Name: Enrolment No:	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2018

Programme Name: B. Tech. APE UP | **Semester :** VII
Course Name : Reservoir Modeling & Simulation | **Time :** 03 hrs.
Course Code : PTEG: 431 | **Max. Marks:** 100
Nos. of page(s) : 2

Instructions:

a. Answers must carry the supporting material such as equations and diagrams
b. Abbreviations used in the questions are standard and have their usual meaning
c. Make appropriate assumptions where data is not supplied

SECTION A

S. No.		Marks	CO
Q 1	What is the necessity of Simulation? Describe a typical reservoir simulation workflow.	4	CO1
Q 2	Define conservation of mass. Describe the assumptions and advantages of Material Balance equation.	4	CO2
Q 3	Explain in brief Darcy's law for three phase Flow.	4	CO3
Q 4	Define Capillary Pressure, Leverett J-Function, Wettability and Transition Zone with suitable equations & Figures.	4	CO2
Q 5	Explain types of simulator and under what conditions would you pick these types of simulators.	4	CO1

SECTION B

Q 1	Define Model initialization. Explain different techniques of initialization.	4 4	CO5
Q 2	What are fundamental laws or rules for expressing the flow of fluids through porous media mathematically? Explain the forces that makes fluids move in the porous media in detail.	4 4	CO3
Q3	Explain the importance of gridding in reservoir simulation. Write down the short notes on Gridding rules, Irregular Grids and LGR.	2 3	CO4

	Explain the different criteria for selecting the prediction cases. Describe Input data and output during prediction performances.	**3**	
Q 4	Define differential equation. Describe different types of differential equations in detail.	**8**	**CO4**
	OR		
Q 4	Explain IMPIS, IMPES, Fully Implicit and finite-difference Method.	**8**	**CO4**
Q 5	Define the basics of upscaling. Why upscaling is required? Explain different methods of upscaling.	**4** **4**	**CO4**
	OR		
Q 5	Describe the following direct and iterative processes of solving simultaneous linear equations.	**8**	**CO4**
	SECTION-C		
Q 1	Explain the common keywords used to enter data for Cartesian grid and corner point grid entered in IMEX. Write the names of software used in Reservoir Modeling and Dynamic Simulation. Set 10 cells to have length of 800 feet using **DX** keyword in Eclipse.	**10** **5** **5**	**CO6**
Q 2	Distinguish iterative procedures for a history match as well as general algorithm for manual history matching along with key reservoir data and additional history matching tools.	**20**	**CO5**
	OR		
Q 2	Describe in detail Water Coning with suitable Figures and equations. Explain in details the uses of Core Data, Production logging data, Pressure transient Data, Open hole log data and Historical production data in reservoir Simulation for enhancement of production.	**5** **15**	**CO5**