

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS

II-B.TECH-I-Semester End Examinations (Supply) - June- 2025

NETWORK ANALYSIS AND SYNTHESIS

(ECE)

[Time: 3 Hours]

[Max. Marks: 60]

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 10 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

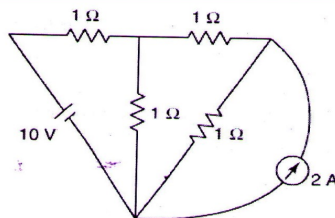
(20 Marks)

1. a) Write about the relationship between twig & link. [1M]
- b) What is a fundamental cut-set matrix? [1M]
- c) Write the time constants of RL and RC networks. [1M]
- d) Define Quality factor. [1M]
- e) Define transfer admittance and impedance of a two port network. [1M]
- f) What is an attenuator? [1M]
- g) Differentiate between active and passive filters. [1M]
- h) List the types of equalizer circuits. [1M]
- i) List the properties of Hurwitz polynomial. [1M]
- j) What do you mean by network synthesis? [1M]

PART-B

(50 Marks)

2. For the network shown in figure, write down the f-cutset matrix selecting twigs and obtain the network equilibrium equation in matrix form using KCL. [10M]



OR

- 3.a) Explain the dot convention with an example. [5M]
- b) Derive the expression for coefficient of coupling in coupled circuits. [5M]
- 4.a) Deduce the transient response of source free series RL circuit. [5 M]
- b) Derive the expressions for quality factor and bandwidth of series and parallel resonance circuits. [5 M]

OR

5. Obtain the transient response for the series RC network for DC excitation. [10M]
- 6.a) Find y-parameters in terms of z-parameters. [5M]
- b) For a two port network, Y parameters are $Y_{11}=0.1 \text{ ohm}$, $Y_{22}=0.05 \text{ ohm}$, $Y_{12}=Y_{21}=-0.02 \text{ ohm}$. Calculate the Z parameters of the network. [5M]

OR

- 7.a) An admittance is given by $Y(s)=1/(s+2)$. Find the pole zero plot. [5M]
- b) Explain the significance of characteristic impedance. [5M]

8. Design a high pass filter having cutoff frequency of 1KHz with load resistance of 600ohms. [10M]

OR

9. Design a symmetrical bridged T- attenuator with an attenuation of 30 dB and terminated into a load of 500 Ohms. [10M]

10. Synthesize the given admittance function with 1- Ω termination [10M]

$$Y'_{21}(S) = \frac{S^2}{S^3 + 3S^2 + 3S + 2}$$

OR

11. Synthesize a network using Foster-I and Foster -II forms for the impedance function : [10M]

$$Z(s) = s(s^2 + 9) / \{(s^2 + 5)(s^2 + 13)\}$$
