Name: **Enrolment No:**	UPES UNIVERSITY OF TOMORROW

End Semester Examination, May 2025

Course: Geophysics **Semester: IV**
Program: B.Tech APE **Time : 03 hrs.**
Course Code: PEGS2055 **Max. Marks: 100**

Instructions:

I. Write correct unit in numerical after calculation.
II. Draw neat diagram with proper labeling to explain the answer

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	**Mark true or false** **i.** Electromagnetic methods use electrodes to inject current into the ground **ii.** Direct waves travel faster than refracted waves. **iii.** Drift correction is applied in seismic reflection data. **iv.** In layered media, the velocity of seismic waves typically decreases with depth.	**1*4=4**	**CO1**
Q 2	**i.** Explain magnetic susceptibility with examples. **ii.** Compare the travel speed of seismic waves through dense and less dense rocks with examples.	**2*2=4**	**CO2**
Q 3	i. Apply your understanding of wave propagation to explain the speed difference between P-waves and S-waves earths interior.	**4**	**CO3**
Q 4	Evaluate the specific challenges posed by urban environments on seismic surveys and discuss potential strategies to mitigate these challenges.	**4**	**CO4**
Q 5	Differentiate regional and residual anomalies in geophysical survey. **OR** Differentiate Seismic Reflection and Refraction Survey	**1*4=4**	**CO4**

SECTION B
(4Qx10M= 40 Marks)

Q.6	**i**. Discuss how geophysical methods are integrated with geological models. **ii.** Differentiate between static correction and weathering correction.	**5*2=10**	**CO1**
Q.7	**i.** List and explain three types of anomalies in gravity or magnetic surveys. **ii**. Define porosity. Explain influence of porosity in hydrocarbon migration and accumulation.	**5*2=10**	**CO2**
Q.8	**i.** Explain the diurnal correction in magnetic surveys? **ii.** Explain different corrections applied and its significance in seismic survey	**5*2=10**	**CO3**

Q.9	**Answer any two of the following** **i.** Draw and define typical seismic refraction profile showing different types of waves. **ii.** Define porosity and explain its significance in reservoir characterization. List the typical porosity ranges for the following reservoir rocks: **Sandstone, Limestone, Carbonates, Shale.** **iii.** A petroleum reservoir has the following characteristics: Area (A) = 150 acres; Net pay thickness (h) = 20 feet; Porosity (ϕ) = 0.25; Water saturation (Sw) = 0.30. Calculate the volume of hydrocarbons in place (HCIIP).	**5*2=10**	**CO4**
SECTION-C **(2Qx20M=40 Marks)**			
Q.10	**Answer any Two** **i.** Discuss static, elevation, and NMO corrections in seismic surveys. **ii.** In a refraction survey, the travel time at 1500 m offset is 1.2 s. If the first layer velocity is 600 m/s and the second layer velocity is 1800 m/s, estimate the depth to the refractor. **iii.** (a) Explain the importance of weathering correction in land-based seismic reflection surveys. (b) A receiver shows an extra delay of 0.04 seconds due to a weathering layer with a seismic velocity of 600 m/s. Calculate the thickness of the weathered layer responsible for this delay.	**10*2=20**	**CO3**
Q.11	**i.** Explain the principle and application of time-lapse (4D) seismic in enhanced oil recovery. **ii.** A geophone is placed 20 m above the reference datum and a shot point is 10 m below the same datum. If the average velocity of the top layer is 1800 m/s, compute the elevation correction for the geophone and shot point.	**10*2=20**	**CO4**