UPES
End Semester Examination, December 2023

Course: Production Engineering I **Semester** : V
Program: B.Tech. (APEG) **Time** : 3 Hrs.
Course Code: PEAU3001 **Max. Marks :** 100

Instructions:
1. All questions are compulsory.
2. Assume any missing data, if any

	SECTION - A (5Qx4M= 20 Marks)		
S. No.		**Marks**	**CO**
Q1	List the different functions of a tubing head	**4**	**CO1**
Q2	Mention the significance of production manifold	**4**	**CO1**
Q3	Enumerate the significance of a casing spool in a well head assembly.	**4**	**CO1**
Q4	Differentiate between overbalanced and underbalanced perforation	**4**	**CO2**
Q5	List the common problems encountered during production of hydrocarbon fluid.	**4**	**CO4**
	SECTION - B (4Qx10M= 40 Marks)		
Q6	Explain in detail the matrix acidizing job design for a sandstone reservoir.	**10**	**CO2**
Q7	For the sieve analysis data given below, estimate the following design parameters using Schwartz method: a) Is the sand uniform? b) Design point c) Formation critical grain size d) Gravel critical grain size	**10**	**CO3**

Depth, Feet	D_{10}, Inches	D_{40}, Inches	D_{90}, Inches
2786	0.040	0.018	0.0027
2795	0.090	0.060	0.0130
2799	0.037	0.016	0.0022
3160	0.050	0.023	0.0029
3169	0.033	0.017	0.0033
3175	0.045	0.033	0.0053

Q8	Describe the factors that are taken into consideration during the selection process of completion fluid.	10	CO4
Q9	Discuss how the skin factor and flow efficiency contribute to a better understanding of formation damage.	10	CO4
	SECTION - C **(2Qx20M= 40 Marks)**		
Q10	The following data are given for a hydraulic fracturing treatment design: • Pay zone thickness: 50 feet • Young's modulus of rock: 4×10^6 psi • Poison's ratio: 0.25 • Fluid viscosity: 1.25 cP. • Leak off coefficient: $0.003 \text{ft}/\text{min}^{1/2}$ • Proppant density: 185 lb/ft^3 • Proppant porosity: 0.4 • Fracture half length: 1,200 feet • Fracture height: 70 feet • Fluid injection rate: 35 bpm • Final proppant concentration: 5 ppg. Calculate the following: a) Fracture width using KGD model (Marks - 2) b) Time of injection of fracturing fluid assuming $K_L = 1.5$ (Marks - 5) c) Fracture, Injection, leak off and pad volumes (Marks - 8) d) Time of pad volume (Marks - 2) Proppant concentration after 35 minutes of injection of fracturing fluid (Marks - 3)	20	CO2

Q11	a) Explain gravel packing method for sand control in oil reservoirs with the help of illustrative diagram.
	b) Explain the following:
	  i. Load-bearing sands
	  ii. Uniformity coefficient
		10
		+
		10
			CO3

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