SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. III Year I Semester Regular Examinations December-2025
POWER SYSTEMS-II
(Electrical & Electronics Engineering)

Time: 3 Hours   Max. Marks: 70

PART-A
(Answer all the Questions 10 x 2 = 20 Marks)

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1	a	What is the formula for effect of ground on capacitance of single conductor?	CO1	L1	2M
	b	Explain the advantages of bundled conductors in a transmission lines.	CO1	L2	2M
	c	Explain the effect of charging current in transmission lines.	CO2	L2	2M
	d	What is surge impedance?	CO2	L1	2M
	e	What are the insulating materials used in insulators?	CO3	L1	2M
	f	Define safety factor of insulator.	CO3	L1	2M
	g	Give two factors that will affect the sag in transmission line.	CO4	L2	2M
	h	Define radio interference due corona.	CO5	L1	2M
	i	Explain the importance of voltage control.	CO6	L2	2M
	j	What is asynchronous load in a transmission system?	CO6	L1	2M

PART-B
(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

2 a Explain the different types of conductors.   CO1 L2 5M
   b Find the expression for the inductance of single-phase two-wire transmission line. CO1 L3 5M

OR

3 a Derive an expression for the capacitance per phase for a 3-phase overhead transmission line when conductors are symmetrically placed. CO1 L3 6M
   b Calculate the capacitance per km of a three-phase transmission line as shown in the following figure. The radius of the conductor is 0.5cm. The lines are un-transposed. CO1 L3 4M
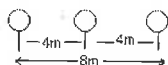
UNIT-II

4 a Derive the equations for sending voltage and sending current of medium transmission line using the nominal- T method with a neat phasor diagram. CO2 L3 5M
   b Derive the ABCD constants of the medium transmission line by using the nominal-T method. CO2 L3 5M

OR

5 A balanced 3-phase load of 30 MW is supplied at 132 kV, 50 Hz and 0.85 p.f. lagging by means of a transmission line. The series impedance of a single conductor is $(20 + j52)$ ohms and the total phase-neutral admittance is 315×10^{-6} Siemen. Using nominal-T method, determine:
(i) the A, B, C and D constants of the line (ii) sending end voltage and (iii) voltage regulation of the line. CO2 L3 10M

UNIT-III

6 Explain various types of insulators with neat diagrams. CO3 L2 1

OR

7 a A three-phase overhead line is suspended by a suspension type insulator, which consists of three units. The potential across the top unit and middle unit are 12kV and 18kV respectively. Calculate: (i) the ratio of capacitance between pin and earth to the self-capacitance of each unit (ii) line voltage and (iii) string efficiency. CO3 L4
   b Explain the mathematical expression for string efficiency for 3 disc suspension insulator. CO3 L3

UNIT-IV

8 a Derive the expression for sag of transmission line with equal supports. CO4 L3
   b A 132 kV transmission line has the following data: weight of conductor = 680kg/km; length of span = 260m; ultimate strength = 3100kg, safety factor=2. Calculate height above the ground at which the conductor should be supported. Ground clearance is 10 meters. CO4 L4

OR

9 a What is corona? Explain the formation of corona briefly. CO5 L1
   b A 3-phase, 220 kV, 50 Hz transmission line consists of 1.5 cm radius conductors spaced 2 metres apart in equilateral triangular formation. If the temperature is 40°C and atmospheric pressure is 76 cm, calculate the corona loss per km of the line. Take $m_o = 0.85$. CO5 L4

UNIT-V

10 Explain with a neat sketch : CO6 L2 1(
i. Booster transformers ii. Induction regulators

OR

11 Explain the effect of shunt and series capacitors with neat phasor diagrams. CO6 L2 1(

*** END ***