Name:	
Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2022

Course: **Reservoir Development & Simulation**   Semester: **III**
Program: **M. Sc. Petroleum Geosciences**   Time   : **03 hrs.**
Course Code: **PEGS 8009**   Max. Marks: **100**

Nos. of page(s)   :   **2**
Instructions: All question are compulsory.
   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		
(5Qx4M=20Marks)		
S. No.		**Marks**	**CO**

S. No.		Marks	CO
Q 1	Define the benefits of Reservoir Simulation Study. Explain the different steps in a Typical Reservoir Simulation Study.	4	CO1
Q 2	Explain Wild Cat well, Discovery well, Exploratory well and Development well.	4	CO2
Q 3	Explain Material Balance Equation. Write down the assumptions and advantages of using MBE.	4	CO2
Q 4	Write down the short notes on Critical water saturation, Free water level, Productivity Index and well spacing with suitable figure.	4	CO2
Q 5	Illustrate Cartesian, Radial and Unstructured with suitable figures.	4	CO3
SECTION B			
(4Qx10M= 40 Marks)			
Q 6	Describe one dimensional form of Diffusivity equation and differential form of Darcy's law for single phase flow with suitable equations.	10	CO3
Q 7	Discuss model initialization during simulation. Explain the various techniques of initialization.	10	CO4
Q 8	Explain upscaling. Describe different methods of upscaling in detail.	10	CO4
Q 9	Discuss the various criteria for selecting the prediction cases. Describe the various Input data and output during prediction performances. **OR**	10	CO5

	Define History Matching. Explain the objectives of History Matching. Describe uncertainties in History Matching. Discuss sort of data should be matched during history match.		

	SECTION-C **(2Qx20M=40 Marks)**		
Q 10	a. Define different method for estimating oil & gas reserves. Describe objective, time of estimation and types of reserves in detail. **(10 Marks)** b Discuss volumetric method. Write down the formula to calculate initial gas in place by volumetric method and **Calculate the initial gas in place from the given data of gas field:** Area = 180 acres Net productive thickness = 60 ft. Porosity = 32% Connate water saturation S_{wc} = 24% Bg at pi = 0.00583 ft3/SCF **(10 Marks)**	20	CO2
Q 11	a. Describe decline curve analysis. Illustrate the different types of decline curve analysis. **(10 Marks)** b. Calculate the amount of oil predict after one year. A well has declined from 100 BOPD to 95 BOPD during a month period. Assuming Exponential decline also calculate the rate after more 11 month. **(10 Marks)** **OR** a. Describe **a**dvantages and **l**imitations of **r**eservoir **s**imulation. Explain input and output files in **b**lack **o**il IMEX **s**imulator of CMG. Write down the names of modeling software for **s**tatic and dynamic modeling. **(10 Marks)** b. Discuss different sections in Eclipse data file. **Define a box 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 BOX, **TOPS** and **ENDBOX** keywords in Eclipse. **(10 Marks)**	20	CO5