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)	What is the effect of earth on line capacitance?	[2M]	1	2
	b)	What is the significance of a T- model and π – model of a transmission line?	[2M]	2	2
	c)	What is meant by attenuation constant and write its role in the transmission waves?	[2M]	3	2
	d)	Derive the expression for the raise in voltage due to Ferranti 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 with reason why the Bundled - Conductor lines have lower inductance than Single- conductor lines of the same area of Cross section.	[5M]	1	2
	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)	Three conductors of a three phase transmission line are arranged in a horizontal plane and are 4 meters apart. The diameter of each conductor is 2.4 cm. Find the inductance per kilometer of each conductor. Assume the load is balanced and the phase sequence as R, Y, B. Find the average inductance per phase for the regularly transposed line.	[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)	Explain the effect of power factor on the regulation of the short transmission line.	[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)	Derive the transmission parameters or A, B, C, D parameters of a long transmission line by use of complex exponentials.	[5M]	2	3
	b)	A 275 kV overhead transmission line has the following characteristics: Z = (12.5 + j 66) Ω, Y = 4.4 x 10-4 $\angle 90^0$ S. Calculate the ABCD constants and the surge impedance of the line.	[5M]	2	3
		UNIT-III			

6.	a)	Discuss in detail about Attenuation and Distortion in transmission lines and causes of it.	[5M]	3	2
	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	2
	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 how shunt reactors can eliminate the Ferranti effect in transmission lines.	[5M]	4	2
	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)	A single-phase overhead line has two conductors of diameter 1 cm with a spacing of 1 meter between centers. If the dielectric strength of air is 21 kV/cm, determine the line voltage for which corona will commence on the line.	[5M]	4	3
		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)	Derive the expression for the Sag in vertical plane when the conductor is covering ice and wind pressure.	[5M]	5	2
	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, $\alpha=16.6\times10^{-6}$/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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