



Name:

Enrolment No:

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2019

Programme Name: B. Tech. APE UP
Course Name : Reservoir Modeling & Simulation
Course Code : PTEG: 431
Nos. of page(s) : 2

Semester : VII
Time : 03 hrs.
Max. Marks: 100

Instructions:

- 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

Sl. No.		Marks	CO
Q 1	What are the uses and misuse of Reservoir Simulation model? What are the sources of errors in a numerical model?	4	CO1
Q 2	What are the differences between the Classical and Numerical Simulation Methods?	4	CO1
Q 3	What are the capabilities of reservoir model for dynamics of reservoir behavior? Write down the use of core data in reservoir simulation.	4	CO1
Q 4	Define Bubble Point Pressure, Dew Point, Aquifer and Transition Zone with suitable Figures.	4	CO2
Q 5	What is Wettability? Define effects of Wettability on Relative Permeability.	4	CO2

SECTION B

Q 6	What is Material Balance equation (MBE)? Write down the advantages, limitations and sources of data use in Material Balance equation.	8	CO1
Q 7	What are the classifications of reservoir fluids? How does a simulator determine whether the oil is saturated or under-saturated? What changes will you make in the simulation model if water production is less and oil production is more than the historic data?	8	CO2
Q 8	Define 0, 1, 2, and 3 dimensional models with suitable figures Write down the conditions where you use?	8	CO3
Q 9	What is differential equation? Write down the classification of differential equation. Explain Partial Differential Equation.	8	CO3

OR

	What is Black Oil? For a BLACKOIL system list the number of unknown and the equations required to solve for these at each time step. Explain each equation identifying the data input by the user.		
Q 10	<p>What are some of the Criteria you would use for Grid Selection? Define the irregular grids and Local Grid Refinement with suitable figures.</p> <p style="text-align: center;">OR</p> <p>Define the basics of upscaling. Why upscaling? Explain Fine Scale. Explain different methods of upscaling.</p>	8	CO4
SECTION-C			
Q 11	<p>What are some of the common geometrical representation of reservoirs? Under what conditions would you choose these types of geometries? What are the common keywords used to enter data for Cartesian grid and corner point grid entered in IMEX? (10 Marks)</p> <p>What are the different deliverables for construction of Geo-cellular model in Petrel? (5 Marks)</p> <p>What is simulator? Write down the types and uses of each simulator (5 Marks)</p>	20	CO6
Q 12	<p>Describe 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. (15 Marks)</p> <p>Define History Matching. What are the objectives of History Matching? Explain uncertainties in History Matching. (5 Marks)</p> <p style="text-align: center;">OR</p> <p>What are the various Input Fluid Data in dynamic Simulation? Describe model initialization during simulation. What are the techniques of initialization? (5 Marks)</p> <p>Give example of (a) where you would use a Black Oil model and (b) where you would use a Compositional simulation model. (5 Marks)</p> <p>Describe Exponential Decline Curve Analysis with suitable figures and equation. A well has declined from 100 BOPD to 85 BOPD during a month period. Assuming Exponential decline, predict the rate after 12 month and predict the amount of oil produced after one year. (10 Marks)</p>	20	CO5