



B. Tech III Semester Regular Examinations, February 2022
NETWORK ANALYSIS
(ELECTRONICS & COMMUNICATION ENGINEERING)

Maximum Marks: 70

Date: 25.02.2022 Duration: 3 hours

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

Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 Why dot convention required in coupled circuits?
- 2 Define oriented graph, tree.
- 3 Calculate the time constant of an RC circuit with $R = 10 \text{ k}\Omega$ and $C = 40 \mu\text{F}$.
- 4 What is meant by free and forced response?
- 5 Write the expression of convolution integral.
- 6 Determine the quality factor of a coil for the series resonant circuit consisting of $R = 10 \text{ ohm}$, $L = 0.1 \text{ H}$ and $C = 10 \text{ microfarad}$.
- 7 Give the condition for reciprocity and symmetrical condition for Z- parameter.
- 8 The Y-parameter of a two-port network are $Y_{11}=Y_{22}=3 \text{ }\Omega$, $Y_{12}=Y_{21}=2 \text{ }\Omega$. Determine the h_{22} of the network.
- 9 What are the demerits of m-derived filters?
- 10 Why the constant - k filter is called as prototype filter section?

Part-B

Answer All the following questions.

(5X10M=50Marks)

- 11 Explain the procedure for Tie-set matrix with suitable example. [10]
- 12 (a) Two coupled coils have a coefficient of coupling of 0.65. If the self-inductances of the coils are 0.02 H and 0.08 H, calculate the equivalent inductance if the two coils are connected in i) series aiding, ii) parallel aiding and c) parallel opposing
(b) Write short notes on Ideal transformer. [6+4]
- 13 In the RL circuit of Figure 1, the switch is closed at $t = 0$. Find the current $i(t)$ and the voltage across resistance and inductance. [10]

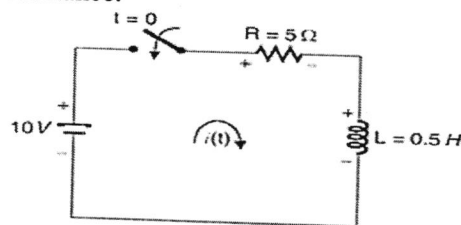


Figure.1

OR

- 14 In the RLC circuit of Figure.2, the capacitor has an initial voltage of 40 V, when the switch is closed at $t = 0$. Find an expression for the current $i(t)$. [10]

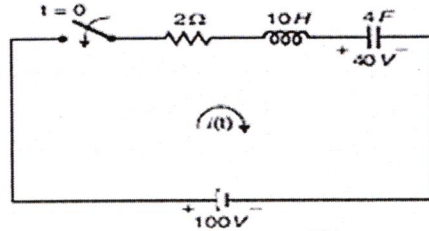


Figure.2

- 15 (a) The parameters of an RLC parallel circuit excited by a current source are $R = 40 \Omega$, $L = 2$ mH and $C = 3 \mu\text{F}$. Determine the resonant frequency, quality factor, bandwidth and cut-off frequencies.

- (b) Find the inverse Laplace transform of given function $F(S)$

$$F(S) = \frac{S + 2}{S(S + 3)(S + 4)}$$

[6+4]

OR

- 16 Determine the convolution integral when $f_1(t) = e^{-2t}$ and $f_2(t) = 2t$. [10]

- 17 For the symmetrical two-port network shown in Figure 3, find the Z-parameters and Y-parameters. [10]

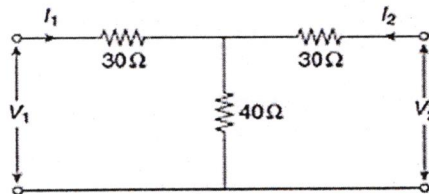


Figure.3

OR

- 18 Explain the different types of interconnections of two port network. [10]

- 19 (a) Design m-derived T-type low pass filter to work into load of 500Ω and cut-off frequency at 4 kHz.

- (b) Design an m-derived high pass filter π section to work into load of 600Ω and cut-off frequency at 318.3Hz. [5+5]

OR

- 20 Discuss the ideal characteristics of low pass, high pass, band pass, and band stop filter. [10]