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

UPES

End Semester Examination, May 2025

Course Name: Applied Geology **Semester:** II
Program: Basin Analysis **Time: 3** hrs.
Course Code: PEGS 7033 **Max. Marks:** 100
Nos. of page(s) 2

Instructions

I. All questions are compulsory.
II. Read question carefully and write appropriate answer.
III. Write correct unit in after numerical calculation.
IV. Use neat diagram with proper labeling to explain the answer.

SECTION A (5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Briefly explain the importance of basin analysis in petroleum exploration.	**4**	**CO1**
Q 2	Illustrate pull-apart basins.	**4**	**CO2**
Q 3	Write short notes on the role of thermal subsidence in basin evolution.	**4**	**CO4**
Q 4	Define dynamic topography and explain its geological significance.	**4**	**CO5**
Q 5	Describe how burial history affects reservoir porosity.	**4**	**CO3**

SECTION B (4Qx10M= 40 Marks)

Q 6	Explain the classification of sedimentary basins based on tectonic setting with suitable examples.	**10**	**CO2**
Q 7	Examine the processes and implications of basin subsidence. Explain, how does thermal history influence basin evolution?	**10**	**CO3**
Q 8	Describe the process of backstripping in basin analysis. Explain, How does it help in reconstructing subsidence history and paleobathymetry?	**10**	**CO5**
Q 9	In a sedimentary basin, a thickness of 100m and porosity 20% of a sedimentary unit is recorded from a borehole depth at 4 km, whereas same sedimentary unit has 50% initial porosity at the surface. Evaluate the original thickness and compacted thickness of the sedimentary unit. OR Discuss the changes in reservoir and petrophysical properties during burial and how these changes impact hydrocarbon generation and preservation.	**10**	**CO4**

SECTION-C (2Qx20M=40 Marks)

Q 10	Explain the role of eustatic sea-level changes in basin infill patterns. Explain, how do such changes complicate basin analysis?	**20**	**CO4**
Q 11	a. Explain the stratigraphy and petroleum potential of any two Indian sedimentary basins. b. Explain how thermal history and subsidence models are used to assess basin maturity and hydrocarbon potential.	**20**	**CO5**

	OR Large area of continent consists of 30 km of crust with density 2.8 Mg/m3 over 90 km of material with density 3.1 Mg/m^3. The asthenosphere density is 3.2 Mg/m^3 . This region is covered with a 1.6 km thickness of ice of density 0.9 Mg/m^3 . The ice-covered region is assumed in isostatic equilibrium. Then, the ice melts. By how much will the rock surface of the continent change when the new isostatic equilibrium is re-established?		