ELIZADE UNIVERSITY

ILARA-MOKIN

ONDO STATE

FACULTY: Basic and Applied Sciences
DEPARTMENT: Physical and Chemical Sciences
FIRST SEMESTER EXAMINATIONS
2017/2018 ACADEMIC SESSION

COURSE CODE: AGP 315

COURSE TITLE: SEISMIC PROSPECTING METHODS

DURATION: 2 Hrs: 30 mins

HOD's SIGNATURE

TOTAL MARKS: 60

Matriculation Number: _____

INSTRUCTIONS:

1. Write your matriculation number in the space provided above and also on the cover page of the exam booklet.
2. This question paper consists of 1 page
3. Answer all questions in the exam booklet provided.
4. At the end of this examination, place the question paper inside the exam booklet.
5. **Attempt any four (4) of the five (5) questions**

AGP 315 17/18

1. a. Using Hook's law, define the following elastic moduli. You may support your answers with appropriate diagrams (i) Young's modulus (E); (ii) Shear modulus; (iii) Bulk modulus

   b. Derive the equation for T – X curve for a wave originating from a source point O at the surface SS' and reflected by a horizontal plain RR'. Assumed the plane RR' is h meter below SS', overlain by a medium of constant velocity, V and source – receiver distance X with travel time, T.

   c. In (b) above, obtain the vertical reflection time, T_o 20 Marks

2. a. Determine the root-mean square (rms) velocity and the interval velocity between media A and B in the subsurface having the following properties:

For layer A	For layer B
Velocity of Layer A = 1400 m/sec	Velocity of Layer B = 2400 m/sec
Thickness of layer A = 700 m	Thickness of layer B = 410 m
Time spent in layer A = 380 msec	Time spent in layer B = 160 msec

   Note: Medium B lies beneath medium A

   b. Represent the properties above on a diagram.

   c. List two land and two marine seismic sources. 20 Marks

3 a. Describe four (4) types of spread geometry in seismic data acquisition. You may support your answers with appropriate diagrams.

   b. Calculate the velocity of a compressional wave in a homogeneous rock layer with a density of 2.60 g/cm^3, a Young's modulus of 0.39 x 1011 N/m^2, and a Poisson's ratio of 0.11.

   c. Write short notes on the following: (i) Static Correction (ii) Migration (iii) Normal Moveout 20 Marks

4. a. The amplitude and shape of a seismic wavelet modifies as it travels through the subsurface. Explain the sources of its attenuation.

   b What is your understanding of seismic noise? Explain three types of multiple reflections.

   c. Describe the term Demuiltiplexing. 20 Marks

5. a. Given the notation "sh" for shale and "ss" for sandstone. Calculate the reflection and transmission coefficients at a shale/sandstone interface described by the following elastic parameters:

   V_{sh} = 3.02km/s; ρ_{sh} = 2.23g/cm^3

   V_{ss} = 2.43km/s; ρ_{ss} = 2.08g/cm^3

   b. Explain the following terms: Reflection Coefficient and Transmission Coefficient.

   c. Describe the term Stacking. 20 Marks