

BSMN 113: INTRODUCTION TO GEOPHYSICS

STREAM: Y1S1

TIME: 2 HOURS

DAY:

DATE:

INSTRUCTIONS

- 1. Do not write anything on this question paper.**
- 2. Attempt question ONE (compulsory) and any other TWO questions.**

QUESTION ONE [30 MARKS]

- a) What is Geophysics? Explain in detail. [2 Marks]
- b) Explain the following branches of Geophysics
- i. Biogeophysics [3 Marks]
 - ii. Geodesy [3 Marks]
 - iii. Geodynamics [3 Marks]
 - iv. Paleomagnetism [3 Marks]
 - v. Tectonophysics [3 Marks]
 - vi. Exploration Geophysics [3 Marks]
 - vii. Geophysical fluid dynamics [3 Marks]
 - viii. Near surface geophysics [3 Marks]
- c) Describe the solar system and its composition. [4 Marks]

QUESTION TWO [20 MARKS]

- a) Explain the continental drift phenomena and outline any four evidences that support it. [6 Marks]
- b) i) Describe plate tectonics theory. [2 Marks]
- ii) Outline the three types of plate boundaries and explain geological features formed at such boundaries. [6 Marks]
- c) Draw the structure of the Earth, show its three major parts and its two major discontinuities. [6 Marks]

QUESTION THREE [20 MARKS]

- a) Describe gravity method as used in geophysical exploration. [2 Marks]
- b) i) State Newton's Law of Universal gravitation. [2 Marks]
- ii) Derive the expression g for acceleration due to gravity. [3 Marks]
- c) Acceleration due to gravity on the Earth's surface is a function of latitude. Explain this statement. [3 Marks]
- d) State and explain five necessary gravity reductions applied to raw gravity data resulting to complete bouguer anomaly. Write the expression for complete bouguer anomaly. [10 Marks]

QUESTION FOUR [20 MARKS]

- a) Describe magnetic method as used in geophysical exploration. [2 Marks]
- b) Explain the following terms as used in magnetic method in geophysical exploration and outline their causes.

- i) Main field [2 Marks]
 - ii) Diurnal variations [2 Marks]
 - iii) Magnetic anomalies [3 Marks]
- c) Explain the following terms.
- i) Magnetic potential [2 Marks]
 - ii) Magnetic moment [2 Marks]
 - iii) Secular variation [2 Marks]
- d) With aid of a diagram, define the elements of the geomagnetic field.
[5 Marks]

QUESTION FIVE [20 MARKS]

- a) With aid of sketches, describe the propagation of different types of seismic waves. [5 Marks]
- b) i) Explain any five possible sources of heat in the Earth. [10 Marks]
- ii) Heat flow (q) from a heat flow province is given by equation;

$$q = q_r + DA$$

Explain the significance of all the terms in the equation. [5 Marks]