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UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2017

Program/course: B.Tech. APE- UP

Semester – V

Subject: Petroleum Exploration Geological & Geophysical Methods Max. Marks : 100
Code : GSEG- 323 Duration : 3 Hrs
No. of pages: 03

Section-A

1. Explain the following: [4×5]
 - a. Find out the relationship of Seismic Body wave velocities with modulus constants.
 - b. A rock has 20% porosity. The P-wave velocities for the rock matrix and pore fluid are 4 and 2 km/s respectively. What is the overall P-wave velocity of the rock?
 - c. Differentiate between Seal, Cap rock and Trap.
 - d. Differentiate between Geological characteristics of conventional and unconventional hydrocarbon accumulations in a trap.

Section-B: attempt any four [4×10]

2. Calculate the NMO for $x= 1000\text{m}$ and depth of interface layer from the given seismic survey diagram (**Fig. 1**).
3. Evaluate the relevance of Peter's Half-Slope Method in magnetics. Explain the working principle of Proton-precession magnetometer.
4. Explain the procedure for source rock evaluation.
OR
Give a brief account of different type of corrections being done in land and ocean gravity survey to delineate the sub-surface anomaly.
5. Critically examine the processes involved in secondary migration vs accumulation of hydrocarbons.
6. Derive the equation for resistivity using four-electrode Schlumberger arrangement.

Section – C: Answer all questions, (choice is given in Q8)

[2×20]

7. How reflected signal be differentiated from noise? Evaluate the amplitudes and arrival times of multiple reflections coming as signal and noise, assuming normal incidence from **Fig.2**.
8. Describe in detail about formation of petroleum w.r.t. geological processes, mention about all stages, genetic potential & transformation ratio, role of temperature, time and pressure.

OR

9. Answer the following in detail.
 - a. Criticall examine the conditions of reservoir rocks and traps for hydrocarbon accumulation.
 - b. Examine the time of Source Rock deposition vs the time of petroleum generation.

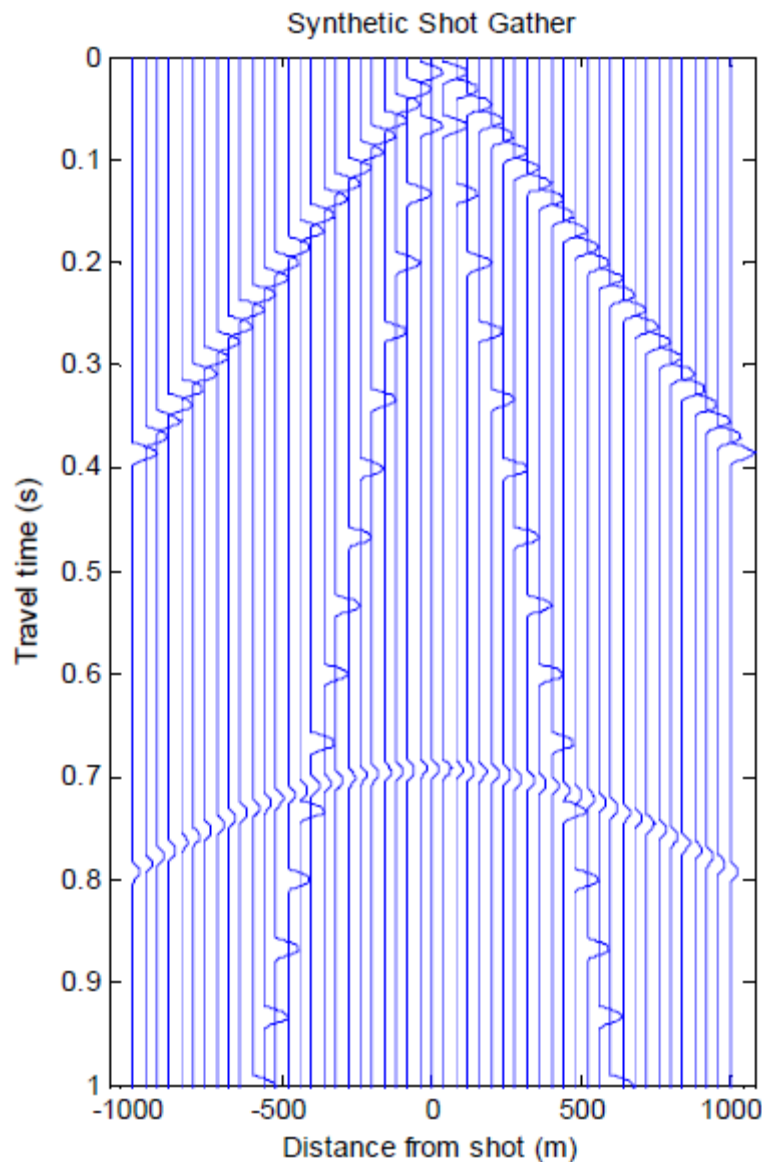


Fig. 1

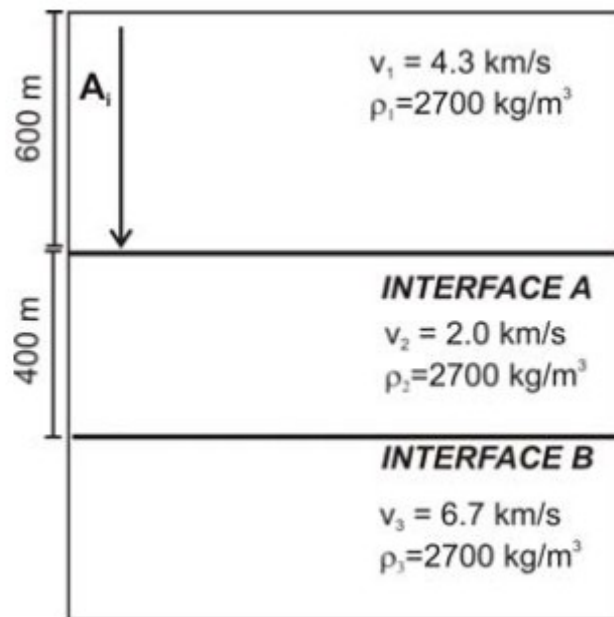


Fig. 2

END