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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

February / March 2023 Semester End Main Examinations

Programme: B.E. **Semester: V**
Branch: Electrical & Electronics Engineering **Duration: 3 hrs.**
Course Code: 19EE5PCTND **Max Marks: 100**
Course: Transmission and Distribution **Date: 01.03.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

UNIT - I

1	a)	Mention the advantages of high voltage for power transmission. Justify each.	**07**
	b)	Derive the expression for the sag when the supports are at equal level.	**07**
	c)	A string of 4 insulators has self-capacitance equal to 4 times the pin to earth capacitance. Calculate (i) the voltage distribution across various units as a percentage of total voltage across the string. (ii) string efficiency.	**06**

OR

2	a)	Explain feeder, distributor and service mains of a distribution scheme.	**06**
	b)	Define string efficiency. Name the methods of increasing string efficiency and explain the use of guard ring.	**07**
	c)	A transmission line conductor is having a diameter of 20 mm and weights 1.0 kg/mt. The span is 280 mts.The wind pressure is 40 kg/mt^2 of projected area with ice coating of 10 mm. The ultimate strength of conductor is 10000kg. Calculate the maximum sag if the factor of safety is 2 and ice weights 910 kg/mt^3.	**07**

UNIT - II

3	a)	Derive an expression for the insulation resistance of a single core cable.	**06**
	b)	Derive an expression for power loss in dielectric of single core cable.	**06**
	c)	The maximum and minimum stresses in the dielectric of a single core cable are 40 kv/cm (rms) and 10 kv/cm (rms respectively. If the conductor diameter is 2 cm, find (i) thickness of insulation and (ii) operating voltage.	**08**

UNIT - III

4	a)	Derive an expression for the inductance of a single phase two wire line.	**06**
	b)	Derive an expression for line to neutral capacitance for a three phase overhead transmission line when the conductors are unsymmetrically spaced but transposed.	**08**
	c)	A three-phase line has conductor 2 cm in diameter spaced equilaterally 1 mt apart. If the dielectric strength of air is 30 kv(max) per cm,find the disruptive critical voltage for the line. Take air density factor δ= 0.952 and irregularity factor m=0.9.	**06**

UNIT - IV

5 a) Explain how overhead transmission line are classified. **04**

b) Derive an expression for sending end voltage and current for long transmission line using rigorous solution method. **10**

c) A 132kv, 50Hz, three-phase transmission line delivers a load of 50MW at 0.8 power factor lagging at the receiving end. The generalized constants of the transmission line are $A = D = 0.95\angle 1.4^0$, $= 96\angle 78^0$, $C = 0.0015\angle 90^0$. find the regulation of the line .Use nominal T-method. **06**

UNIT - V

6 a) Explain the radial feeders used in distribution system. **05**

b) What are the various advantages of neutral grounding? **05**

c) The loading on a distributor is shown in figureQ6(C). The distributor is a two-core cable for which the resistance and reactance are 0.25Ω and 0.125Ω per 1000 meters of cable run respectively. What should be the voltage at the point A to maintain 400V at the point D? **10**

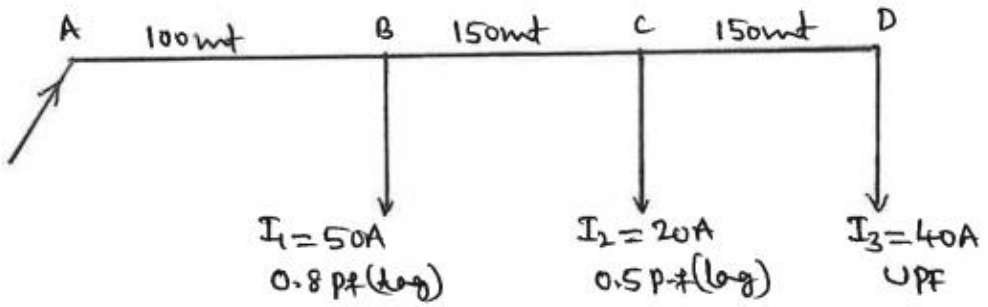

FIG. Q6(C)

OR

7 a) Derive the expression for A.C distributors with concentrated loads of referring power factor: Power factors referred to receiving end voltage. **10**

b) Find the cross-section area of the distributor shown in figure Q7 (b). The distances are given in meters. Take $\rho=1.78\text{x}10^{-8}$ Ω-mt. The maximum voltage drop is no to exceed 10V. The conductor is fed from point A. **10**

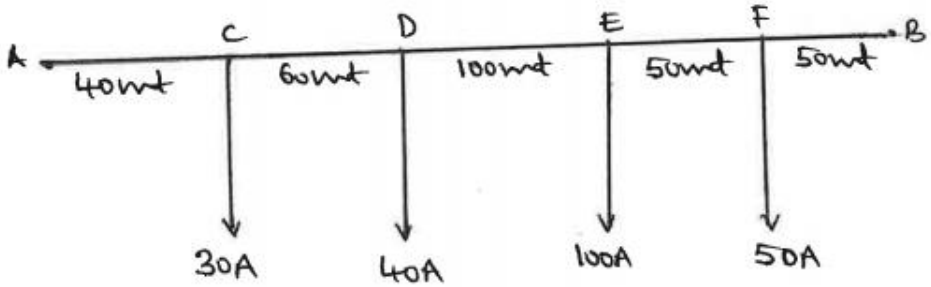

FIG. Q7(b)

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