SNS COLLEGE OF TECHNOLOGY

COIMBATORE-35

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Staff in Charge: **S. Bharath** Course Code & Name: **19EEE308 : Smart Grid.**
Semester: **VII** Class**: IV Year B.E – EEE** Academic Year: **2023-2024 (Even Semester)**

PART B - QUESTION BANK

UNIT 1

1 Derive the expression for calculation the internal and external flux linkages for a conductor carrying current. Use these expressions to derive the equation for the inductance of a single-phase transmission line.

2 Derive the inductance of a three-phase transmission line with symmetrical spacing.

3 Derive the expression for inductance of three phase line with unsymmetrical spacing.

4 Calculate the loop inductance per km of a single-phase line comprising of 2 parallel

(i) Copper of relative permeability 1 (7)
(ii) Steel of relative permeability 50. (6)

5 Derive the inductance of three phase double circuit line by
(i) Symmetrical spacing. (7)
(ii) Unsymmetrical spacing. (6)

6 (i) Calculate the GMR of a conductor having seven strands each of 3mm radius.
(ii)Explain why and how transposition of three phase lines are done (6)

7 (i) Derive the expression for inductance for bundled conductor. (8)
(ii)Explain the advantages of bundled conductor when used for overhead line. (5)

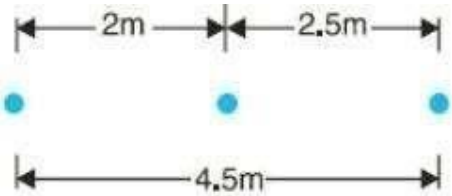
8 Derive the capacitance of three phase line with symmetrical and spacing.

9 Derive from first principle the capacitance per km to neutral of three phases overhead transmission line with unsymmetrical spacing of conductors assuming transposition.

10 (i) Derive the expression for capacitance of a single-phase overhead line. (5)
(ii) Find out the capacitance of single-phase line of 30km long consisting of two parallel wires each 15mm diameter and 1.5m apart. (8)

11 A 220kV,50Hz, 200km long three phase line has its conductors on the corners of a triangle with sides 6m,6m and 12m. The conductor radius is 1.81cm. Find the capacitance per phase per km. Capacitive reactance per phase, Charging current and Charging Mega volt-amperes

12 A 3-phase, 50 Hz, 66 kV overhead line conductors are placed in a horizontal plane as shown in Fig. The conductor diameter is 1·25 cm. If the line length is 100 km, calculate (i) capacitance per phase, (ii) charging current per phase, assuming complete transposition of the line.



13 Explain clearly the skin effect and proximity effects when referred to overhead lines.

14 (i) Deduce an expression for line to neutral capacitance of a three-phase overhead transmission line with unsymmetrical spacing when the conductors spaced. (5)

(ii) A 50Hz transposed line has its line conductors arranged in a line with unsymmetrical spacing. Radius of each conductor is 3cm and the distance between conductors is 3m. Find the line to neutral capacitor for 1km and the reactance. (10)