GEO4-1424: Applied Geophysics - Part II

room MIN.204 May 18, 2007 11:00 - 13:00

closed book test

(The numbers in square brackets indicate the maximum marks for evaluation.)

1 [16] Describe briefly at least four of the following in the context of reflection seismics (four best answers count) :

- exploding reflector model
- (apparent) velocity filtering in the Fourier domain
- 4-D surveys
- DMO
- vibroseis sweep deconvolution
- receiver array

2 [8] • Derive an expression for a dereverberation operator in marine seismics using a suitable model.

3 [10] • Describe the principle of Diffraction-stack migration, also give a sketch.
• What are its disadvantages, and what can be done about these?

5 [12] • Using a sketch, explain the use of rms-velocity in reflection seismics.
• Derive - from first principles - an expression for Vrms for a horizontally layered sequence of homogeneous beds.

6 [14] • Given an input wavelet [3, 1, -1], design the three-point Wiener optimum filter to shape it to the delayed spike [0, 2, 0].
• Determine the filtering error; discuss how could this error have been reduced.
[hint: normal equations for the Wiener filter are: φ input, input * filter = φ input, desired]

Note: Summary of the GPR papers is due on June 1 (preferrably electronically)