Roll No.												

PRESIDENCY UNIVERSITY

BENGALURU

Mid - Term Examinations – October 2025

Date: 10-10-2025 **Time:** 11.45am to 01.15pm

School: SOE	**Program:** B. Tech - EEE	
Course Code: EEE2029	**Course Name:** Transmission and Distribution	
Semester: V	**Max Marks**: 50	**Weightage**: 25%

CO - Levels	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**
Marks	14	22	14	-	-

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	State the advantages of higher voltage transmission in power systems.	2 Marks	L1	CO1
2	What are the three main stages of a power system?	2 Marks	L1	CO1
3	List the important factors to be considered while deciding the transmission systems.	2 Marks	L1	CO2
4	Mention the typical range of distances and the voltage range that define a long transmission line.	2 Marks	L1	CO3
5	Recall the basic assumptions made in the modeling of medium transmission lines.	2 Marks	L1	CO3

Part B

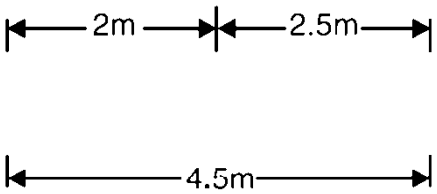
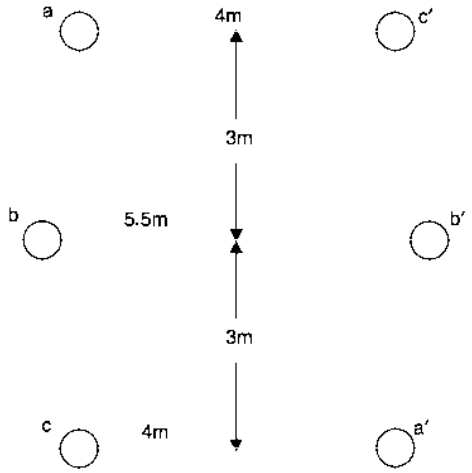
Answer the Questions. **Total Marks 40M**

6.		A new engineering graduate joins a power utility company. During the induction training, the senior engineer asks them to explain the overall structure of the power system to understand how electricity flows from generation plants to end consumers. Using a neat diagram, explain the basic structure of a power system and its main components.	10 Marks	L2	CO1
		Or			
7.	**a.**	An industrial customer complains that although their electricity bill shows high energy usage, the utility also charges	05 Marks	L2	CO1

		them for poor power factor. The manager wants to know the difference between the useful power consumed and the extra power that flows back and forth in the system. As an engineer, explain the difference between active power and reactive power in AC transmission systems.			
	b.	A power utility is considering increasing the transmission voltage to reduce losses over long distances. However, the design team warns that there are practical limits to how high the voltage can be raised. Explain the limitations of using very high transmission voltages in a power system.	05 Marks	L2	CO1

8.	**a.**	A power company is planning to build a 765 kV transmission line to carry electricity over 400 km. Initially, they considered using a single conductor per phase. However, the engineers suggest using quad-bundled conductors instead. As a design engineer, explain why bundled conductors are preferred over single conductors in this case. List the benefits of using bundled conductors	06 Marks	L2	CO2
	b.	An electrical utility is designing a 220 kV, 200 km transmission line. During the design review, a junior engineer suggests calculating only the inductance of the line to determine its impedance, ignoring the capacitance effect. As the senior engineer, explain why it is necessary to calculate both inductance and capacitance when determining the transmission line's impedance.	04 Marks	L2	CO2
		Or			
9.	**a.**	In an AC transmission line conductor, current tends to flow more near the surface of the conductor rather than uniformly throughout the cross-section. Explain why this happens and discuss how frequency and conductor diameter influence it.	05 Marks	L2	CO2
	b.	A state electricity board is planning to set up a new 220 kV transmission line to connect a power plant to a city located 150 km away. The planning team must decide on the type of transmission system to adopt. As a junior engineer in the team, list and explain the important factors that need to be considered while deciding the transmission system for this project.	05 Marks	L2	CO2

10.	A utility company is planning a 100 km, 3-phase, 50 Hz, 33 kV overhead transmission line. The line conductors are arranged in a horizontal configuration Fig. 1 and each conductor has a diameter of 1.20 cm. As a design engineer, you are asked to: i Identify the unknown transmission line parameters that can be determined from the given data. ii List these parameters clearly. iii Perform the necessary calculations to obtain their values.	10 Marks	L3	CO2

	 Fig. 1			
	Or			
11.	An electrical utility company KPTCL is constructing a double-circuit, 3-phase transmission line as shown in Fig. 2. Each conductor has a radius of 0.75 cm, and the line is fully transposed to ensure balanced mutual inductance. The system operates with a phase sequence of ABC. As part of the design study, determine the inductance per phase per km of this transmission line.  Fig. 2	10 Marks	L3	CO2

12.	A regional electricity board is designing a 11 kV, 50 Hz short transmission line of 20 km to supply power to a nearby town. The design team wants to evaluate the line performance before finalizing the system. As an engineer, summarize the steps you would follow to calculate the performance of this short transmission line, and identify the key factors (like resistance, reactance, voltage regulation, and efficiency) that must be considered in the analysis.	10 Marks	L3	CO3
	Or			
13.	A small hydro power station wants to transmit 200 kW at unity power factor to a nearby village using a single-phase, 3300 V transmission line. The line uses a copper conductor of cross-sectional area 0.775 cm^2, and the utility requires at least 90% transmission efficiency. The specific resistance of copper is 1.725 $\mu\Omega \cdot cm$. As the design engineer, determine the maximum length (in km) of the transmission line that can be used while still meeting the required efficiency.	10 Marks	L3	CO3