

B. TECH.
(SEM III) THEORY EXAMINATION 2018-19
NETWORK ANALYSIS AND SYNTHESIS

Time: 3 Hours

Total Marks: 70

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

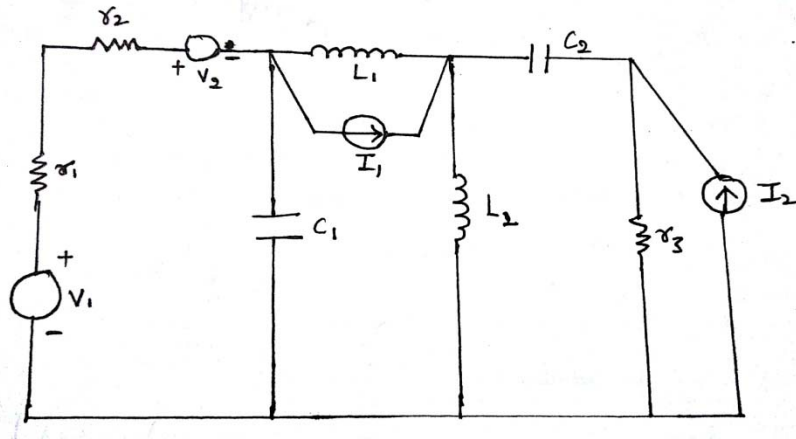
1. Attempt all questions in brief. 2 x 7 = 14
- explain continuous and discrete time signals
 - obtain the Laplace transform of $e^{-\theta} \cos \omega t$, θ being a constant.
 - Explain the necessary conditions for transfer function.
 - Write the applications of bode plot.
 - explain the parameters of two port network
 - What is Hurwitz polynomial
 - explain the characteristics of positive real functions (PRF).

SECTION B

2. Attempt any three of the following: 7 x 3 = 21
- Distinguish between the mesh current analysis and node voltage analysis.
 - Explain the following: linear and nonlinear circuits, active and passive circuits.
 - State and prove maximum power transfer theorem with example.
 - Check the stability criteria of the following polynomial by applying Routh–Hurwitz criterion: $P(s) = s^4 + 2s^3 + 4s^2 + 12s + 10$
 - An admittance function is given as $Y(s) = (4s^2 + 6s)/(s+1)$ realizes the network.

SECTION C

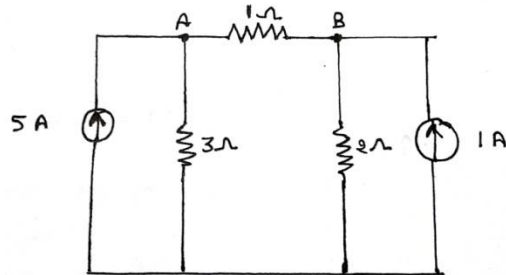
3. Attempt any one part of the following: 7 x 1 = 7
- Explain the terms: deterministic and random signals, power and energy signals.
 - Write the characteristics of test signals and also draw its waveform.
4. Attempt any one part of the following: 7 x 1 = 7
- Obtain h parameters in terms of z parameters for two port networks.
 - Explain the term: Butterworth filter, band stop filter, band pass filter.
5. Attempt any one part of the following: 7 x 1 = 7
- Check whether a polynomial expressed as: $P(s) = s^3 + 6s^2 + 11s + 6$ is Hurwitz or not.
 - Check the positive realness of the function: $F(s) = (s^2+10s+4)/(s+2)$.
6. Attempt any one part of the following: 7 x 1 = 7
- Draw the bode plot of the following transfer function having unity feedback
 $G(s) = 1/s(1+s) (1+0.1s)$
 - Draw the oriented graph of the network shown in figure and write the incidence matrix



7. Attempt any *one* part of the following:

7 x 1 = 7

a) Find the current through 1Ω resistor shown in figure using Thevenin's method



b) Find poles and zeroes of following transfer function:

$$N(s) = (s+1) / (s^2 + 2s + 2)$$

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