NAMIBIA UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF HEALTH AND APPLIED SCIENCES

DEPARTMENT OF NATURAL AND APPLIED SCIENCES

QUALIFICATION: BACHELOR OF SCIENCE (MAJOR AND MINOR)	
QUALIFICATION CODE: 07BOSC	**LEVEL:** 7
COURSE CODE: GPH701S	**COURSE NAME:** GEOPHYSICS
SESSION: JUNE 2019	**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

Non-programmable Calculator

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

QUESTION 1 **[15]**

1.1 Sketch a well labelled diagram of the earth structure, showing the three layers and their discontinuity. (5)

1.2 List any four major tectonic plates. (2)

1.3 Briefly explain the following mechanical subdivisions of the earth.

1.3.1 Lithosphere (2)

1.3.2 Asthenosphere (2)

1.3.3 Mesosphere (2)

1.3.4 Siderosphere (2)

QUESTION 2 **[20]**

2.1 Define Seismic waves. (2)

2.2 What are body elastic waves? Briefly outline the characteristic difference between these waves and named surface waves. (5)

2.3 State the difference between "Moveout and Normal Moveout" for a reflector in a single horizontal reflector. (5)

2.4 A seismic reflection section shows a set of parallel reflectors at two-way times of 1.00, 2.00, 3.00 and 4.00. The time average velocities for these reflection times have estimated from stacking velocities at each end of the section to be 2.50, 3.00, 3.50 and 4.00 km/s respectively. Find the depth to each reflector. (8)

QUESTION 3 **[20]**

3.1 Discuss the factors that affect seismic velocities. (5)

3.2 What are the sources of seismic noise? (3)

3.3 List and explain the two types of seismic noise. (4)

3.4 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 Xc if h is 31? (8)

QUESTION 4 **[15]**

4.1 Outline the factors affecting density of rocks. (2)

4.2 Briefly discuss the following gravity corrections:

4.2.1 Free air correction (2)

4.2.2 Bouguer correction (2)

4.2.3 Latitude correction (2)

4.3 Name the two kinds of gravimeter. (2)

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

QUESTION 5 **[15]**

5.1 Write down the equation for magnetic force between two magnetic poles and define the various parameters. (3)

5.2 What did you understand by the term magnetic susceptibility (k)? (2)

5.3 Explain the following terms.

5.3.1 Diamagnetism (2)

5.3.1 Paramagnetism (2)

5.3.3 Ferromagnetism (2)

5.4 Explain remanent magnetization. (4)

QUESTION 6 **[15]**

6.1 State Coulomb's law of electricity. (3)

6.2 List two important physical properties of rocks required for electrical surveying. (2)

6.3 Explain what is meant by apparent resistivity. (4)

6.4 Explain how telluric currents are generated. (6)

END!