

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**

- a) explain continuous and discrete time signals
- b) obtain the Laplace transform of $e^{-\theta t} \cos \omega t$, θ being a constant.
- c) Explain the necessary conditions for transfer function.
- d) Write the applications of bode plot.
- e) explain the parameters of two port network
- f) What is Hurwitz polynomial
- g) explain the characteristics of positive real functions (PRF).

SECTION B**2. Attempt any three of the following: 7 x 3 = 21**

- a) Distinguish between the mesh current analysis and node voltage analysis.
- b) Explain the following: linear and nonlinear circuits, active and passive circuits.
- c) State and prove maximum power transfer theorem with example.
- d) Check the stability criteria of the following polynomial by applying Routh–Hurwitz criterion: $P(s) = s^4 + 2s^3 + 4s^2 + 12s + 10$
- e) 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**

- a) Explain the terms: deterministic and random signals, power and energy signals.
- b) Write the characteristics of test signals and also draw its waveform.

4. Attempt any one part of the following: 7 x 1 = 7

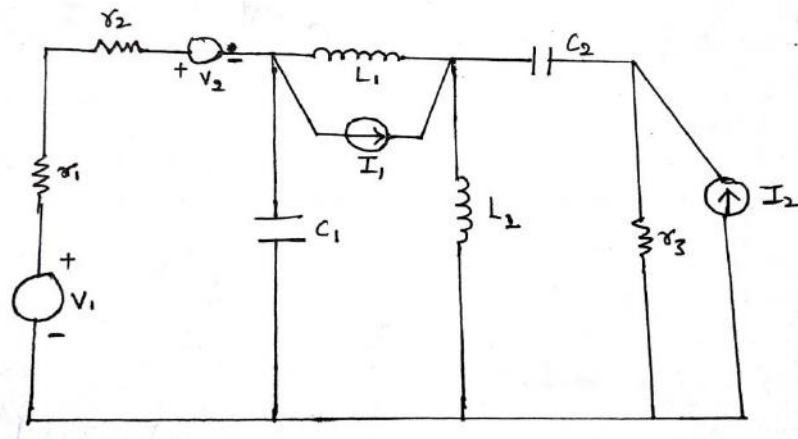
- a) Obtain h parameters in terms of z parameters for two port networks.
- b) Explain the term: Butterworth filter, band stop filter, band pass filter.

5. Attempt any one part of the following: 7 x 1 = 7

- a) Check whether a polynomial expressed as: $P(s) = s^3 + 6s^2 + 11s + 6$ is Hurwitz or not.
- b) 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

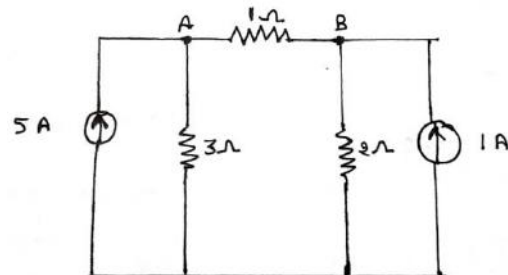
- a) Draw the bode plot of the following transfer function having unity feedback
 $G(s) = 1/s(1+s)(1+0.1s)$
- b) Draw the oriented graph of the network shown in figure and write the incidence matrix



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:

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