International Islamic University Chittagong
Department of Electrical and Electronic Engineering

B.Sc. Engineering in EEE

Midterm Assignment, Autumn-2024

Course Code: **EEE-2415** Course Title: **Transmission & Distribution of Electrical Power**

Full Marks: **15**

Answer each of the questions from the followings; Figures in the right margin indicate full marks.

General Instruction:

1) Write down the assignment in A4 pages.
2) Write down your matric ID in the right corner of every page.
3) Coping from each other and internet sources is prohibited. If found any case, it will be **Zero** Mark in the assignment.
4) Assignment Submission deadline is **20/10/2024** within **1.00PM** in my office room. No assignment will be accepted beyond this deadline and count as absent in the assignment.
5) Follow the assignment front page template during submission. Add your midterm admit card along with the assignment just after the front page.

Course Outcomes (COs), Program Outcomes (POs) and Bloom's Levels (BL) of the Questions			
CO	**CO Statements**	**PO**	**BL**
CO1	Develop the idea to deliver quality power to the end users using transmission and distribution system.	**PO-1**	**C3**
CO2	Ability to apply various voltage control techniques to maintain proper voltage at the level of end users.	**PO-2**	**C4,C5**
CO3	Modelling of the transmission and distribution line to analysis the effect of line parameters on the power flow.	**PO-3**	**C4,C5**

Bloom's Levels (BL) of the Questions						
Letter Symbols	**C1**	**C2**	**C3**	**C4**	**C5**	**C6**
Meaning	Remember	Understand	Apply	Analyze	Evaluate	Create

1. Deduce an expression for capacitance from an unsymmetrical three-phase transposed line. A 3-phase, 50 Hz, 132 kV overhead line has conductors placed in a horizontal plane **X** (m) apart. Conductor diameter is 2 cm. If the line length is 100 km, calculate the charging current per phase, assuming complete transposition. Consider that the value of **X** is the last digit of your **Matric ID** (if the last digit of your ID is zero, in that case consider the 2nd last digit of your **Matric ID**). **CO1** **C5** **3+2**

2. Draw the equivalent circuit of a 3-φ long transmission line showing its line parameters. A 100 km medium 3-φ , 50 Hz transmission line delivers 30 MW at 0.8 power factor lagging at 66 kV (phase). The line constants are ***R*** Ω, ***L mH, and C*** µF. Shunt leakage may be neglected. Determine, the sending end power factor, voltage regulation, and transmission efficiency of the line using the nominal **T** method. Consider that the values of ***R, L,*** and ***C*** are equal to the last digit of your **Matric ID** (if the last digit of your ID is zero, in that case consider the 2nd last digit of your **Matric ID**). **CO3** **C1 C5** **1+4**

3.	A long transmission line is open circuited at the receiving end. Will there be any current in the line at the sending end? Explain your answer. Suppose a 20 km long 3-φ, 50 Hz transmission line delivers 4 MW at a power factor of 0.8 lagging to a load of an industry. The resistance and reactance of each conductor are $\boldsymbol{R}$ Ω and $\boldsymbol{X_L}$ Ω, respectively. If the sending end voltage is 33 kV, Determine, **(i)** receiving end voltage, **(ii)** line current, and **(iii)** Transmission efficiency. Consider that the values of $\boldsymbol{R}$ and $\boldsymbol{X_L}$ are equal to the last digit of your **Matric ID** (if the last digit of your ID is zero, in that case consider the 2nd last digit of your **Matric ID**).	**CO3**	**C2** **C5**	**1+4**

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