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Bengaluru

Mid Term Examinations - October 2026

Date: 06/10/2026 **Time:** 11:45 AM - 01:15 PM

Course Code: PET2116 **Course Name:** Oil and Gas Surface Facility Design

Semester: Fifth Semester **Max. Marks:** 50 **Weightage:** 50%

CO - Levels	CO1	CO2	CO3
Marks	26	40	24

PART A: Answer Following Questions. 10 M

Q.N.	Questions	M	CO	BT
1	State the term cricondentherm.	2	CO1	BT1
2	List the basic components of surface production facilities.	2	CO1	BT1
3	Tell the primary difference between a two-phase separator and a three-phase separator.	2	CO1	BT1
4	Name the empirical sizing constant or coefficient used in the Souders-Brown equation used to find the maximum allowable gas velocity in a separator.	2	CO3	BT1
5	State the fundamental law used to derive droplet settling velocity in separators.	2	CO3	BT1

PARTB: Answer Any 1 Following Questions. 20 M

Q.N.	Questions	M	CO	BT
06.A	Describe the subsurface production process and also the major equipment involved in bringing reservoir fluids to the surface.	10	CO1	BT2
06.B	Determine the bubble point line and the dew point line on a hydrocarbon P-T phase envelope with a neat labeled diagram.	10	CO2	BT3
07.A	Explain in detail the varius stages used to handle the production stream from the wellhead to separators.	10	CO1	BT2
07.B	Demonstrate the working principle of three phase vertical separtor along with its advantages and disadvantages.	10	CO2	BT3

PARTC: Answer Any 1 Following Questions. 20 M

Q.N.	Questions	M	CO	BT
08.A	A rigid oil droplet d_m = 100* 10^{-6} m is settling in a gravity separator. The liquid density is 850 kg/m^3 and the gas density is 50 kg/m^3. Assuming the flow condition satisfies Stokes' Law and the dynamic viscosity of the gas is 1.6 10^{-5} Pa.s, calculate the terminal settling velocity V_t of the droplet in m/s. (Take g = 9.81 m/s^2)	10	CO2	BT3
08.B	Analyze the Souders–Brown relationship and derive the governing expression for maximum allowable gas velocity in two-phase gas–liquid separator sizing. Explain the physical factors influencing the selection of the empirical K-factor.	10	CO3	BT4

09.A	A vertical process separator is being designed to handle a mixture of oil and gas under steady-state conditions. The density of the liquid oil phase is p_o = 850 kg/$m^3$and the density of the gas phase is p_v= 24 kg/m^3. The volumetric flow rate of the gas entering the separator is 1.5 m^3. Taking the empirical Souders-Brown constant (K = 0.1 m/s), calculate the minimum inner diameter of the vertical separator (in meters) required to prevent liquid entrainment.	10	CO2	BT3
09.B	Relate the relationship between laminar flow and the terminal settling velocity of a droplet with the help of derivation, using stokes law.	10	CO3	BT4