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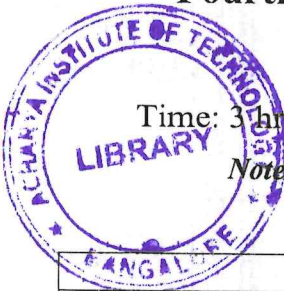
Fourth Semester B.E./B.Tech. Degree Examination, June /July 2026 Transmission and Distribution

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.

2.M : Marks , L: Bloom's level , C: Course outcomes.



Module – 1			M	L	C
Q.1	a.	With the help of single line diagram, discuss the structure of electrical power system indicating the standard voltages.	06	L2	CO1
	b.	A transmission line has a span of 150 m between level supports. The conductor has a cross – sectional area of 2cm^2 . The tension in the conductor is 2000 kg. If the specific gravity of the conductor material is 9.9 gm/cm^3 and wind pressure is 1.5 kg /m lengths, calculate the sag. What is the vertical sag?	07	L3	CO1
	c.	Define string efficiency. What are the methods of increasing string efficiency? Discuss.	07	L1	CO1
OR					
Q.2	a.	Discuss how increase in transmission voltage if a transmission line results in i) Reduced volume of conductor material ii) Increased transmission efficiency.	06	L2	CO1
	b.	Discuss the desirable properties of insulators. Explain any one type of insulator with neat sketch.	07	L2	CO2
	c.	An insulator string consists of three units each having a safe working voltage of 15 kv. The ratio of self capacitance to shunt capacitance of each unit is 8.1, find the maximum safe working voltage of the string. Also find the string efficiency.	07	L3	CO2
Module – 2					
Q.3	a.	Derive an expression for the inductance of a three phase overhead line due to internal and external flux.	10	L4	CO3
	b.	Explain the concept of self GDM and mutual GDM.	04	L2	CO3
	c.	Calculate the inductance of each conductor in a 3 – phase, 3 – wire system when the conductors are arranged in a horizontal plane with spacing such that $D_{31} = 4\text{m}$, $D_{12} = D_{23} = 2\text{m}$. The conductors are transposed and have a diameter of 2.5 cm as shown in fig. Q.3 (c).	06	L3	CO3
Fig. Q.3 (c)					

OR

Q.4	a.	Derive an expression for the line to neutral capacitance for a 3 – phase overhead transmission line when the conductors are unsymmetrically spaced.	10	L4	CO3
	b.	Compare single circuit and double circuit lines.	05	L2	CO3
	c.	Calculate the capacitance of a 100 km long 3 – phase, 50 Hz overhead transmission line consisting of 3 conductors each of diameter 2 cm and spaced 2.5 m at the corners of an equilateral triangle.	05	L3	CO3

Module – 3

Q.5	a.	Discuss how transmission lines are classified.	06	L4	CO3
	b.	A 3 – phase, 50Hz transmission line 100 km long delivers 20 MW at 0.9 p.f lagging and at 110 kv. The resistance and reactance of the line per phase per km are 0.2Ω and 0.4Ω respectively. While capacitance admittance is 2.5×10^{-6} siemen/km/phase. Calculate: i) The current and Voltage at the sending end ii) Efficiency of Transmission. Use nominal T – method.	08	L3	CO4
	c.	Derive an expression for ABCD constants of a medium transmission line using nominal π method. Also prove that the line is symmetrical and reciprocal.	06	L4	CO4

OR

Q.6	a.	What are A, B, C and D parameters? Briefly explain.	04	L2	CO4
	b.	Derive an expression for ABCD constants of a medium transmission line using T – method. Also prove that the line is symmetrical and reciprocal.	06	L4	CO4
	c.	A balanced 3 – phase load of 30 mw is supplied at 132 KV, 50 Hz and 0.85 p.f lagging by means of 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) A, B, C and D constants of the line ii) Sending end voltage iii) Regulation of the line	10	L3	CO4

Module – 4

Q.7	a.	Briefly explain the factors influencing the corona.	06	L2	CO5
	b.	Derive an expression for critical disruptive voltage and visual critical voltage reference to corona.	08	L4	CO5
	c.	A 132 KV line with 1.956 cm dia. Conductors is built so that corona takes place if the line voltage exceeds 210 KV (rms). If the value of potential gradient at which ionization occurs can be taken as 30 KV per cm. Find the spacing between the conductors.	06	L3	CO5

OR

Q.8	a.	With the help of cross sectional diagram, discuss the construction of single core cable.	08	L2	CO5
	b.	Discuss the different types of cables based on the voltage level.	07	L2	CO5
	c.	A single-core cable has a conductor diameter of 1 cm and insulation thickness of 0.4 cm. If the specific resistance of insulation is $5 \times 10^{14} \Omega$ - cm, calculate the insulation resistance for a 2 km length of the cable.	05	L3	CO5

Module – 5

Q.9	a.	Discuss the following terms with reference to distribution system. i) Radial feeder ii) Parallel feeder iii) Loop feeder iv) Interconnected network.	10	L2	CO6
	b.	A single phase ring distributor ABC is fed at A. The loads at B and C are 20A at 0.8 p.f lagging and 15A at 0.6 p.f lagging respectively; both expressed with reference to the voltage at A. The total impedance of the three sections AB, BC and CA are $(1 + j1)$, $(1 + j2)$ and $(1 + j3)$ ohms respectively. Find the total current fed at A and the current in each section. Use Thevenin's theorem to obtain the results.	10	L3	CO6
OR					
Q.10	a.	Discuss the limitations of distribution system.	04	L2	CO6
	b.	Discuss the power quality and various reliability aids.	08	L2	CO6
	c.	A 3 – phase, 4 – wire distributor supplies a balanced voltages of 400 / 230 V to a load consisting of 30 A at p.f.0.866 lagging for R – phase, 30 A at p.f. 0.866 loading for Y – phase and 30A at unity p.f. for B – phase. The resistance of each line conductor is 0.2 Ω . The area of cross section of neutral is half of any line conductor. Calculate the supply end voltage for R – phase. The phase sequency is RYB.	08	L3	CO6
