


Name:			
Enrolment No:			
UPES End Semester Examination, December 2024			
Course: Reservoir Modeling & Simulation Program: B. Tech. APE UP Course Code: PEAU 4002 Nos. of page(s):2		Semester: VII Time : 03 hrs. Max. Marks: 100	
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	List out the objectives of Reservoir Simulation Study. Differentiate the uses and misuses of reservoir simulation.	4	CO1
Q 2	State Simulator. Illustrate overall solution methodology of reservoir simulation with flow diagram	4	CO2
Q 3	Illustrate physical model, mathematical model, numerical and computer model.	4	CO2
Q 4	Define the differential form of the darcy's three phase flow and 1-D linear diffusivity equation with suitable equations.	4	CO3
Q 5	Explain the different types of models based on geometry and their uses with suitable figure.	4	CO3
SECTION B (4Qx10M= 40 Marks)			
Q 6	<p>Explain the advantages of material balance equations. Calculate the remaining reservoir oil volume if the cumulative oil production, for example reservoir was 14.73×10^6 STB at the time when reservoir pressure was 900 psig. At the same time cumulative production of solution gas was 4.05×10^9 SCF.</p> <p>Data: $N = 90.46 \times 10^6$ [STB] B_o at 900 psig = 1.104 [RB/STB]</p>	10	CO2

Q 7	(a) Discuss uses of 0, 1, 2, and 3 dimensional models in detail with suitable figures. (b) Explain ten golden rules of reservoir simulation.	10 (5+5)	CO3
Q 8	Explain finite-difference formulations, model initialization, IMPES, IMPIS and fully implicit method in simulation.	10	CO4
Q 9	(a) Describe the different file sections in eclipse data file in detail. (b) Set 10 cells to have length of 100 feet using DX keyword and define a box in eclipse data file as follows: X direction - cell 1 to cell 10 Y direction - cell 1 to cell 10 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 10,000 feet using the BOX , TOPS and ENDBOX keywords OR (a) Discuss the common keywords used to enter data for Cartesian grid and corner point grid entered in IMEX. (b) Describe pre-processor and post processor files for CMG simulator. Write down the names of software for used in Static modeling and dynamic simulation	10 (5+5)	CO6
SECTION-C (2Qx20M=40 Marks)			
Q 10	(a) Explain the discretization process. Describe gridding rules, irregular grids and LGR with suitable figures. (b) Discuss the basics of upscaling. Describe different methods of upscaling with suitable figures and examples.	20 (10+10)	CO4
Q 11	Discuss uncertainties in history matching. Describe automated history matching step by step. Illustrate overall iterative procedure for a history match. Apply the history matching case studies of limestone reservoir for any Indian field. OR Discuss the various criteria for selecting the prediction cases. Describe the various input data and output during prediction performances. Apply the prediction case studies of sandstone reservoir for any Indian Field.	20	CO5