Name: **Enrolment No:**	

UPES

End Semester Examination, May 2025

Course: Exploration methods in G & G **Semester: II**

Program: M.Sc. Applied Geology **Time : 03 hrs.**

Course Code PEAG7008 **Max. Marks: 100**

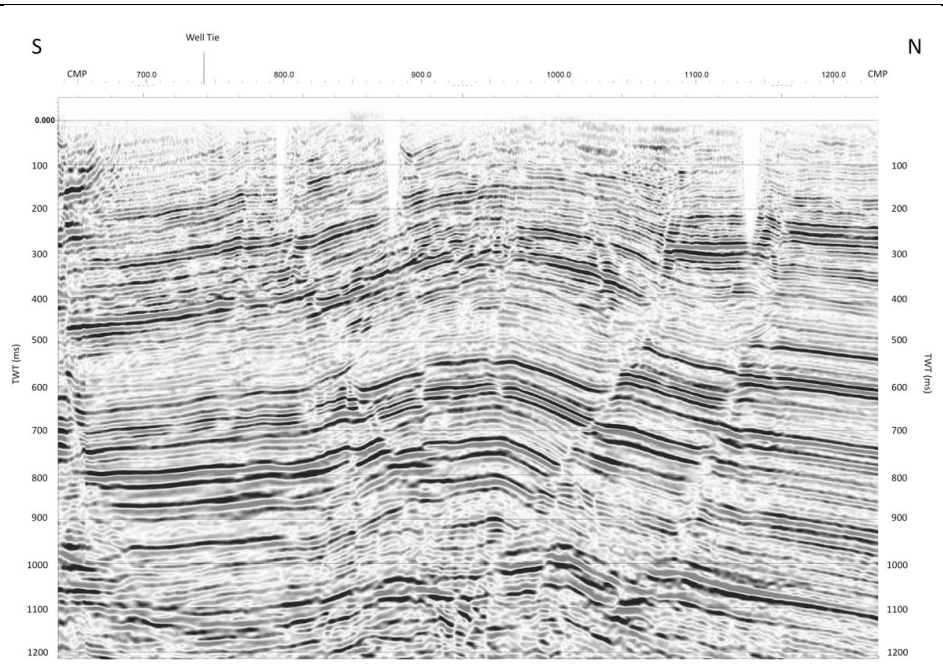
Instructions: Draw appropriate diagrams.

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
1	Define gravity anomalies and explain their significance in geophysical surveys.	**4**	**CO1**
2	Differentiate between isopach and structural maps.	**4**	**CO1**
3	Define porosity and permeability.	**4**	**CO2**
4	List the main instruments used in magnetic surveys.	**4**	**CO2**
5	Explain the concept of subsurface mapping and name any two types.	**4**	**CO2**

SECTION B
(4Qx10M= 40 Marks)

6	Apply the concept of seismic refraction to determine subsurface layering in a two-layer case.	**10**	**CO3**
7	Explain how gravity data reduction improves interpretation of subsurface features.	**10**	**CO2**
8	Interpret the following seismic section, and justify.	**10**	**CO4**

			
9	(A) Analyze how surface geochemical anomalies and stable isotope signatures (e.g., $\delta^{13}C$, $\delta^{34}S$) can be used to distinguish between biogenic and thermogenic sources in mineral exploration. (B) Provide examples where this analysis has been critical in identifying ore-forming processes or hydrocarbon seepage.	**7+3=10**	**CO3**
	OR		
9	(A) Elaborate the seismic acquisition techniques. (B) Compare the advantages and limitations of seismic reflection and refraction surveys.	**5+5=10**	**CO3**
	SECTION-C **(2Qx20M=40 Marks)**		
10	Prepare a comprehensive geological field plan for mapping and sampling in a tectonically active region. Include ethical and environmental considerations.	**20**	**CO4**
	OR		
10	Draw a process work flow diagram illustrating the geological and geochemical techniques of petroleum exploration. Elaborate each step.	**20**	**CO4**
11	Evaluate the source rock potential, kerogen type and maturity of a shale rock with 4 wt. % of TOC releases 0.25mgHC/g Rock free gases, 0.3mgHC/g Rock HC gases and 1.45 mg CO_2/g Rock CO_2 gases at 447^{o}C, 467^{o}C and 560^{o}C temperature respectively. (b) Draw the Van Krevelen diagram and create cross plots to determine the kerogen types.	**20**	**CO4**