Name: **Enrolment No:**	

UPES
End Semester Examination, May 2025

Course: Reservoir Characterization
Program: B. Tech. APE UP
Course Code: PEAU 3048P
Nos. of page(s): 3

Semester: VI
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.	Question	Marks	CO
Q 1	State the terms source rock, reservoir rock, cap rock and contour map with suitable sketches.	**4**	**CO1**
Q 2	Illustrate sedimentary basin with suitable sketch.	**4**	**CO1**
Q 3	Explain porosity and permeability relationship with texture. Write down the bulk density of limestone, sandstone and dolomite based on lithology.	**4**	**CO2**
Q 4	Distinguish between the following with suitable examples and figures. (a) Sandstone and carbonate rocks (b) Igneous and metamorphic rocks (c) Fault and folds (d) Primary porosity and secondary porosity	**4**	**CO3**
Q 5	Define the term reserves. Illustrate the different types of P10, P50 & P90 reserves.	**4**	**CO3**
	SECTION B **(4Qx10M= 40 Marks)**		
Q 6	Explain the following stages in the formation of hydrocarbons decomposition i.e. sedimentation, motion, maturation, migration and trapping with suitable sketches.	**10**	**CO2**

Q 7	Enumerate the importance and classification of drive mechanisms in a reservoir. Explain each drive mechanism with suitable figures.	**10**	**CO2**
Q 8	Define well spacing. Illustrate the different rules of well spacing. Explain different types of patterns with suitable figures.	**10**	**CO3**
Q 9	Describe Reservoir Quality Index (RQI) and Flow Zone Indictor (FZI) with suitable equations, figures and examples. **OR** Discuss fluid saturation and explain critical saturations (Oil, Water and Gas) and average saturations with suitable equations. Illustrate the factors affecting fluid saturations.	**10**	**CO4**
SECTION-C (2Qx20M=40 Marks)			
Q 10	(a) Discuss reservoir modeling and its type. List out the different steps of geological modeling and dynamic simulation with suitable case study. (b) Describe a volumetric method. Write down the formula to calculate initial oil and gas in place by volumetric method and **Calculate the initial gas in place from the given data of gas field:** Area = 160 acres Net productive thickness = 40 ft. Porosity = 22% Connate water saturation S_{wc} = 23% Bg at pi = 0.00533 ft3/SCF	**20 (10+10)**	**CO4**
Q 11	(a) Discuss reservoir characterization from data and parameters to stochastic approach with suitable case study. (b) A petroleum reservoir has an aerial extent of 20,000 ft^2 and a pay thickness of 100 ft. The reservoir rock has a uniform porosity of 35%. Find the pore volume of this reservoir. **OR** (a) Describe **sources of data use in MBE**. Cumulative oil production, for example, reservoirs, was 14.73 $\times 10^6$ STB at the time when reservoir pressure was 900 psig. At the same time cumulative production of solution gas was 4.05 $\times 10^9$ SCF. Calculate the reservoir volume occupied by released gas.	**20 (10+10)**	**CO5**

	Data Given: N = 90.46 $\times 10^6$ [STB] Rsi at 1225 psig = 230 [SCF/STB] Rs at 900 psig = 169 [SCF/STB] Bg at 900 psig = 0.002905 [RB/SCF] (b) Discuss advantages of DCA. **Assuming exponential decline, predict the rate** after 11 more months and after 22.5 months if a well has declined from 100 BOPD to 96 BOPD during a one-month period. Also predict the amount of oil produced after one year.		