Roll No											

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
MID TERM EXAMINATION - APR 2023

Semester : Semester VI - 2020
Course Code : PET3006
Course Name : Sem VI - PET3006 - Advanced Petroleum Reservoir Engineering
Program : PET

Date : 17-APR-2023
Time : 11:30AM - 1P
Max Marks : 60
Weightage : 30%

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 2 = 10M)**

1. What is the name of the model that can be used to estimate the water influx into a gas or oil reservoir is based on the basic definition of compressibility? Write the equation of the model.

(CO1) [Knowledge]

2. How many types of well arrangements are used for water injection? Name all the patterns.

(CO2) [Knowledge]

3. What is water influx rate? Write the overall classification of water aquifer.

(CO1) [Knowledge]

4. What are the different methods of Secondary Recovery Techniques?

(CO2) [Knowledge]

5. A typical waterflood response is characterized by an _____in oil rate, followed by a _____, and an eventual breakthrough of injected water at the producer well.

(CO2) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS **(3 X 10 = 30M)**

6. The water influx model that can be used to estimate the water influx rate into an oil reservoir is based on the compressibility concept. Determine the cumulative water influx using appropriate model that results from a pressure drop of 200 psi at the oil-water contact with an encroachment angle of 80°. The reservoir-aquifer system is characterized by the following properties:

	Reservoir	Aquifer
Radius, ft	6000	20,000
Porosity	0.18	0.15
cf 1/psi	4E-06	3E-06
cw, 1/psi	5E-06	4E-06
h, ft	25	20

(CO1) [Comprehension]

7. A typical plot of the oil production rates versus waterflood life for a successful waterflood performance in a reservoir with a gas cap is producing during the effective production time. Discuss all the factors for the effective waterflood operation.

(CO2) [Comprehension]

8. A reservoir aquifer system has the geometry and dimensions of an aquifer radius is 15000' and a reservoir radius is 5000' with an encroachment angle of 80 degree, if the aquifer properties are as follows-

Thickness is 50', viscosity = 0.4 cP, Φ=0.25, K= 50 mD, Ct = 9 E-06 psi-1.

t (yrs)	WD
0.5	2.70
1.0	3.50
1.5	3.82
2.0	3.93
3.0	3.98

Calculate the water influx using proper method for the above given times after an instantaneous pressure drop of 100 psi at the oil-water contact (OWC) at time, t=0.

(CO1) [Comprehension]

PART C

ANSWER THE FOLLOWING QUESTION **(1 X 20 = 20M)**

9. The dimensionless form of the diffusivity equation is used to describe the transient flow behavior in the aquifer. Calculate the water influx after 100, 200, 300, 400 and 500 days into a reservoir whose boundary pressure is suddenly lowered and handled at 2485 psi. A reservoir- aquifer system has the properties are as follows-

Pi =2500 psi, Φ=0.25, K= 85 mD, h=50', Ra=30,000', Ro=10,000', viscosity = 0.4 cP, Ct = 8 E-06 psi-1, θ=90°.

t (days)	WD (bbls/psi)
100	0.895
200	1.363
300	1.800
400	2.000
500	2.400

(CO1) [Application]