PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
END TERM EXAMINATION - JUN 2023

Semester : Semester VI - 2020

Course Code : PET2010

Course Name : Sem VI - PET2010 - Introduction To Oil and Gas Reservoir Simulation

Program : PET

Date : 23-JUN-2023
Time : 9.30AM -12.30PM

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. Define a reservoir model. Mention the difference between modelling and simulation.

    (CO1) [Knowledge]

2. Mention different stages of life cycle of oil production that comes under reservoir management and write the objective of reservoir management.

    (CO1) [Knowledge]

3. Define reservoir simulation and mention its purposes.

    (CO1) [Knowledge]

4. Write the mathematical expressions for depletion drive index (DDI), segregation drive index (SDI), water drive index (WDI) and expansion drive index (EDI) in the following equation:
    DDI + SDI + WDI + EDI = 1.0

    (CO1) [Knowledge]

5. Define the following:
    a) Oil formation volume factor
    b) Gas formation volume factor
    c) Water formation volume factor
    d) Total formation volume factor

    (CO1) [Knowledge]

PART B

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

6. Define Reservoir heterogeneity. Mention different types of heterogeneity. Explain all the steps followed for identification of Dykstra-Parsons Permeability Variation and Lorenz Coefficient.

(CO1) [Comprehension]

7. During data preparation for reservoir simulation, the reservoir is divided into grids and different rock properties are assigned to each grid. Discuss the rock properties in detail that are assigned to the grids.

(CO1) [Comprehension]

8. In primary oil recovery mechanism, the reservoir utilizes its own energy to produce oil. Describe different primary oil recovery mechanisms where the reservoir provides the natural energy.

(CO1) [Comprehension]

PART C

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

9. The Big Butte field is a combination-drive reservoir. The current reservoir pressure is estimated at 2500 psi. The following additional information is available:
Volume of bulk oil zone = 100,000 ac-ft
Volume of bulk gas zone = 20,000 ac-ft
Estimate the oil initially in place.
The reservoir production data and PVT information are given below:

	Initial reservoir condition	Current reservoir condition
p, psi	3000	2500
Bo, bbl/STB	1.35	1.33
Rs, scf/STB	600	500
Np, MMSTB	0	5
Gp, MMMscf	-	5.5
Bw, bbl/STB	1.00	1.00
We, MMbbl	0	3
Wp, MMbbl	0	0.2
Bg, bbl/scf	0.0011	0.0015
cf , cw	0	0

(CO1) [Application]