Roll No.												

PRESIDENCY UNIVERSITY

BENGALURU

Mid - Term Examinations – MARCH 2026

Date: 10- 03- 2026 **Time:** 09:30am – 11:00am

School: SOE	**Program:** B.Tech - PET	
Course Code : PET2007	**Course Name:** Oil and Gas Surface Facility Design	
Semester: VI	**Max Marks**: 50	**Weightage:** 25%

CO - Levels	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**
Marks	**16**	**17**	**17**	**-**	**-**

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. **5Q x 2M=10M**

1	Identify two drawbacks of a vertical separator.	**2 Marks**	**L1**	**CO1**
2	List two selection consideration for separators.	**2 Marks**	**L1**	**CO1**
3	Outline four factors that affect phase separation.	**2 Marks**	**L1**	**CO1**
4	Define any two vessel internals.	**2 Marks**	**L1**	**CO2**
5	Describe stage separation.	**2 Marks**	**L1**	**CO3**

Part B

Answer the Questions. **Total Marks 40M**

6.	Explain the working of a three-phase vertical separator using a labeled schematic diagram, and describe the function of each major component involved in the separation process.	**10 Marks**	**L2**	**CO1**
	Or			
7.	Summarize the detailed comparison between filter separators and glycol dehydrators in terms of design, function, and application in gas processing systems.	**10 Marks**	**L2**	**CO1**

8.	Interpret the given data to design a three-phase vertical separator. Oil flow rate = 5,000 bopd Water flow rate = 3,000 bwpd Gas flow rate = 5 MMSCFD Operating pressure = 150 psia Operating temperature = 80°F Oil gravity = 30° API $(S.G.)_w$ = 1.07 $(S.G.)_g$ = 0.7 Oil viscosity = 10 cp Assume, drag coefficient, C_D = 0.851 Compressibility factor, z = 0.84 Retention time, $(t_r)_o = (t_r)_w$ = 10 min β= 0.257 Oil droplet size = 100 micron Water droplet size = 500 micron Based on these data calculate separator size, seam to seam length and slenderness ratio, assume the vessel internal diameter ranging from 84 to 102 inches.	**15 Marks**	**L3**	**CO2**
	Or			

9.	Interpret the given data to design a three-phase horizontal separator. Oil flow rate = 5,000 bopd Water flow rate = 3,000 bwpd Gas flow rate = 5 MMSCFD Operating pressure = 150 psia Operating temperature = 80°F Oil gravity = 30° API $(S.G.)_w = 1.07$ $(S.G.)_g = 0.7$ Oil viscosity = 10 cp Assume, drag coefficient, $C_D = 0.851$ Compressibility factor, z = 0.84 Retention time, $(t_r)_o = (t_r)_w = 10$ min $\beta = 0.257$ Oil droplet size = 100 micron Water droplet size = 500 micron Based on these data calculate separator size, seam to seam length and slenderness ratio, assume the vessel internal diameter ranging from 60 to 108 inches.	**15 Marks**	**L3**	**CO2**

10.	Analyze and derive the equation for the terminal settling velocity of a droplet under laminar flow conditions using Stokes' Law.	**15 Marks**	**L4**	**CO3**
	Or			
11.	Analyze and derive the governing equations for gas and liquid capacity in the sizing of a horizontal separator.	**15 Marks**	**L4**	**CO3**