Code No: P18EET08

HALL TICKET NUMBER

PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE
(AUTONOMOUS)
III B.TECH I SEMESTER END REGULAR EXAMINATIONS, DEC/JAN – 2022/23
POWER SYSTEMS-II
(EEE Branch)

Time: 3 hours Max. Marks: 60

Note: Question Paper consists of Two parts (Part-A and Part-B)

PART-A

Answer all the questions in Part-A (5X2=10M)

Q.No.		Questions	Marks	CO	KL
1.	a)	Describe the transposition?	[2M]	1	2
	b)	Why the distributed parameters will result the accurate analysis than the lumped parameters?	[2M]	2	2
	c)	What is the velocity of the propagation of surges in overhead lines and cables?	[2M]	3	2
	d)	What is meant by proximity effect?	[2M]	4	2
	e)	What is the effect of wind on Sag calculations	[2M]	5	2

PART-B

Answer One Question from each UNIT (5X10=50M)

Q.No.		Questions	Marks	CO	KL
		UNIT-I			
2.	a)	Explain the advantages of ACSR conductors when used for overhead lines.	[5M]	1	3
	b)	Explain the effect of earth on the capacitance of a transmission line by using the method of images.	[5M]	1	3
		OR			
3.	a)	Calculate the capacitance per phase of a three phase, three wire system by considering earth effect, when the conductors are arranged in a horizontal plane with spacing D12=D23=3.5m, and D31=7m. The conductors are transposed and each has a diameter of 2.0 cm. Assume the transmission line is 4m above the ground level.	[5M]	1	3
	b)	Explain the reason why the geometric mean radius of a stranded conductor is less than that of a solid conductor of the same overall diameter.	[5M]	1	2
		UNIT-II			
4.	a)	What are various parameters of a transmission line and how they are considered for different lines?	[5M]	2	2
	b)	Derive the expression for the characteristic impedance of a long transmission line by rigorous method.	[5M]	2	3
		OR			
5.	a)	Starting from first principles deduce expressions for ABCD constants of a long line in terms of its parameters.	[5M]	2	3
	b)	Explain the interpretation of the long line equations.	[5M]	2	3
		UNIT-III			
6.	a)	Develop equivalent circuit for analyzing the behavior of traveling waves at transition point's transmission lines.	[5M]	3	3

	b)	A 500 KV surge travels on an overhead line of surge impedance 400 ohms towards its junction with a cable that has a surge impedance of 40 ohms. Find: i) transmitted voltage, ii) transmitted current, iii) reflected voltage, and iv) reflected current.	[5M]	3	3
		OR			
7.	a)	Derive the expression for travelling wave of a transmission lines	[5M]	3	3
	b)	A step wave of 200 KV travels on a line having surge impedance of 500 ohms and reaches the end of the line where the line is terminated by an inductance of 2500μH. Find the voltage across the inductance.	[5M]	3	3
		UNIT-IV			
8.	a)	Explain the effect of radio interference on the performance of transmission lines.	[5M]	4	3
	b)	A 3-phase, 50 Hz, 144 kV transmission line has conductors in equilateral formation spaced 2.2 metres apart. The conductor diameter is 1.02 cm and the surface factor is 0.86. The air pressure and temperature are 76 cm of Hg and 28°C respectively. Determine the critical visual voltage for corona and the corona loss per km per phase of the line, mv = 0.75.	[5M]	4	3
		OR			
9.	a)	Discuss how the line voltage and the line spacing will effects the corona in the lines?	[5M]	4	2
	b)	What is Ferranti effect? Deduce a simple expression for the voltage rise of an unloaded line.	[5M]	4	2
		UNIT-V			
10.	a)	Discuss the considerations which govern the selection of span and conductor configuration of a high voltage line.	[5M]	5	2
	b)	Derive the expressions for sag and tension when the supports are at unequal heights.	[5M]	5	3
		OR			
11.	a)	Explain how sag is determined for an overhead line conductor taking into account the effects of wind and ice loading.	[5M]	5	3
	b)	An overhead line having a conductor of diameter 12 mm and a span length of 160 meters has a sag of 4.0 meters at – 6°C with 10 mm thick ice coating and wind pressure of 45 kg/m2 of projected area. $E = 130 \times 10^6$ kg/cm2, $\alpha = 16.6 \times 10^{-6}$/C, ice density 910 kg/m3, copper density 8850 kg/m3. Determine the temperature at which the sag will remain the same under fair weather conditions.	[5M]	5	3

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