



**NAMIBIA UNIVERSITY  
OF SCIENCE AND TECHNOLOGY**  
FACULTY OF HEALTH AND APPLIED SCIENCES  
DEPARTMENT OF NATURAL AND APPLIED SCIENCES

<b>QUALIFICATION:</b> BACHELOR OF SCIENCE (MAJOR AND MINOR)	
<b>QUALIFICATION CODE:</b> 07BOSC	<b>LEVEL:</b> 7
<b>COURSE CODE:</b> GPH701S	<b>COURSE NAME:</b> GEOPHYSICS
<b>SESSION:</b> JULY 2019	<b>PAPER:</b> THEORY
<b>DURATION:</b> 3 HOURS	<b>MARKS:</b> 100

<b>SUPPLEMENTARY/SECOND OPPORTUNITY EXAMINATION QUESTION PAPER</b>	
<b>EXAMINER (S)</b>	MR EMMANUEL EJEMBI
<b>MODERATOR:</b>	MR ROBERT MWANACHILENGA

<b>INSTRUCTIONS</b>
<ol style="list-style-type: none"><li>1. Write all your answers in the answer booklet provided.</li><li>2. Read the whole question before answering.</li><li>3. Begin each question on a new page.</li></ol>

**PERMISSIBLE MATERIALS**

Non-programmable Calculator

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

**QUESTION 1** **[15]**

1.1 Draw a well labelled diagram of the earth's structure, showing the mechanical subdivision, and the continental and oceanic crust. (5)

1.2 Explain the following terms:

1.2.1 Crust (2)

1.2.2 Mantle (2)

1.2.3 Core (2)

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

**QUESTION 2** **[20]**

2.1 What are the differences between the two types of surface waves? (5)

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

2.3 Explain the term dip move-out ( $\Delta_{td}$ ). (3)

2.4 The velocity of top layer of a 2-layer model is  $1.34 \text{ kms}^{-1}$  and that of the bottom is (7)

$2.1 \text{ kms}^{-1}$ . What are the critical angle of refraction and critical distance  $X_c$  if depth  $h$  is 31 km.

**QUESTION 3**

**[15]**

- 3.1 Define the term seismic waves. (3)
- 3.2 State the difference between coherent and incoherent noise. (3)
- 3.3 Discuss the three main categories of seismic process. (6)
- 3.4 What are the objective of data-enhancement process? (3)

**QUESTION 4**

**[20]**

- 4.1 State the two Newton laws, which the gravity method depend on. (4)
- 4.2 What are the assumptions for the Newton laws of gravitation? (3)
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- 4.3 Briefly discuss the following gravity corrections:
- 4.3.1 Instrument drift (2)
- 4.3.2 Earth's tides (2)
- 4.3.3 Observed gravity. (2)
- 4.4 Calculate the maximum gravity anomaly due to a sphere of radius 1km and a density contain  $300 \text{ kgm}^{-3}$  buried at a depth of (i) 1 km (ii) 2 km (iii) 15 km ( $G = 6.672 \times 10^{-11} \text{ Nmkg}^{-2}$ ). (7)

**QUESTION 5** **[15]**

5.1 Define the intensity of induced magnetization ( $J_i$ ) of a material. (2)

5.2 List three causes of magnetic anomalies. (3)

5.3 State four applications of the magnetic method of geophysical surveying. (4)

5.4 Explain the following terms:

5.4.1 Chemical remanent magnetization (CRM) (2)

5.4.2 Detrital remanent magnetization (DRM) (2)

5.4.3 Thermoremanent magnetization (TRM) (2)

**QUESTION 6** **[15]**

6.1 State electric potential difference between two points. (2)

6.2 What are the difference between electric resistivity and conductivity of a conductor? (2)

6.3 Which characteristic of the ground determines its electrical resistivity? (3)

6.4 Briefly explain the origin of telluric current. (8)

**END!**