QP Code: RM22BTECH185 | Reg. No | | | | | | | | | | | AY 22

GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (Fourth Semester Regular) Examinations, May – 2024

22BELPC24003 /22BEEPC24003 – Electrical Power Transmission and Distribution

(EE & EEE)

Time: 3 hrs | Maximum: 70 Marks

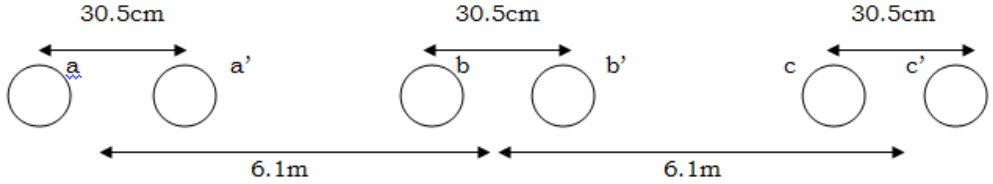
(The figures in the right-hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

Q.1. Answer ***ALL*** questions	CO #	Blooms Level
a. How does skin effect vary with conductor material?	CO1	K2
b. Why do we find line to neutral capacitance in a 3-phase system?	CO1	K2
c. What is sag tamplate?	CO3	K1
d. Mention two advantages of ring main system.	CO4	K1
e. Why is it necessary to earth neutral?	CO5	K2

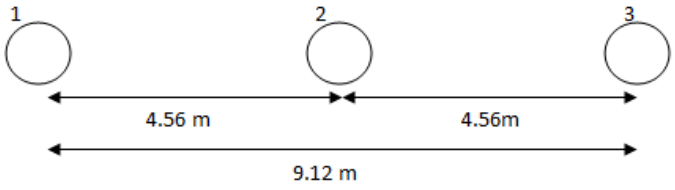
PART – B **(15 x 4 = 60 Marks)**

Answer ***ALL*** questions	Marks	CO #	Blooms Level
2. a. Derive an expression for the capacitance of a 1-phase overhead transmission line.	8	CO1	K2
b. A 3-phase single circuit bundled conductor line with two subconductors per phase has horizontal spacing with 6.1m between the center lines of adjacent phases. The distance between the sub-conductors of each phase is 30.5 cm and each sub-conductor has a diameter of 2.54cm. Find the inductance per phase per km of line.	7	CO1	K3



(OR)

c. Derive an expression for the inductance per phase of a 3-phase overhead transmission line with conductors are unsymmetrical spacing.	8	CO1	K2
d. A 3-phase, 50 Hz, 132 kV overhead transmission line has conductors in a horizontal plane 4.56 m apart. Conductor diameter is 22.4 mm. If the line length is 100km, calculate the charging current per phase assuming complete transposition.	7	CO1	K3



3.a. Explain different types of transmission line.	5	CO2	K2

b.	Derive an expression for the Hyperbolic form of the equation of a long transmission line.	10	CO2	K2
	(OR)			
c.	What is series ad shunt compensation?	5	CO2	K1
d.	A 50Hz, 3-phase 100km long transmission line has a total resistance of 35 Ω, series reactance of 140 Ω and shunt admittance (line to neutral) 930 X 10^{-6} mho. It delivers 40 MW at 220Kv at 0.9 p.f. lagging. Using the nominal-π method, determine the following: (i) A, B, C, and D constants of the line (ii) Sending end voltage (iii) Sending end current (iv) Sending end power factor (v) Voltage regulation (vi) Transmission efficiency of the line.	10	CO2	K3
4.a.	Obtain expressions for the sag and maximum tension when the supports are at the same level.	7	CO3	K2
b.	A transmission line has a span of 275 m between level supports. The conductors has an effective diameter of 0.196 cm and weighs 0.865 kg/m. its working tension is 4030kg. If the conductor has an ice coating of radial thickness 1.27 cm and is subjected to a wind pressure of 3.9 gm/cm2 of projected area, calculate sag. Weigh of 1 cc of ice is 0.91 gm.	8	CO3	K3
	(OR)			
c.	Describe the radial system and ring main system of distribution.	7	CO3	K2
d.	An insulator string has three units each having a safe working voltage of 15kV. The ratio of unit self-capacitance to stray capacitance of earth is 10:1. Calculate (i) The maximum safe working voltage (ii) The string efficiency.	8	CO3	K3
5.a.	Write short notes on touch and step voltage.	7	CO5	K1
b.	A 2-wire DC distributor 300 m long is uniformly loaded with 2 A/m. The resistance of a single wire is 0.3 Ω/km. If the distributor is fed at one end, calculate (i) Voltage drop up to a distance of 225 m from the feeding pt. (ii) Maximum voltage drop.	8	CO4	K3
	(OR)			
c.	With a neat diagram explain Kelvin's law for conductor size. What are its limitations?	8	CO4	K2
d.	Write short notes on Neutral grounding.	7	CO5	K1

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