Roll No.												

PRESIDENCY UNIVERSITY

BENGALURU

Mid-Term Examinations – October 2025

Date: 08-10-2025 **Time:** 09.30am to 11.00am

School: SOE	**Program:** B.Tech. (PET)	
Course Code: PET2105	**Course Name:** Fundamentals of Oil and Gas Well Drilling Technology	
Semester: III	**Max Marks**: 50	**Weightage**: 25%

CO - Levels	CO1	CO2	CO3	CO4	CO5	CO6
Marks	26	24	-	-	-	-

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

1.	**Select the correct option:** Which component both provides engagement of the Kelly drive bushing with the rotary table and provides the tapered seating for the slips? A) Kelly bushing B) Master bushing C) Swivel D) Rotary hose	**2 Marks**	**L1**	**CO1**
2.	**Select the correct option:** The total derrick load is not equally distributed over all four derrick legs due to the placement of: a) Drilling line b) Drawworks c) Crown block d) Traveling block	**2 Marks**	**L1**	**CO1**
3.	**Select the correct option:** Match the following: (i) Traveling Block – (a) Measures weight (ii) Draw works – (b) Moving pulleys	**2 Marks**	**L1**	**CO1**

	(iii) Hook – (c) Heavy load lifting (iv) Weight Indicator (d) Winch for drilling line Options: A) i-b, ii-d, iii-c, iv-a B) i-c, ii-a, iii-d, iv-b C) i-d, ii-c, iii-a, iv-b D) i-b, ii-c, iii-d, iv-a			
4.	Outline the common Kelly shapes and choose which shape has the stronger drive section: a) Square b) Hexagonal c) Round d) Octagonal	**2 Marks**	**L1**	**CO2**
5.	State the function of a Kelly accessory used in drilling operations.	**2 Marks**	**L1**	**CO2**

Part B

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

6.	**a.**	Explain the main components and functions of the hoisting system in a drilling rig.	**10 Marks**	**L2**	**CO1**
	b.	Given: string weight in mud = 350,000 lb, block + hook = 20,000 lb, number of lines = 8, efficiency factor = 0.88. Estimate the following: (i) Fast Line Load (FLL) in lb (ii) Hook Load (HL). (iii) Dead Line Load (DLL).	**10 Marks**	**L2**	**CO1**
		Or			
7.	**a.**	Distinguish between kick indicators and kick warning signs, and state the major causes of kicks encountered during drilling operations.	**10 Marks**	**L2**	**CO1**
	b.	Describe the major differences between onshore drilling rigs and offshore drilling systems with suitable examples.	**10 Marks**	**L2**	**CO1**

8.	**a.**	Examine the grades of drill pipe specified by API. How many grades are there, how is each grade specified, and which grade would you predict to be best suited for ultra-deep wells with high loading conditions?	**10 Marks**	**L3**	**CO2**
	b.	Classify different drill string accessories (HWDP, drilling jar, stabilizers, reamers, shock subs) and illustrate their specific functions in drilling operations.	**10 Marks**	**L3**	**CO2**
		Or			
9.	**a.**	Apply the buoyancy factor (BF) concept to determine the effective weight of a 25,000 lb drill string immersed in mud of	**10 Marks**	**L3**	CO2

		specific gravity 1.20.			
	b.	Apply the given formulas to calculate the tool joint weight and the effective weight per foot of a 5″ OD, 16.02 ppf, Grade X95 drill pipe joint. If the wall thickness is reduced by 30% due to wear, classify the pipe according to API standards.	**10 Marks**	**L3**	**CO2**

Formulas to use:

1. **Tool joint weight:**

$$W_{tj} = \frac{\pi}{4} \times L \times (D^2 - d^2) \times \rho$$

2. **Adjusted tool joint length (ft):**

$$L_{adj} = \frac{L + 2.253(D - D_{TE})}{12}$$

3. **Assembly weight per foot:**

$$W_{assembly\_ppf} = \frac{(pipe\ weight\ ppf \times 29.4) + W_{tj}}{29.4 + L_{adj}}$$