Code No.: EC401PC | R20 | H.T.No. | | | 8 | R | | | | | |

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
II–B.TECH–II–Semester End Examinations (Supply) - February- 2023
NETWORK ANALYSIS AND TRANSMISSION LINES
(ECE)

[Time: 3 Hours] **[Max. Marks: 70]**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 20 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A **(20 Marks)**

1.	a)	Define Graph, Tree, Basic Cut set and Basic Tie set. Illustrate with an example.	[2M]
	b)	Explain Active elements in detail.	[2M]
	c)	Derive the relation between voltage and current in a series connected RL Circuits.	[2M]
	d)	Draw a power triangle in series connected RLC networks.	[2M]
	e)	Derive the relation between RMS and maximum value.	[2M]
	f)	Define form factor and peak factor	[2M]
	g)	Differentiate group and phase velocities	[2M]
	h)	What is condition for distortion less transmission line?	[2M]
	i)	List the properties of smith chart	[2M]
	j)	Explain how Quarter wave transformer is used for matching?	[2M]

PART-B **(50 Marks)**

2.	a)	What is a basic cutset matrix? Explain with an example.	[5 M]
	b)	An Iron ring of a mean length of 50 cm has an air gap of 1 mm and a winding of 200 turns. If the relative permeability of the Iron is 400, when a current of 1 Amp flows in the winding, determine the flux density? (Neglect leakage and fringing.)	[5 M]
		OR	
3.	a)	Discuss the dot convention used in magnetically coupled coils.	[5 M]
	b)	Derive an expression for the coefficient of coupling between two mutually coupled coils.	[5 M]
4.	a)	Derive and draw the response of a series RLC circuit for a step input.	[5 M]
	b)	An impedance $Z_1 = 10 + j10\ \Omega$ is connected in parallel with another impedance of resistance 8.5 Ω and a variable capacitance connected in series. Find C such that the circuit is in resonance at 5 kHz.	[5 M]
		OR	
5.	a)	Design a series RLC circuit that will have an impedance of 10 Ω at the resonant frequency of $\omega_0 = 100$ rad/s and a quality factor of 80. Find the bandwidth.	[5 M]
	b)	Obtain the response of the R-L-C series circuit for exponential excitation. Use the Laplace Transform method.	[5 M]

6.a) Explain different parameters to be considered for the design of attenuators. [5 M]

b) Draw the symmetrical T and π sections and their decomposition into L sections. [5 M]

OR

7.a) Define Hybrid parameters of a Two Port network. Establish the relation between Hybrid parameters and ABCD Parameters. [5 M]

b) Draw the circuit diagram for the T and π sections of the composite filter. [5 M]

8.a) Distinguish between the different types of distortions present in conventional transmission lines, and establish the condition for distortion less transmission lines. [5 M]

b) A 75 Ω transmission line has a propagation constant of 0.05+j5 N/m, at 50 MHz. Find its primary constants, assuming phase velocity as 60% of light velocity and no distortion. [5 M]

OR

9.a) Explain the significance of infinite line, and hence obtain general expression for the line characteristic impedance using the lossy line equivalent circuit. [5 M]

b) Establish the expressions for the propagation characteristics α, β, γ, λ, v_p, Z_0 for lossy distortion less transmission lines. [5 M]

10.a) Sketch the variations of input impedances of SC and OC lines with 5l, and explain how a UHF line can be used as an inductance or a capacitance. [5 M]

b) A 500 Ω RF line is connected to a load 75+j40 Ω. Estimate the resultant reflection coefficient, VSWR, Z_{min}, Z_{max}. Also find its Input Impedance, if the line length is 0.5λ [5 M]

OR

11.a) Explain the principle of impedance matching using a single stub. [5 M]

b) Define the terms: Reflection coefficient and VSWR. Derive expressions for the same, as applicable to RF lines. [5 M]

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