


Name:			
Enrolment No:			
UPES End Semester Examination, May 2023			
Course: Advanced Production Engineering Semester: VI Program: B.Tech APE UP Course Code: PEAU3019 Instructions: Attempt all the questions in a serial order.		Time : 03 hrs. Max. Marks: 100	
SECTION A (5Qx4M=20Marks)			
S. No.		Marks	CO
Q 1	State briefly the purpose of the following components of a storage tank (A) Vacuum relief valves and pressure valves (B) Flame Arrestor and Manhole	4	CO2
Q2	Briefly explain the stage separation of hydrocarbons and how to decide the optimum number of stages for separators?	4	CO1
Q3	State the role of artificial lift techniques in the hydrocarbon recovery. Discuss about any two artificial lift techniques briefly.	4	CO5
Q4	The velocity profile of a single phase fluid turbulent flow in a pipe is much flatter than laminar flow. Justify this statement.	4	CO3
Q5	Briefly state the purpose of surface production operations in petroleum operations?	4	CO1
SECTION B (4Qx10M= 40 Marks)			
Q5	Discuss the plot of Reynolds number with flow rate diagrammatically showing the changes in Reynolds number with (a) Pipe diameter (b) Fluid Viscosities	10	CO4
Q6	Give your insights on the method of predicting the fluid flow regimes for the following given cases (a) Single phase fluid flow (b) Two phase gas-liquid flow Draw appropriate diagrams to explain the flow regimes for each flow regime prediction technique.	10	CO4

Q7	<p>A. State the purpose of metering in oil and gas operations. Discuss the different types of meters used in oil and gas metering?</p> <p style="text-align: center;">OR</p> <p>B. Discuss in detail either of the following methods to predict the two-phase vertical lift performance of hydrocarbons.</p> <p>i. Poettmann and Carpenter</p> <p>ii. Gillbert</p>	10	CO3
Q8	Classify different types of storage tanks used to store hydrocarbons under atmospheric conditions. Briefly differentiate the working and design of IFRT, CFRT and EFRT type of tanks.	10	CO2
<p>SECTION-C (2Qx20M=40 Marks)</p>			
Q 9	An oil well is producing from an undersaturated reservoir that is characterized by a bubble-point pressure of 2130 psig. The current average reservoir pressure is 3000 psig. Available flow test data show that the well produced 250 STB/day at a stabilized P_{wf} of 2500 psig. Construct the Inflow Performance Relationship (IPR) data for the entire life of the well on a normal graph sheet.	20	CO5
Q10.	<p>A. Give your insights on the phenomena of holdup behaviour during multiphase flow in wells. How is slip velocity related to holdup fraction and flow rates of each fluid phase?</p> <p>B. If the slip velocity for a gas-liquid flow is 100 ft/min and the superficial velocity of each phase is also 100 ft/min, determine the holdup of both the gas and liquid phase.</p>	10+10	CO4