PRESIDENCY UNIVERSITY
BENGALURU

SET B

SCHOOL OF ENGINEERING
END TERM EXAMINATION - JAN 2024

Semester : Semester V - 2021
Course Code : PET3006
Course Name : Advanced Petroleum Reservoir Engineering
Program : B.Tech.

Date : 11-JAN-2024
Time : 9:30AM - 12:30 PM
Max Marks : 100
Weightage : 50%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.
(iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS   **5 X 2M = 10M**

1. State the classification of the aquifer based on pressure maintenance. Draw a neat diagram explaining the variation of various drives on a pressure vs time plot.

(CO1) [Knowledge]

2. Outline the factors involved while shifting from one recovery techniques to another for improved oil recovery.

(CO2) [Knowledge]

3. Define Gravity Override.

(CO3) [Knowledge]

4. Define AOF. State the condition to achieve AOF.

(CO3) [Knowledge]

5. Define Bypassing of water in waterflooding

(CO3) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS   **5 X 10M = 50M**

6. **The compressibility notion serves as the foundation for the water influx model, which may be used to calculate the water inflow rate into an oil reservoir. Identify the model and predict the cumulative water influx.**
Initial reservoir Pressure = 4000, Current pressure =2900 at oil-water contact fractional encroachment angle=70⁰. other properties are as follows

	Reservoir	Aquifer
Radius, ft	8000	30,000
Porosity	0.20	0.15
Cf (1/psi)	4E-06	3E-06
Cw (1/psi)	5E-06	4E-06
h, ft	30	25

(CO1) [Comprehension]

7. The importance of designing a waterflooding project lies in its ability to optimize oil recovery, sustain reservoir productivity, and ensure the economic and environmental sustainability of oil fields, especially those in their later stages of production. For designing, selection of pattern flooding is done first. Discuss all the factors while selecting the flood patterns. Draw a flood pattern for 7 spots (regular and inverted) arrangement. _____

(CO2) [Comprehension]

8. In the dynamic landscape of the oil and gas industry, the accuracy of reservoir performance predictions influences not only the economic success of extraction projects but also their broader impact on environmental sustainability, safety, and the responsible stewardship of finite natural resources. Describe the different phases of predicting the reservoir performance. Explain each phases in brief.

(CO3) [Comprehension]

9. A comprehensive understanding of reservoir management processes is fundamental for optimizing hydrocarbon recovery, ensuring economic viability, and addressing environmental and safety considerations in the oil and gas industry. It serves as the foundation for making informed decisions throughout the entire life cycle of a reservoir. Explain your understanding of reservoir management process. Explain the concept and its various component with a neat flow chart.

(CO4) [Comprehension]

10. Reservoir management is essential for maximizing hydrocarbon recovery, ensuring economic viability, and maintaining environmental and safety standards in the oil and gas industry. It requires a multidisciplinary approach, incorporating geology, engineering, economics, and environmental science to achieve optimal results throughout the life of a reservoir. Explain the concept of reservoir management. With a neat diagram explain the reservoir life process in connection with reservoir management.

(CO4) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS   **2 X 20M = 40M**

11. The following PVT data characterizes a solution gas drive reservoir. Predict the cumulative oil and gas production for 4150 psi. Viscosity of oil = 1.7cp and gas =0.023cp. Use the TRACY method for oil reservoir prediction.
The following additional data is available:
N= 15MMSTB, p*= 4350, Pi=4350 psia, Pb= 4350psia, Swi= 0.30, GOR*= 840 scf/STB, Gp*=0 and Np*= 0.

P (psi)	Bo (bbl/STB)	Bo (bbl/scf)	Rs (scf/STB)
4350	1.430	6.9*10^(-4)	840
4150	1.420	7.1*10^(-4)	820
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(CO3) [Application]

12. Relating reservoir performance with time is fundamental for a comprehensive understanding of reservoir behavior. It guides decision-making processes related to reservoir management, production optimization, economic evaluations, and environmental considerations throughout the life of the reservoir. you have been assigned to relate the reservoir performance with Time. Prepare and Explain the steps in brief.

(CO3) [Application]