

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech II Year II Semester Regular & Supplementary Examinations June-2024
ELECTRICAL POWER TRANSMISSION SYSTEMS
(Electrical and Electronics Engineering)

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

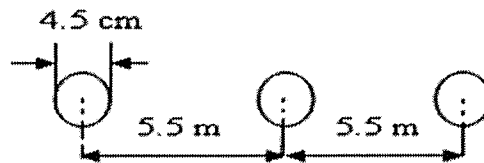
(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

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

OR

- | | | | | |
|---|---|-----|----|----|
| 2 | a Explain the concept of GMR and GMD in single and double-circuit lines | CO1 | L2 | 6M |
| | b Determine the inductance per km per phase of a single circuit 20kV line of the given configuration as shown in Fig. The conductors are transposed and have a diameter of 4.5cm. | CO1 | L3 | 6M |

**UNIT-II**

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|---|--|-----|----|-----|
| 3 | Derive expressions for sending end voltage and current for a long transmission line using a rigorous method. | CO2 | L3 | 12M |
|---|--|-----|----|-----|

OR

- | | | | | |
|---|---|-----|----|----|
| 4 | a Prove the relation $AD-BC=1$ by considering a two-terminal pair network for the nominal T-method. | CO2 | L5 | 6M |
| | b Explain the Ferranti effect in transmission lines. | CO2 | L2 | 6M |

UNIT-III

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|---|---|-----|----|----|
| 5 | a What is string efficiency? Explain any two methods for improving string efficiency. | CO3 | L1 | 6M |
| | b What are the causes of insulation failure? | CO3 | L1 | 6M |

OR

- | | | | | |
|---|--|-----|----|----|
| 6 | a What is corona? Explain the formation of corona briefly. | CO4 | L1 | 6M |
| | b Determine the corona of a 3-phase line 160km long, conductor diameter 1.036cm, 2.44m delta spacing, air temperature 26.67°C, altitude 2440m, corresponding to an approximate barometric pressure of 73.15cm of Mercury, operating voltage 110kv at 50Hz. Assume data if required. (Irregularity factor etc.) | CO4 | L3 | 6M |

UNIT-IV

- 7 a Draw and explain the stringing chart. CO5 L1 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

OR

- 8 a Derive the expression for sag for equal supports. CO5 L3 6M
b Mention the applications of the sag template. CO5 L1 6M

UNIT-V

- 9 Write short notes on CO6 L4 12M
(i) inter-sheath grading (ii) capacitance grading

OR

- 10 Derive an expression for maximum stress and minimum stress in a single-core cable. CO6 L3 12M

*** END ***