ELIZADE UNIVERSITY

ILARA-MOKIN

ONDO STATE

FACULTY: Basic and Applied Sciences

DEPARTMENT: Physical and Chemical Sciences
FIRST SEMESTER EXAMINATIONS
2019/2020 ACADEMIC SESSION

COURSE CODE: AGP 419

COURSE TITLE: GEOPHYSICAL TIME SERIES ANALYSIS

DURATION: 2 Hours

HOD's SIGNATURE

TOTAL MARKS: 60 MARKS

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 2 pages including this page.
3. **Attempt Question 1 and any other three questions.**

1 For a set of signals with inputs 100 Hz, 200 Hz, 250 Hz and 300 Hz sampled at 2 msec, 4 msec and 8 msec. Determine for each input (i) Output (ii) Maximum recoverable frequency and (iii) Alias

15 Marks

2 (a) Given four-point wavelets A = (1, -1, 1, -1), B = (1, 1, 1, 1) and C = (1, 2, 3, 4), find the autocorrelation of each wavelet and the cross – correlation of AB and CA wavelets.

(b) The earth is a filter. Explain using diagram(s)

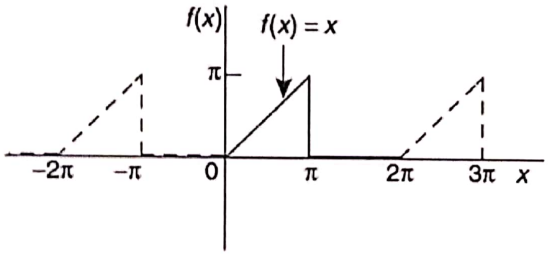
15 Marks

3 (a) Consider a filter with impulse response (2, -1, 1, 3, -2). Evaluate the system using geometric operation of sliding assuming input (1, -1). Use a graph to explain the convolution operation.

(b) List three conditions that could cause incorrect reconstruction of analog signal and describe how you can solve the problem.

15 Marks

4 (a) Obtain a Fourier series for the window shown in the Figure below



(b) Write briefly on the following:

i. Band-pass filter ii. Dynamic range

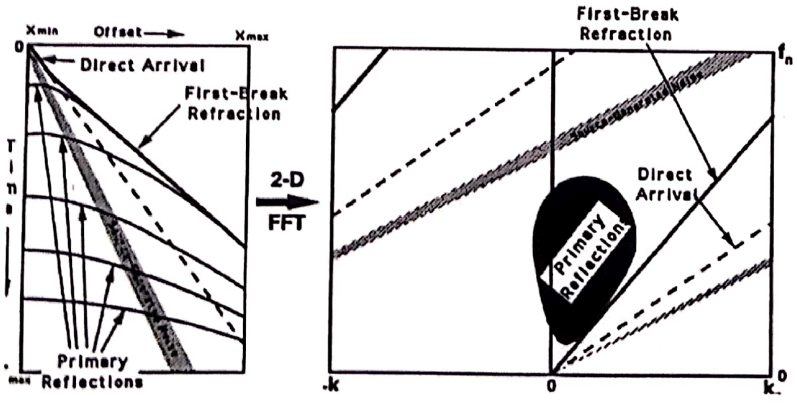
15 Marks

5 (a) Explain using an appropriate diagram the term "Fourier Transform"

(b) Show by means of illustrations the effect of sampling interval on the reconstruction of an analog signal.

15 Marks

6 (a) Use the figure below to explain how F-K Transform aid seismic signal - to -noise ratio



(b) Explain the importance of unit impulse in system analysis. Use diagram where applicable. 15 Marks