Name: **Enrolment No:**	

UPES
End Semester Examination, May 2025

Course: Reservoir Modelling & Simulation **Semester: II**
Program: M. Tech. Petroleum Engineering **Time : 03 hrs.**
Course Code: PEAU 8006P **Max. Marks: 100**
Nos. of page(s): 2

Instructions:
(a) All Questions are Compulsory in Sections A, B and C.
(b) Choices are given in Section B (Question 9) and Section C (Question 11).
(c) Answers must carry supporting material such as equations and diagrams.

SECTION A
(5Qx4M=20Marks)
Answer all questions

S. No.		Marks	CO
Q 1	Differentiate between simulation and simulator. List out the uses and misusage of reservoir simulation.	**4**	**CO1**
Q 2	List out the basic steps in the formulation of all simulator equations. List out the sources of errors in a numerical model.	**4**	**CO1**
Q 3	State the term productivity index and well spacing with suitable figure.	**4**	**CO2**
Q 4	Enumerate the different methods for estimating oil & gas reserves. Define principle and advantages of MBE.	**4**	**CO2**
Q 5	Explain different steps in a typical reservoir simulation study. List out the forces that make fluids move in the porous media in detail.	**4**	**CO3**
	SECTION B **(4Qx10M= 40 Marks)**		
Q 6	(a) Illustrate the names of 16 unknowns and 16 equations, which are required in simulation calculations to solve for each grid block and each time steps. (b) Explain types of models based on dimensions in reservoir simulation with suitable figures.	**10 (5+5)**	**CO2**
Q 7	Discuss normalization and averaging of relative permeability data. Illustrate the uses of capillary pressure data and relative permeability in black oil model.	**10**	**CO3**

Q 8	Explain the criteria for grid selection in black oil model. Illustrate the gridding rules for building the reservoir model.	**10**	**CO3**
Q 9	Discuss upscaling basics. Illustrate the different methods of upscaling in black oil model with suitable figures. **OR** Describe pressure equations for black oil model. List out the initialization techniques.	**10**	**CO4**
SECTION-C (2Qx20M=40 Marks)			
Q 10	(a) Discuss the objectives of matching history. Describe the overall steps used in history matching. Illustrate the uncertainties in history matching with case study of limestone reservoir for any Indian field. (b) Describe the various criteria for selecting the prediction cases. List out the various input data and output data during prediction performances. Apply the prediction case studies of sandstone reservoir for any Indian field.	**20 (10+10)**	**CO5**
Q 11	(a) Discuss pre-processor and post Processor files for CMG Simulator. Illustrate the common keywords used to enter data for Cartesian grid and corner point grid entered in IMEX. (b) Describe the golden rules of reservoir simulation. **Set 10 cells to have length of 500 feet** using **DX** keyword in Eclipse. **OR** (a) Discuss the different keywords (in detail) used in Eclipse for RUNSPEC, GRID, EDIT, PROPS, REGIONS, SOLUTIONS, SUMMARY, and SHEDULE Sections. (b) Explain the different deliverables for construction of Geo-cellular model in Petrel. **Define a box as follows:** X direction - cell 1 to cell 5 Y direction - cell 1 to cell 5 Z direction - cell 1 to cell 1 (top layer only) Set the depth below sea level of the tops of each cell in the box to 8,000 feet using BOX, **TOPS** and **ENDBOX** keywords in Eclipse.	**20 (10+10)**	**CO6**