

**III B. Tech I Semester Regular/Supplementary Examinations, April -2025**  
**POWER SYSTEMS-II**

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**

All Questions Carry Equal Marks

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<b>UNIT-I</b>			
1.	a)	Calculate the capacitance of a conductor per phase of a three phase 400km long line with the conductors spaced at the corners of an equilateral triangle of side 4m and diameter of each conductor being 2.5cm.	[7M]
	b)	Explain the effect of earth on the capacitance of a transmission line by using the method of images.	[7M]
(OR)			
2.	a)	Explain the bundled conductors with merits and demerits?	[7M]
	b)	Prove that the inductance of a group of parallel wires carrying current can be represented in terms of their geometric distance. Explain the meaning of the term self G.M.D and mutual G.M.D.	[7M]
<b>UNIT-II</b>			
3.	a)	Derive the expression for regulation and efficiency of a medium transmission line using nominal $\pi$ method. Draw phasor diagram also.	[7M]
	b)	A 3-phase 50 Hz transmission line has resistance, inductance and capacitance per phase of 10 ohm, 0.1 H and 0.9 $\mu$ F respectively and delivers a load of 35 MW at 132 kV and 0.8 p.f. lag. Determine the efficiency and regulation of the line using (i) nominal-T, (ii) nominal- $\pi$ .	[7M]
(OR)			
4.	a)	Classify the transmission lines	[7M]
	b)	Explain in detail about the Surge impedance loading of Long transmission lines.	[7M]
<b>UNIT-III</b>			
5.	a)	Explain the phenomenon of wave reflection and refraction. Derive an expression for the reflection and refraction coefficients	[7M]
	b)	A 500 kV surge travels on an overhead line of surge impedance 400 $\Omega$ towards its junction with a cable which has a surge impedance of 40 $\Omega$ . Find (i) transmitted voltage and current (ii) reflected voltage and current.	[7M]
(OR)			
6.	a)	Discuss the behavior of a travelling wave when it reaches the end of i. open circuited transmission line ii. short circuited transmission line. Draw diagrams to show voltage and current	[7M]

		on the line before and after the wave reaches the end	
	b)	Discuss the traveling waves on a transmission line.	[7M]
		<b><u>UNIT-IV</u></b>	
7.	a)	Discuss how the line voltage and the line spacing will effects the corona in the lines?	[7M]
	b)	Explain the effect of radio interference on the performance of transmission lines.	[7M]
		(OR)	
8.	a)	A 3-phase,220 kV line consists of 20 mm diameter conductors spaced in a 6 meters delta configuration. Determine the disruptive critical voltage and visual corona voltage (local corona as well as general corona) for the following data. Temperature 250 C, Pressure 73 cm of mercury, surface factor of 0.84,irregularity factor for local corona 0.72,irregurlarity factor for general corona 0.82 m.	[7M]
	b)	Explain the different methods of reducing corona loss.	[7M]
		<b><u>UNIT-V</u></b>	
9.	a)	Explain the static shielding of Insulators String.	[7M]
	b)	What is string efficiency? Why is it necessary to have high string efficiency? How can it be achieved?	[7M]
		(OR)	
10.	a)	Derive the expressions for sag and tension when the supports are at unequal heights.	[7M]
	b)	A transmission line conductor at a river crossing is supported from two towers at heights of 50 meters and 80 meters above water level. The span length is 330 meters. Weight of the conductor is 0.9 kg/meter. Determine the clearance between the conductor and water at a point midway between towers if the tension in the conductor is 1950 kg.	[7M]

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