NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF HEALTH, NATURAL RESOURCES AND APPLIED SCIENCES

SCHOOL OF NATURAL AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGY, CHEMISTRY AND PHYSICS

QUALIFICATION: BACHELOR OF SCIENCE	
QUALIFICATION CODE: 07BOSC	**LEVEL:** 7
COURSE CODE: GPH701S	**COURSE NAME:** GEOPHYSICS
SESSION: JUNE 2023	**PAPER:** THEORY
DURATION: 3 HOURS	**MARKS:** 100

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER (S)	MR EMMANUEL EJEMBI
MODERATOR:	MR OLUWOLE JACOB OLUWASANMI

INSTRUCTIONS
1. Write all your answers in the answer booklet provided. 2. Read the whole question before answering. **3.** Begin each question on a new page.

PERMISSIBLE MATERIALS

Scientific Calculator

THIS QUESTIONS PAPER CONSISTS OF 4 PAGES (Including this front page)

QUESTION 1 **(15)**

1.1 State the two divisions of geophysical survey methods. (4)

1.2 List four appropriate survey methods used for the exploration of fossil fuels. (2)

1.3 What is the measured parameter of seismic travel? (3)

1.4 Briefly explain the inner core layer of the earth's structure. (6)

QUESTION 2 **(20)**

2.1 What are the differences between body and surface waves? (5)

2.2 What do you understand by the term Young's modulus (Y) of an elastic body? (5)

2.3 Write down the equation for the travel time of a single horizontal refractor and define the various parameters. (5)

2.4 A seismic wave travelled through the earth's interior, with a velocity of 500 m/s and refracted at a velocity of 5400 m/s. If the travel time for the geophone at the shot point is 34×10^{-3} seconds. Calculate the depth of the refractor below the shot point. (5)

QUESTION 3 **(15)**

3.1 State the universal law of gravitation. (2)

3.2 Show that the magnitude of acceleration due to gravity on the Earth's (g) is given as (6)

$$g = \frac{GM}{R^2}$$

3.3 What are the objectives of data enhancement process? (3)

3.4. Briefly explain the low velocity layer. (4)

QUESTION 4 **(20)**

4.1 What do you understand by the term gravity anomaly? (2)

4.2 State six applications of gravity method of geophysical survey. (6)

4.3 Write down the equation for the gravity effect of a horizontal sheet of infinite length and define the various parameters. (5)

4.4 Determine the gravity anomaly due to an infinite horizontal slab of a granite of 12 km thick, and a density of $2.67\ \mathrm{gm}^{-3}$ (Taking $\mathrm{G} = 6.67 \times 10^{-11}\mathrm{m}^2\mathrm{s}^{-2}\mathrm{kg}^{-1}$ and $\pi = 3.142$). (7)