NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF HEALTH, APPLIED SCIENCES AND NATURAL RESOURCES

DEPARTMENT OF NATURAL AND APPLIED SCIENCES

QUALIFICATION: BACHELOR OF SCIENCE	
QUALIFICATION CODE: 07BOSC	**LEVEL:** 7
COURSE CODE: GPH701S	**COURSE NAME:** GEOPHYSICS
SESSION: JUNE 2022	**PAPER:** THEORY
DURATION: 3 HOURS	**MARKS:** 100

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER (S)	MR EMMANUEL EJEMBI
MODERATOR:	MR ROBERT MWANACHILENGA

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 **[20]**

1.1 Sketch a well labelled diagram of the earth structure, showing the three layers and their discontinuity. (8)

1.2 List any four minor tectonic plates. (2)

1.3 List 4 application of geophysical surveying and their appropriate survey method. (4)

1.4 Briefly explain the Mantle layer of the earth structure. (6)

QUESTION 2 **[20]**

2.1 State the two types of surface waves? (5)

2.2 What do you understand by the term Bulk modulus (k) of an elastic body? (5)

2.3 Explain the term dip move-out Δ_{td}. (3)

2.4 The velocity of top layer of a 2-layer model is $1.34\ kms^{-1}$ and that of the bottom is $2.1\ kms^{-1}$. What are the critical angle of refraction and critical distance X_c if depth h is 31 km. (7)

QUESTION 3 **[15]**

3.1 Define seismic velocity. (2)

3.2 Name the two Newton laws, which the gravity method depends on. (3)

3.3 What are the sources of seismic noise? (4)

3.4 Briefly explain the two types of seismic noise. (6)

QUESTION 4 **[15]**

4.1 What are the difference between the two kind of gravity meters? (4)

4.2 Briefly discuss the following gravity corrections. (6)

4.3 A long horizontal underground tunnel of circular cross section (radius 1m) and density $2650kg/m$ is driven in a rock, if the tunnel produces a max anomaly of $0.01mgal$ at the surface. Find the depth to its axis ($G = 6.670 \times 10^{-11}Nm^2kg^{-2}$). (5)

QUESTION 5 **[15]**

5.1 What did you understand by the term magnetic anomaly. (2)

5.2 List two oxide of iron and their chemical compositions. (4)

5.3 With the aid of a concise diagram, briefly explain the working principle of the Flux-gate Magnetometer (9)

QUESTION 6 **[15]**

6.1 State electric field intensity. (2)

6.2 What are the difference between electric resistivity and conductivity of a conductor. (4)

6.3 Sketch an electric circuit showing the four-electrode configuration for a resistivity measurement. (4)

6.4 Write down the equation for resistivity in the Werner Configuration and define the various parameters. (5)