UPES
UNIVERSITY OF TOMORROW

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
END Semester Examination, May 2024

Course : Well Testing and Well Stimulation **Semester** : VI
Programme : B.Tech., APE UP **Time** : 03 hrs
Course Code : PEAU 3032 **Max. Marks : 100**
Nos. of page(s) : 1

Instructions: *Assume any data missing*

SNo	SECTION A (5Qx4M=20Marks)	Marks	CO
Q 1	Define Skin Factor.	4	CO1
Q 2	Comment on Horner's Approximation.	4	CO1
Q 3	Define Absolute Open Flow.	4	CO1
Q 4	List various uses of the buildup test data.	4	CO2
Q 5	Define Productivity Index.	4	CO3
	SECTION B (4Qx10M= 40 Marks)		
Q 6	A well located in a reservoir of 4000 ft is producing oil at a constant rate of 30.8 RB/day. The following is the data describing well and formation: μ_o = 1.08cp; Bo = 1.475 RB/STB; k = 0.15 md; C_t = 1.5*10^{-5}/psi; r_w = 0.5ft; r_e = 3000ft; h = 150ft; Φ = 0.23; P_i = 3000psi; S=0. Calculate the reservoir pressure at a radius of 1 ft after 4 hours of production.	10	CO2
Q 7	A Flow-After-Flow test in a gas well reported the following data. 	P_{wf} (psig)	403	394	379	363	 	q_g (MMscf/D)	4.288	9.265	14.552	20.177	 At each rate, pseudo-steady state was reached. Initial shut-in bottom hole pressure was determined to be 408 psi. Estimate the Absolute Flow Potential (AOF) of the tested well using the *theoretical flow equation method*.	10	CO3
Q 8	A sandstone with a porosity of 0.2 containing 10 v% calcite ($CaCO_3$) is to be acidized with HF/HCl mixture solution. A preflush of 15 wt% HCl solution is to be injected ahead of the mixture to dissolve the carbonate minerals and establish a low pH environment. If the HCl preflush is to remove all carbonates in a region within 1 ft beyond a 0.328-ft radius wellbore before the HF/HCl stage enters the formation, what minimum preflush volume is required in terms of gallon per foot of pay zone? *Data:* Density of $CaCO_3$ – 162 lb/ft³; specific gravity of HCl – 1.07.	10	CO4
Q 9	Explain with a neat diagram the processes of cased hole gravel packing. *or* Explain with a neat diagram the processes of open hole gravel packing.	10	CO5
	SECTION-C (2Qx20M=40 Marks)		
Q10	Estimate the well's theoretical stabilized productivity assuming skin values of 0, +5 and -5, from the following data: well drilled on 40 acre spacing, 745-ft radius; oil viscosity, 2 cp; absolute permeability, 50 md; relative oil permeability at S_w=S_{wc}, 0.8; thickness of pay, 16 ft; wellbore radius, 0.39 ft; average reservoir pressure, 2900 psia; formation volume factor, 1.3 barrels/STB; assume 25% drawdown. If the well is currently damaged (S = +5) how much of an increase in productivity might be expected from a fracture (S = -5) operation?	20	CO4
Q11	Elaborate on the various types of formation damage, their common causes, and the steps taken to reduce their effects. **or** Explain with neat diagrams the various stages involved in hydraulic fracturing operations along with the pressure points encountered during the process.	20	CO5