


Name:			
Enrolment No:			
UPES End Semester Examination, May 2023			
Course: Reservoir Modeling and Simulation Program: M. Tech. Petroleum Engineering Course Code: PEGI 7025P Nos. of page(s) : 2		Semester: II Time : 03 hrs. Max. Marks: 100	
Instructions: All question are compulsory. <ol style="list-style-type: none"> Answers must carry the supporting material such as equations and diagrams. Abbreviations used in the questions are standard and have their usual meaning. Make appropriate assumptions where data is not supplied. 			
SECTION A (5Qx4M=20Marks)			
S. No.		Marks	CO
Q 1	Differentiate the uses and misuses of reservoir simulation. Explain source of data for reservoir simulation study.	4	CO1
Q 2	Define computer model. Write down the benefits of computer model.	4	CO1
Q 3	Illustrate the objective, time of estimation and types of reserves in detail.	4	CO2
Q 4	Write down the short notes on Transition zone, wettability, bubble point pressure and Productivity Index with suitable figure.	4	CO2
Q 5	Explain the forces that makes fluids move in the porous media. Discuss the model initialization during simulation.	4	CO3
SECTION B (4Qx10M= 40 Marks)			
Q 6	Discuss the 1D linear diffusivity equations and differential form of Darcy's law for three-phase flow with suitable figures & equations.	10	CO3
Q 7	Describe different types of model and its uses with figures based on dimensions and geometry.	10	CO3
Q 8	State discretization during simulation. Explain upscaling. Describe different methods of upscaling in detail. OR Explain iterative process, Implicit Pressure-Explicit-Saturation and Implicit Pressure-Implicit-Saturation in simulation. State the criteria for grid select in reservoir simulation model.	10	CO4

Q 9	<p>Write down pre and post processor file in CMG-Builder, Illustrate the common keywords used to enter data for Cartesian grid and corner point grid entered in IMEX.</p> <p style="text-align: center;">OR</p> <p>Discuss golden rules in reservoir simulation and Define a box (in Eclipse) 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)</p>	10	CO6
SECTION-C (2Qx20M=40 Marks)			
Q 10	<p>a. Explain principle of Material Balance Equation and Calculate the reservoir volume occupied by released gas [MBE], if Cumulative oil production for our example reservoir was 15.73×10^6 STB at the time when reservoir pressure was 900 psig. At the same time, cumulative production of solution gas was 4.25×10^9 SCF.</p> <p>Data: $N = 95.46 \times 10^6$ [STB] R_{si} at 1225 psig = 240 [SCF/STB] R_s at 900 psig = 179 [SCF/STB] B_g at 900 psig = 0.002705 [RB/SCF] (10 Marks)</p> <p>b Discuss volumetric method. Write down the formula to calculate initial oil in place by volumetric method and Calculate the oil in place from the given data of oil field: Area = 24,500 acres Net productive thickness = 80 ft. Porosity = 15% Average S_{wi} = 55% B_o at p_i = 1.45 bbl/STB (10 Marks)</p>	20	CO2
Q 11	<p>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.</p> <p style="text-align: center;">OR</p> <p>Explain the objectives of History Matching. Discuss uncertainties in History Matching. Describe sort of data should be matched during history match. Apply the prediction case studies of sandstone reservoir for any Indian Field.</p>	20	CO5