

Name:

Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, May 2022

Programme Name: B.Tech APE UP

Semester : VI

Course Name : Well Testing and Well Stimulation

Time : 03 hrs

Course Code : PEAU 8002

Max. Marks: 100

Instructions :

- All questions are compulsory. However, internal choice has been provided. You have to attempt only one of the alternatives.
- Please use the graph papers.

SECTION A

(20 marks)

S. No.		Marks	CO
1	A) The acid used in sandstone acidizing are: a. Hydrochloric-hydrofluoric acid mixtures b. HCL c. Retarded HF d. All of the above B) The disadvantage of using proppants is _____	4	CO4
2	Enumerate the different factors on which rate of the reaction of matrix acidizing is primarily dependent	4	CO4
3	Describe the Horner's plot.	4	CO2
4	Define the process to be used for improving the permeability of Bombay High field.	4	CO4
5	Discuss the conditions is Horner's Approximation applicable.	4	CO4

SECTION B

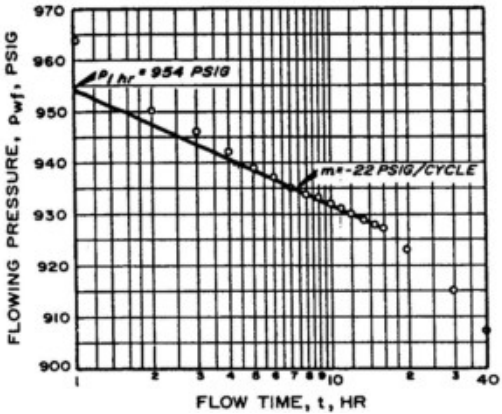
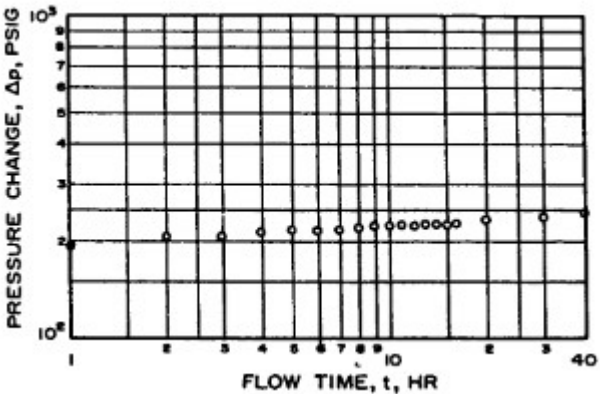
(40 marks)

6	Differentiate between the isochronal and modified isochronal gas well test with the help of graph.	10	CO2
7	Determine total compressibility and skin factor for a damaged or stimulated well characterizing the oil production (23 STB/D) for 7 hours from a reservoir having virgin segment of 1028 ft and following properties:- viscosity = 0.342 cp, $k = 0.12$ mD, $k_s = 0.02$ mD $P_i = 2700$ psia, $P_{wf} = 1500$ psia	10	CO1

$R_e = 2090$ ft,
 $R_w = 0.5$ ft,
 $B_0 = 1.5$ RB/STB,
 $h = 100$ ft
 porosity = 0.20

8 Estimate oil permeability and skin factor from the draw down data of given figures: log-log and semi-log plots.

Know reservoir data are:-
 $h = 130$ ft $\phi = 0.20$
 $r_w = 0.25$ ft, $p_i = 1154$ psia
 $q_o = 348$ STB/D $m = -22$ psi/cycle
 $B = 1.14$ RB/STB $\mu = 3.93$ cp
 $p_{1hr} = 954$ psi $C_t = 8.74 \times 10^{-6}$ psi⁻¹



10 C03

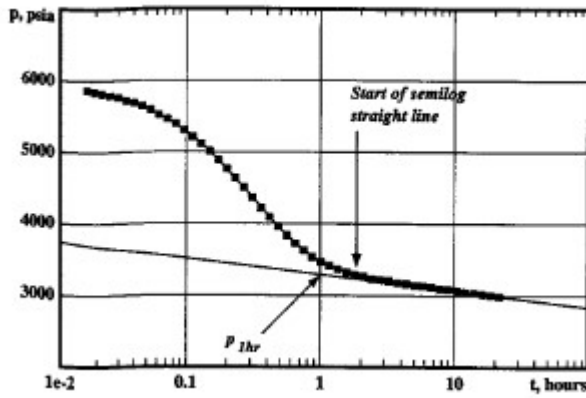
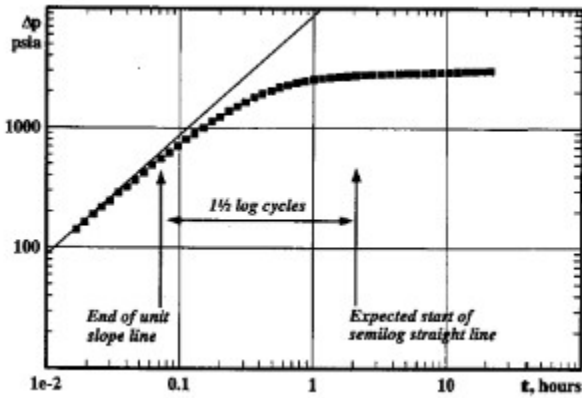
9 “It is an expensive and complicated engineering activity that requires, at minimum, a knowledge of reservoir engineering, fluid flow in porous media, elasticity, fracture mechanics, fluid rheology and fluid mechanics, solids transport, and issues related to gel chemistry.”

10 CO4

	<p>Discuss the process being described while justifying the statement. Also describe the key stages of fluid placement during this treatment. OR Diagrammatically explain the Horner's plot for following conditions:</p> <ol style="list-style-type: none"> Hydraulically fractured well Near boundary well Well with major heterogeneities 		
<p>SECTION-C (40 marks)</p>			
10	<ol style="list-style-type: none"> Calculate a well's skin effect due to radial damage if the permeability impairment is $k/k_s = 5$ fold, the wellbore radius is $r_w = 0.328$ ft and the penetration distance is 0.5 ft. Assume that pseudo-steady state flow conditions and a drainage radius of $r_e = 2980$ ft apply to this well. Determine the portion of the pressure drawdown is lost in the skin zone. Assume that the well has been matrix acidized and the original permeability has been restored in the skin zone. By what factor will the production rate increase assuming the pressure drawdown is the same before and after the treatment. Calculate the factor will the Productivity Index increase? Assume that this well has been fracture treated and a negative pseudo skin factor has been created: $s_f = -5$. Calculate factor will the Productivity Index with respect to the damaged well. 	20	CO2

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For a well test pressure vs time history, calculate wellbore storage co-efficient, permeability, skin, and dimensionless time for the well test data represented by the following log-log and semi-log type curves.



$\phi = 0.21$	$r_w = 0.401 \text{ ft,}$
$p_i = 6009 \text{ psia}$	$q_o = 2500 \text{ STB/D}$
$B = 1.21 \text{ RB/STB}$	$\mu = 0.92 \text{ cp}$
$C_t = 8.72 \times 10^{-6} \text{ psi}^{-1}$	$h = 23 \text{ ft}$

20

CO3