Code No.: EC401PC

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CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
II–B.TECH–II–Semester End Examinations (Regular) - June- 2022
NETWORK ANALYSIS AND TRANSMISSION LINES
(ECE)

[Time: 3 Hours]

[Max. Marks: 70]

Note: 1. Answer any *FIVE* questions. Each question carries 14 marks.
2. All questions carry equal marks.
3. Illustrate your answers with NEAT sketches wherever necessary.

5X14=70

1. a) What is a basic Cutset Matrix? Explain with an example. [7M]
   b) Draw the T equivalent model for magnetically coupled circuits and explain. [7M]

2. a) What is the damping factor? Explain the step response of the second-order system with a underdamped case. [7M]
   b) Determine quality factor and bandwidth for the parallel RLC resonant circuit. Given $R = 100\ \Omega$, $L = 0.2$ mH and $C = 500\ \mu F$. [7M]

3. a) Explain different parameters to be considered for the design of attenuators. [7M]
   b) Draw the symmetrical T and π sections and their decomposition into L sections. [7M]

4. a) Calculate the characteristic impedance for the following line parameters:
   $R = 10.4$ ohms /km; $L = 0.00367$ H/km; $C = 0.00835\mu F$ /km and $G = 10.8 \times 10^{-6}$ mhos /km [7M]
   b) Derive the primary constants (R, L, C, and G) of an infinite transmission line. [7M]

5. A transmission line has an impedance of $300\ \Omega$ is terminated with the load impedance of $150+j150\ \Omega$ then determine the following parameters using Smith chart. i) VSWR ii) Reflection Coefficient iii) input impedance at $0.1\ \lambda$ distance from the load. iv) Input admittance at $0.1\ \lambda$ distance. v) Voltage minimum and maximum. [14M]

6. a) What is an electric circuit? What is a magnetic circuit? Make a comparison between the electric circuit and the magnetic circuit. [7M]
   b) A Coil 1 of a pair of coupled coils has a continuous current of 5A, and the corresponding fluxes ϕ_{11} and ϕ_{12} are 0.2 and 0.4 mWb respectively. If the turns are $N_1 = 500$ and $N_2 = 1500$, find L_1, L_2, M, and k. [7M]

7. a) Derive and draw the response of a series RLC circuit for a step input. [7M]
   b) An impedance $Z1 = 10 + j10\ \Omega$ is connected in parallel with another impedance of resistance $8.5\ \Omega$ and a variable capacitance connected in series. Find C such that the circuit is in resonance at 5 kHz. [7M]

8. a) Derive the characteristics impedance of π section network. [7M]
   b) Define Hybrid parameters of a Two Port network. Establish the relation between Hybrid Parameters and ABCD Parameters. [7M]

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