

Roll No



**PRESIDENCY UNIVERSITY
BENGALURU**

**SCHOOL OF ENGINEERING
END TERM EXAMINATION - JUN 2023**

Semester : Semester VI - 2020

Course Code : PET3005

Course Name : Sem VI - PET3005 - Multilateral and Horizontal Well Technology

Program : PET

Date : 16-JUN-2023

Time : 9.30AM - 12.30PM

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

(10 X 3 = 30M)

1. List the steps for evaluating horizontal well test data. (CO3) [Knowledge]
2. State the three forces affecting fluid flow distributions around the wellbores. (CO4) [Knowledge]
3. State the application of the interference test. (CO3) [Knowledge]
4. List the methods of drilling horizontal well. (CO1) [Knowledge]
5. Differentiate between horizontal and vertical well tests. (CO3) [Knowledge]
6. Enumerate the properties of reservoir rock that influence horizontal well drilling. (CO2) [Knowledge]
7. Enumerate the information generated from Drawdown Test. (CO3) [Knowledge]
8. Define practical reasons for choosing horizontal well for gas reservoirs. (CO4) [Knowledge]
9. Define sidetracking. List the typical steps of sidetracking. (CO1) [Knowledge]
10. Define wellbore storage. (CO3) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS

(2 X 15 = 30M)

11. Drilling horizontal wells are suitable for low porosity and permeability reservoir. Being a completion engineer suggests, with a neat sketch, the types of completion used in a horizontal well.
(CO3) [Comprehension]
12. "Three flow regimes are usually identified: steady state, pseudosteady state, and transient state. The flow regime depends on the boundary condition, which can be identified by the rate of change in pressure with time.". Explain types of flow regimes in the case of horizontal well test with a neat sketch.
(CO4) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS

(2 X 20 = 40M)

13. A 1640 ft long horizontal well is drilled in the lowest zone of an oil reservoir. The reservoir has gas cap. Determine critical oil production rates for horizontal wells using Giger and Efros method. The wells are placed at 160 acres well spacing. The reservoir is isotropic with following data:
 $Kv=Kh = 70\text{md}$
 $2Xe = 2Ye = 2640 \text{ ft}$
 $H = 80\text{ft}$
 $Bo = 1.1 \text{ RB/STB}$
 $\mu_o = 0.42 \text{ cp}$
 $rw = 0.328 \text{ ft}$
 $\Delta\rho=0.48 \text{ gm/cc}$
(CO4) [Application]
14. A 2000-ft-long horizontal well is drilled in an oil reservoir produced by a solution gas-drive mechanism. At a bottom hole pressure of 2000 psia, the well produced 400 STB/day. The reservoir pressure was 2500 psia and the recovery factor was 4%. If the bubble point pressure is 2500 psia: $V= 0.1$ and $n= 1$
a. calculate the maximum oil flow rate, q_{max}
b. calculate the oil rate for $p_{\text{wf}} = 1500 \text{ psia}$
c. construct the IPR curve.
(CO4) [Application]