airport runway. Interpret the data and generate the geologic model along the proposed runway. What are your observation(s)? Give appropriate advice.
(b) Highlight **four (4)** features or characteristics of engineering geophysics.

Offset (m)	Travel Time (ms)	Offset (m)	Travel time (ms)
0	0.0	190	21.7
30	5.0	210	23.2
50	9.0	230	24.6
70	13.2	260	32.2
90	16.2	280	33.9
110	17.2	300	35.2
130	18.0	320	36.5
150	19.6	340	37.7
170	20.7	360	39.2

(22 marks)

3. (a) (i) Determine the RQD of a particular site with the following parameters:
 $V_o = 2000 \text{ m/s}$, $V_p = 1525 \text{ m/s}$, $K_2 = 0.0002596$.
(ii) Rate the strength of site.
(b) What relevant information would an engineering geophysicist provide for each of these professionals?
(i) an electrical engineer (ii) a civil engineer
(iii) Water resource engineer (iv) a mining engineer
(16 marks)

4. (a) Geoelectric sequence from a typical basement environment is shown in Figure 1. Study the figure and answer the following questions;
- How many geologic/geoelectric layers are delineated by the section? Give the geoelectric characteristics of each layer.
 - Which of the layers is appropriate for electrical earthing? Give reason for your answer.
 - Do you consider any buried metal pipe within the second layer subjected to any threat? State such threat if any and give reason for your answer.
 - What advice would you give to Building Engineers, suppose Figure 1 was delineated at a proposed site for a three-floor building?
- (b)
- List **four (4)** factors that affect the resistivity of earth material.
 - Outline **three (3)** applications of electrical resistivity and **three (3)** seismic refraction prospecting methods in engineering site investigation.

(22 marks)

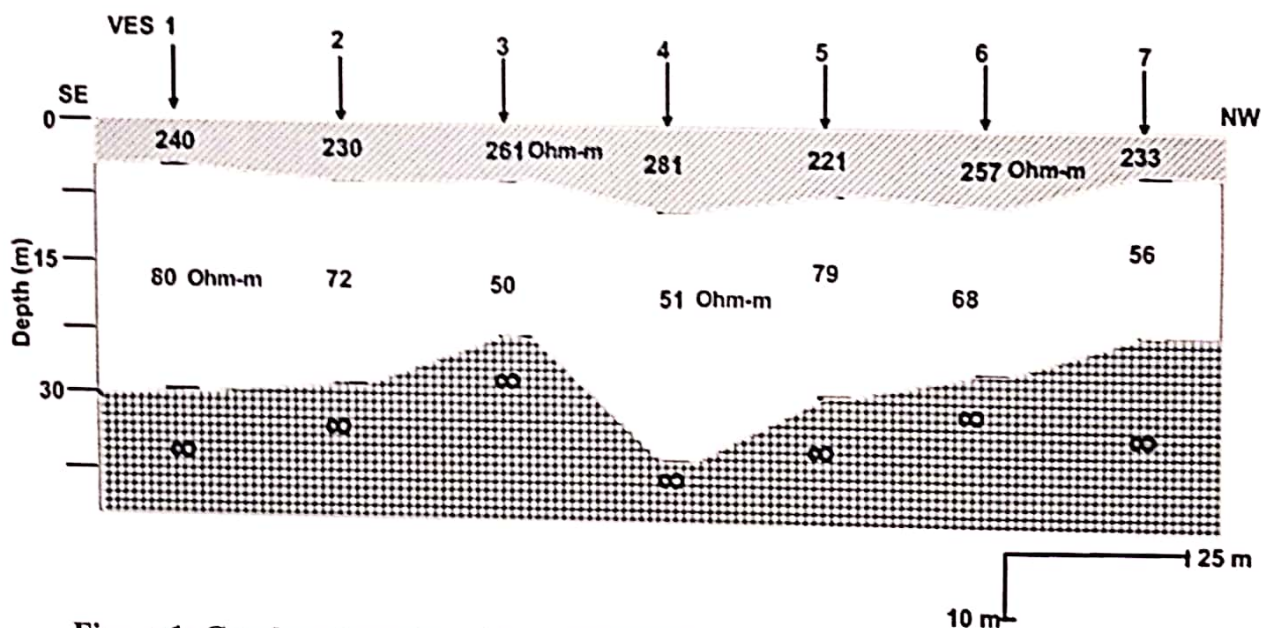


Figure 1: Geoelectric Section Along SE-NW Direction of a Construction Site