


Name:				
Enrolment No:				
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES End Semester Examination, December 2022				
Programme Name: B.Tech. (APEG)		Semester : V		
Course Name : Production Engineering I		Time : 3 Hrs.		
Course Code : PEAU3001		Max. Marks : 100		
Nos. of page(s) : 2				
Instructions:				
1. All questions are compulsory.				
2. Assume any missing data, if any				
S. No.	Section - A (Attempt all questions) (5Qx4M=20Marks)	Marks	CO	
Q1	List the different functions of a casing head	4	CO1	
Q2	Illustrate the characteristics of the T-Cap on a Christmas tree	4	CO1	
Q3	Identify the various valves utilized in the production flow system	4	CO1	
Q4	What are the potential causes of sand production?	4	CO3	
Q5	Clarify the meaning of "conformance control" in the context of an oil reservoir	4	CO3	
Section - B (Attempt all questions) (4Qx10M=40Marks)				
Q6	Draw a schematic depicting the flow lines, production manifold, and header	10	CO1	
Q7	With help of schematic representation, explain the mechanism of jet perforation technique	10	CO2	
Q8	Describe the necessary steps for an effective hydraulic fracturing design job	10	CO2	
Q9	A 25-wt% HCl is needed to propagate wormholes 4 feet from a 0.320-foot radius wellbore in a limestone formation (specific gravity 2.71) with a porosity of 0.2. The designed injection rate is 0.1 bbl/min-ft, the diffusion coefficient is 10^{-9} m ² /sec, and the density of the 25 % HCl is 1.10 g/cm ³ . In linear core floods, 1.5-pore volume is needed for wormhole breakthrough at the end of the core. Calculate the acid volume requirement in gal/ft, using volumetric model	10	CO2	
Section - C (Attempt all questions) (2Qx20M=40Marks)				
Q10	a) Summarize the general guidelines for effective sand management	10+10	CO3	
	b) The following are the results of a sieve analysis,			
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">U.S. Sieve No</td> <td style="width: 50%;">Mass of sand retained on each sieve (gm)</td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">0</td> </tr> </table>			U.S. Sieve No
U.S. Sieve No	Mass of sand retained on each sieve (gm)			
4	0			

		10	20.1		
		20	40.2		
		40	100.4		
		60	89.1		
		100	95.3		
		200	59.3		
		Pan	30.5		
	<p>I. Plot the grain-size distribution curve. Refer to Table 1 at the end of the question paper for US sieve sizes</p> <p>II. Calculate the uniformity coefficient (C)</p>				
Q11	<p>a) What problems can be encountered during well production? Describe the preventative steps to be taken to avoid them</p> <p>b) How the skin factor and flow efficiency provide insight into the formation damage?</p>				10+10 CO4

Table 1: U.S. Sieve Size

Sieve Number	Opening (mm)
4	4.76
5	4
6	3.36
7	2.83
8	2.38
10	2
12	1.68
14	1.41
16	1.19
18	1
20	0.84
25	0.71
30	0.59
35	0.5
40	0.42
45	0.345
50	0.3
60	0.25
70	0.21
80	0.177
100	0.149
120	0.125
140	0.105
170	0.088
200	0.074
230	0.062
270	0.053
325	0.044