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Roll No.

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 $e^{-\theta} \cos wt$, 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.

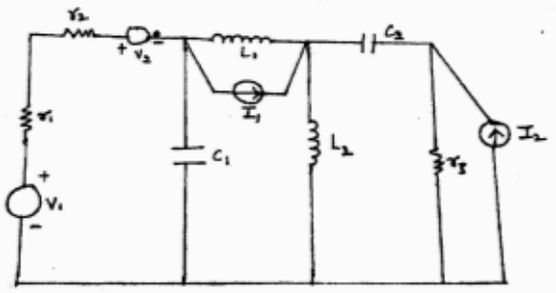
SECTION C

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.

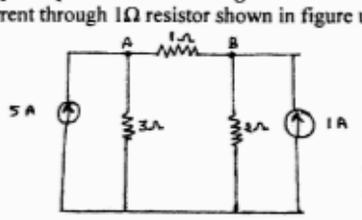
5. **Attempt any *one* part of the following:** **7 x 1 = 7**
   a) Check whether a polynomial expressed as: $P(s) = s^3 + 6s^2 + 11s + 6$ is Hurwitz or not.
   b) Check the positive realness of the function: $F(s) = (s^2+10s+4)/(s+2)$.

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:

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