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B.M.S. College of Engineering, Bengaluru-560019

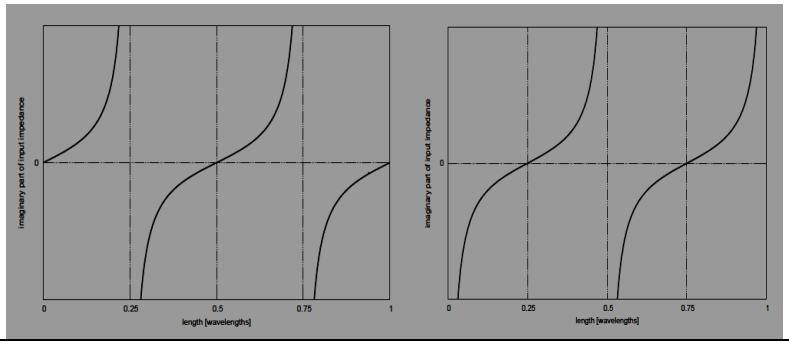
Autonomous Institute Affiliated to VTU

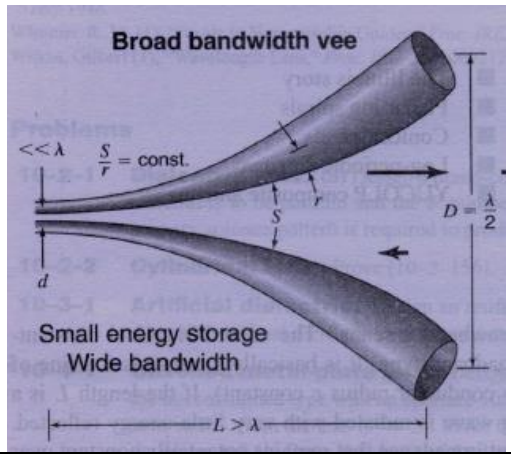
October 2024 Supplementary Examinations

Programme: B.E. **Semester: VI**
Branch: Electronics & Telecommunication Engineering **Duration: 3 hrs.**
Course Code: 22ET6PCTLA **Max Marks: 100**
Course: Transmission Lines and Antennas

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	CO	PO	Marks
1	a)	Explain the different types of distortions in a transmission lines. Derive the condition for a distortionless line.	CO2	PO1	**06**
	b)	A generator of 1 Volt,1000Hz supplies power to a 100 km open wire line terminated in Z_0 having the following parameters: R=10Ω/Km, G=0.8 μ υ/Km, L=0.004 H/Km and C=0.008 μF/Km. Calculate Z_0,α,β,γ, λ of the line.	CO2	PO1	**06**
	c)	Measurements carried out on a certain distortionless line at an angular frequency of 1500 rads/sec, yielded the following values: G=2.25μυ/Km, C= 8nF/Km and Z_0=800Ω.Determine R, L, γ, V_p.	CO2	PO1	**08**
		OR			
2	a)	Derive expression for reflection factor and reflection loss.	CO2	PO1	**06**
	b)	Measurements carried out on a telephone cable has shown negligible values of inductance and conductance. The attenuation constant was found to be 0.05 nepers/km, the phase velocity to be 80000 km/sec and characteristic impedance to be $400\angle -45^0\Omega$. Determine β, γ, ω and the values of R and C of the telephone cable.	CO2	PO1	**06**
	c)	The Characteristic impedance of a transmission line is 50Ω.Input impedance of the open circuited line is (100+ j 150) .when the transmission line a short circuited, what will be the value of impedance.	CO2	PO1	**08**
		UNIT - II			
3	a)	Identify the below given plots and also derive expression for the same 	CO2	PO1	**08**

		b)	A 50 MHz open-wire line is to be built of copper wire of diameter 3.264mm and to have R_0=425Ω. Find the desired spacing 'd'.	*CO2*	*PO1*	**04**
		c)	A load impedance of Z_L=(60-j80)Ω is required to be matched to a 50Ω co-axial line, by using a short circuited stub of length 'l' located at a distance 'd' from the load. The wavelength of operation is 1 meter. Using Smith chart, find 'd' and 'l'.	*CO3*	*PO2*	**08**
			UNIT - III			
	4	a)	Show that the directivity of a short dipole is 1.5 and for λ/2 antenna is 1.64	*CO2*	*PO1*	**06**
		b)	Find the directivity of the following intensity patterns. (i)Unidirectional cosine patterns, (ii) Bidirectional cosine patterns,(iii) Unidirectional sine patterns and (iv) Bidirectional sine patterns	*CO2*	*PO1*	**10**
		c)	Obtain relationship between A_{em} and d of an antenna.	*CO2*	*PO1*	**04**
			OR			
	5	a)	Derive Friis transmission formula.	*CO2*	*PO1*	**06**
		b)	Complete the field pattern and find BWFN and HPBW for a linear uniform array of 6 isotropic point sources spaced λ/2 distance apart.The power is applied with equal amplitude and in phase.	*CO2*	*PO1*	**10**
		c)	Find the effective aperture of an isotropic antenna given D and A_{em} of short dipole as 1.5 and $(3/8\pi)\lambda^2$ respectively.	*CO2*	*PO1*	**04**
			UNIT - IV			
	6	a)	Derive expression for electric fields due to current element of a short dipole.	*CO2*	*PO1*	**06**
		b)	Approximately how far away from a 50kHz cycle circuit would you find the radiation field comparable to the inductor's field?	*CO2*	*PO1*	**04**
		c)	Prove that the radiation resistance of λ/2 dipole is 73Ω.	*CO2*	*PO1*	**10**
			UNIT - V			
	7	a)	What is Rumsey's principle? Explain in detail the log-spiral antenna.	*CO1*		**08**
		b)	Briefly explain how,an infinite biconical antenna is analogous to an infinite uniform transmission line.	*CO1*		**08**
		c)	If d=4mm and D=100mm in the below given figure, find bandwidth. 	*CO2*	*PO1*	**04**

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