UPES
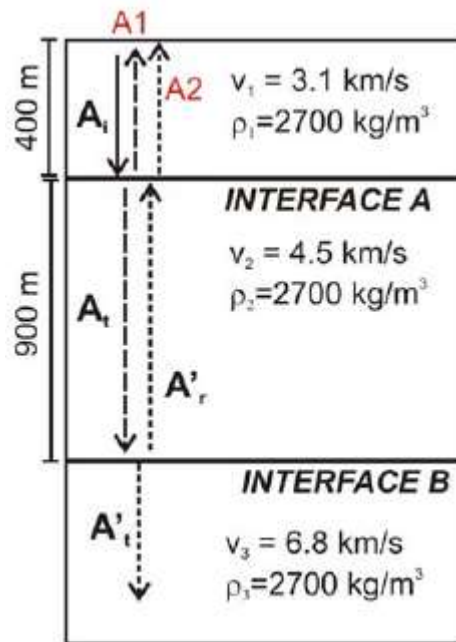**End Semester Examination, May 2024**
Course: Geological and Geophysical methods of Exploration   Semester: IV
Program: B.Tech APE UP   Time   : 03 hrs.
Course Code: PEGS 2035   Max. Marks: 100

Instructions: Answer all questions. However, there is internal choice in Q9 and Q11

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Describe the role of Bouguer anomaly in gravity data reduction	4	CO1
Q 2	Define 'Induced magnetization'	4	CO1
Q 3	A formation is having matrix density 3 gm/cc, fluid density of 1 gm/cc and porosity of 20%. Find the bulk density of formation	4	CO2
Q 4	Explain the term vitrinite reflectance	4	CO2
Q 5	Discuss the conditions necessary for oil accumulation	4	CO2

SECTION B
(4Qx10M= 40 Marks)

Q 6	Explain the various method of gravity anomaly analysis for separating local anomaly from regional anomaly.	10	CO2
Q 7	Analyze different types of kerogens and their potential in Oil and gas formation.	10	CO3
Q 8	Evaluate the potential application of gravity, magnetic, seismic and electrical resistivity methods in subsurface investigations of mineral and hydrocarbon mapping. **OR** Examine the working principle of proton precession magnetometer	10	CO3
Q 9	Calculate the effect of a 20 m change in elevation on the arrival times of reflections, assuming a layer velocity of 3000 m/s and no weathering layer	10	CO4

SECTION-C
(2Qx20M=40 Marks)

Q 10	Analyze the seismic source and detector for ocean survey.	20 (8+12)	CO4

A seismic data record has been plotted between geophone location from source (meter) and arrival time of seismic signal (milli second) for shallow depth investigation using seismic refraction method as given in table. Calculate the thickness of the top layer.

distance (m)	time (milli second)
0	0
5	11
10	26
20	49
40	65
60	71
80	76
100	83
120	88

Q 11 Evaluate NMO correction. Explain the steps of correcting migration of seismic signal in dipping bed.

OR

Calculate the amplitude and reflection coefficient of first two arrivals of signal from given figure.

20   **CO4**