



PRESIDENCY UNIVERSITY

BENGALURU

Roll No.												
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End - Term Examinations – May/June 2026

Date: 14 – 05- 2026

Time: 01:00pm – 04:00pm

School: SOE	Program: B.Tech (PET)	
Course Code: PET2007	Course Name: Oil and Gas Surface Facility Design	
Semester: VI	Max Marks: 100	Weightage: 50%

CO - Levels	CO1	CO2	CO3	CO4	CO5
Marks	04	20	20	28	28

Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks.

10Q x 2M=20M

1.	Identify two types of liquid level control schemes used in three-phase separators based on their interface and oil chamber configurations.	2 Marks	L1	CO1
2.	Describe the working principle of cyclone separator.	2 Marks	L1	CO1
3.	List atleast two selection consideration for separators.	2 Marks	L1	CO4
4.	List atleast four factors that affect phase separation.	2 Marks	L1	CO4
5.	Define gravity settling in two points.	2 Marks	L1	CO4
6.	Define the operational challenges caused by foamy crudes and paraffin in surface facility design.	2 Marks	L1	CO4
7.	Outline the significance of surface facility operations in the petroleum industry and their impact on overall production efficiency.	2 Marks	L1	CO5
8.	List any two vessel internals and explain its functions.	2 Marks	L1	CO5
9.	List 4 factors that is considered while treating crude oil.	2 Marks	L1	CO5
10.	Define Lease Automatic Custody Transfer (LACT) unit and describe its primary function.	2 Marks	L1	CO5

Part B

Answer the Questions.

Total Marks 80M

11.	Interpret the working principles of two-phase horizontal separators by describing and classifying any two types. Determine the role of each component with the help of labeled schematic diagrams.	20 Marks	L3	CO2
Or				
12.	Apply your understanding of separation processes to explain and illustrate the working of a three-phase vertical separator. Prepare a labeled schematic diagram and describe the function of its key components.	20 Marks	L3	CO2

13.	Calculate the given data to design a two-phase vertical separator. Flow Rate: 10 MMscfd at 0.6 specific gravity 2,000 bopd at 38° API Operating Pressure: 800 psia Operating Temperature: 50° F $d_m = 120$ micron $\mu = 0.013$ cp $z = 0.84$ $C_D = 0.851$ (Assume a retention time of 1, 2, and 3 minutes, with the vessel internal diameter ranging from 24 to 48 inches.)	20 Marks	L4	CO3
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Or

14.	Calculate the given data to design a two-phase horizontal separator. Flow Rate: 10 MMscfd at 0.6 specific gravity 2,000 bopd at 38° API Operating Pressure: 800 psia Operating Temperature: 50° F $d_m = 120$ micron $\mu = 0.013$ cp $z = 0.84$	20 Marks	L4	CO3
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	$C_D = 0.851$ (Assume a retention time of 3 minutes, with the vessel internal diameter ranging from 16 to 48.)			
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15.	Analyze and derive the equation for the terminal settling velocity of a droplet under laminar flow conditions using Stokes' Law.	20 Marks	L4	C04
Or				
16.	Analyze and derive the governing equations for gas and liquid capacity in the sizing of a two-phase horizontal separator.	20 Marks	L4	C04

17.	Examine and analyze the significance of crude oil desalting in surface production operations, with emphasis on its role in minimizing corrosion, scaling, and fouling in downstream units. Compare, contrast, and differentiate between single-stage and two-stage desalting systems by discussing their operating principles, effectiveness, and field applications. Support your answer with well-labeled process flow diagrams for each system.	20 Marks	L4	C05
Or				
18.	Analyze and examine the operational significance of heater treaters in crude oil treatment, particularly in the separation of water and gas to enhance processing efficiency and transport quality. Compare, contrast, and differentiate between indirect-fired and direct-fired heater treaters, as well as vertical and horizontal configurations, by discussing their selection criteria, advantages, and limitations. Support your answer with clearly labeled schematics for each configuration.	20 Marks	L4	C05