GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY UNIVERSITY, ODISHA, GUNUPUR
(GIET UNIVERSITY)

B. Tech (Fourth Semester - Regular) Examinations, April – 2025

23BELPC24003/23BEEPC24003 – Electrical Power Transmission and Distribution (EPTD)

(EE & EEE)

Time: 3 hrs Maximum: 60 Marks

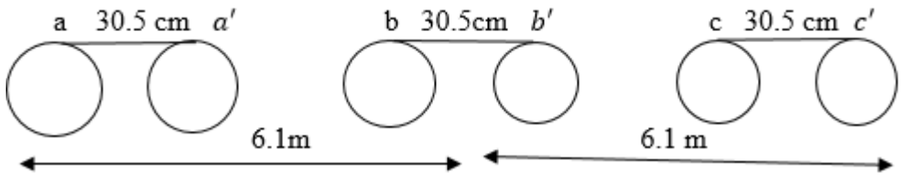
Answer ALL questions
(The figures in the right hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

	Q.1. Answer ***ALL*** questions	CO #	Blooms Level
a.	How length and spacing between the conductors of transmission line is affected its capacitance	CO1	K1
b.	Explain why the voltage distribution over a string of suspension insulators is not uniform.	CO2	K2
c.	Distinguish between Primary and Secondary distribution	CO3	K2
d.	Determine the critical disruptive voltage and corona loss for a 3 – phase line operating at 110 KV which has conductor of 1.25cm diameter arranged in a 3.05 meter delta . Assume air density factor of 1.07 and dielectric strength of air to be 21KV/cm .	CO4	K3
e.	What is Tee-offs and different types of Tee-offs .	CO5	K1

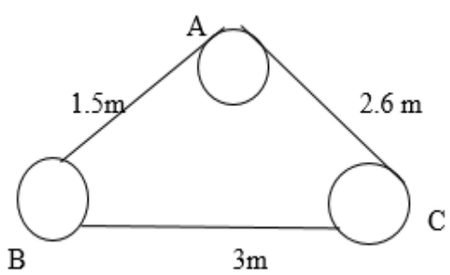
PART – B **(10 x 5 = 50 Marks)**

	Answer ***ALL*** the questions	Marks	CO #	Blooms Level
2. a.	Derive an expression for the Inductance of three- Phase lines with asymmetrical Spacing and also explain transposition .	5	CO1	K3
b.	A 3 phase single circuit bundled conductor line with two sub conductors per phase has horizontal spacing with 6.1 m between the centre lines of adjacent phases . The distance between the sub conductors of each phase is 30.5 cm and each sub-conductor has diameter 2.54cm. Find the inductance per phase per km of line.	5	CO1	K3



(OR)

c.	Derive an expression for capacitance of a three -phase line with unsymmetrical Spacing.	5	CO1	K3
d.	A single 3 -phase line operated at 50 Hz arranged as shown in the figure. The conductor diameter is 8mm and the line is regularly transposed. Determine the capacitance per km .	5	CO1	K3



3.a.	Derive an expression equivalent T circuit of a medium transmission lines parameters of this circuit in terms of line parameters	5	CO2	K3
b.	A 3 – phase overhead transmission line delivers a load of 80 MW at 0.8pf lagging and 220 KV between the lines. Its total series impedance per phase and total shunt admittance per phase are $200\angle 80°\ \Omega$ & $0.0013\angle 90°$ mho per phase respectively . Using nominal T – method determine the following:-			
	(i) A, B , C & D constants of the line	5	CO2	K3
	(ii) Sending end voltage			
	(iii) Sending end current			
	(iv) Sending end power factor			
	(v) Transmission efficiency of the line			

	(vi) Voltage regulation (vii) Charging current				
	(OR)				
c.	Derive an expression for sag and Tension Calculation when (i) Supports are at equal levels (ii) Supports are at unequal levels	5	CO2	K3
d.	A transmission line has a span of 160m between the level supports . With the following data calculate the height of conductor above the ground level at which it should be supported if a minimum clearance of 7m is to be left between the ground and the support . Cross sectional area of conductor = 2.2 cm^2 , Density of material = 8.9g/cc, wind force = 1.6Kg/m , Ultimate strength = 4980 kg/cm^2 , factory of safety = 4 .	5	CO2	K3
4.a.	Explain briefly the voltage drop in DC distributors (i) When distributor is fed at one end (ii) Uniformly distributed load (iii) Distributor fed at both ends	5	CO3	K2
b.	A two wire dc distributor system is 3 Km long and its supplies loads of 200A , 100A , 75A and 50 A at 800m , 1200m , 2000m and 3000m from the feeding point 'A' . Each conductor has go and return resistance of 0.004Ω per 100m . Calculate the voltage at each load point if voltage at feeding point is 250 V.	5	CO3	K3
	(OR)			
c.	Describe the steps to be considered before installing a distribution substation	5	CO3	K2
d.	A 2 – wire dc distributor cable AB is 2.2 Km long and supplies load of 25A , 50A , 75A at 0.4 Km , 1 Km & 1.6Km from the point A . Each conductor has a resistance of 0.05Ω/Km . Calculate the potential difference at each point if potential difference of 400V is maintained at point A .	5	CO3	K3
5.a.	The conductor of single core cable has a diameter of 6 mm , the diameter over the insulation is 24 mm . If the insulation resistance of the cable is 16000 ohms per km , Calculate the specific resistance of the dielectric used .	5	CO4	K3
b.	A 6.5 Km long cable has a conductor diameter of 15 mm and internal sheath diameter of 30mm . Find the conductor resistance and insulation resistance of each piece if the cable is cut into two pieces of equal length . Specific resistance of conductor material is 0.017 micro ohm meter . Specific resistance of insulation material 6 mega ohm meter .	5	CO4	K3
	(OR)			
c.	Derive an expression for capacitance and dielectric stress/potential gradient of single core cable	5	CO4	K3
d.	A single core cable used on 33 KV , 50Hz has conductor diameter 10mm and inner diameter of sheath 25mm. The relative permittivity of insulating material used is 3.5 . Find :- (i) Capacitance of cable per km (ii) Maximum electrostatic stress in the cable (iii) Minimum electrostatic stress in the cable (iv) Charging current per Km .	5	CO4	K3
6.a.	Explain Planning of construction work in overhead distribution lines	5	CO5	K2
b.	Discuss fixing of cross Arms and Insulators and Installation process	5	CO5	K2
	(OR)			
c.	Describe Setting of stays . What are the key aspects of stay setting in the power lines.	5	CO5	K2
d.	Explain Earthing , Purpose of earthing in Transmission lines , Types of earthing and benefits of proper earthing	5	CO5	K2

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