SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester Regular & Supplementary Examinations August-2023

ELECTRICAL POWER TRANSMISSION SYSTEMS
(Electrical & Electronics Engineering)

Time: 3 Hours **Max. Marks: 60**

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

1	a	Find the expression for the inductance of single-phase two-wire transmission lines.	CO1	L3	6M
	b	Explain the different types of conductors briefly.	CO1	L2	6M

OR

2 a Calculate the capacitance per phase of a three-phase transmission line as shown in the following fig. The radius of the conductor is 0.5cm. The lines are un-transposed.   CO1   L4   6M
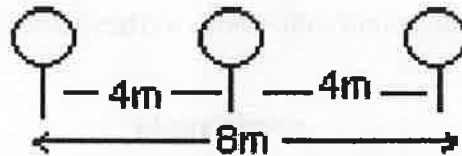
b When conductors are unsymmetrically placed, derive an expression for the capacitance per phase for a 3-phase overhead transmission line.   CO1   L3   6M

UNIT-II

3 a Derive the equations for sending voltage and the current using the nominal T method with a neat phasor diagram.   CO2   L3   6M

b Explain the transmission efficiency and % regulation in the transmission line.   CO2   L2   6M

OR

4 Derive expressions for sending end voltage and current for a long transmission line using a rigorous method.   CO2   L3   12M

UNIT-III

5 a What is string efficiency? Explain any two methods for improving string efficiency.   CO3   L2   6M

b A 3-phase, 220kV, 50Hz transmission line consisting of a 1.5 cm radius conductor spaced 2m apart in an equilateral triangular formation. If the temperature is 40^0c and atmospheric pressure is 76cm .Calculate the corona loss per km of the line. Take m_a=0.85.   CO4   L3   6M

OR

6 a Each line of the three-phase system is suspended by a string of 3 insulators. If the voltage across the top unit is 17.5kV, calculate the line to neutral voltage. Assume that the shunt capacitance between each insulator and earth is$1/8^{th}$ of the capacitance of the insulator itself. Also, find the string efficiency.   CO3   L3   6M

b What are the advantages and disadvantages of corona?   CO4   L2   6M

UNIT-IV

7 Define sag and Derive the expression for sag and tension when the supports are at unequal heights.   CO5   L3   12M

OR

8	a	Write a short note on the effect of wind and ice loading on the calculation of sag.	CO5	L3	6M
	b	An overhead transmission line at a river crossing is supported by two towers at heights of 40m and 90 m above water level. The horizontal distance between the towers is 400m. If the allowable tension is 2000kg, find the clearance between the conductor and water at a point mid-way between the towers' height of the conductor is 1kg/m.	CO5	L4	6M

UNIT-V

9	a	Explain the construction of underground cables.	CO6	L3	8M
	b	What are the limitations of solid types of cables?	CO6	L2	4M

OR

10	a	A33KV single core cable has a conductor diameter of 10 mm and a sheath of the inside diameter of 40mm. find the maximum and minimum stress in the insulation.	CO6	L3	6M
	b	Distinguish between Underground cables and overhead lines.	CO6	L2	6M

*** END ***