M. Sc. (ECI) (Sem. III) (CBCS) Examination

November / December - 2018

Paper - 9 : Advance Circuit & Network Concepts

(New Syllabus)

Faculty Code : 003
### Subject Code : 1273001

Time : $2\frac{1}{2}$ Hours]   [Total Marks : **70**

Instructions : (1)   Figures on right hand side indicate marks.

(2)   Assume suitable data if necessary.

1   Answer the following : (Any **Seven**)   **14**

(1)   Explain the "Translation in Frequency domain" property of Laplace Transform

(2)   Find Laplace Transform of $(t+2)^2 \cdot e^t$

(3)   Transform the circuit shown in fig. below to the s-domain & determine the Laplace Impedance
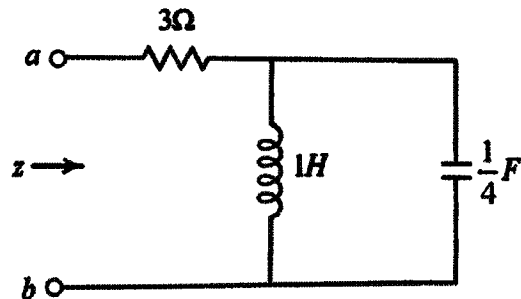
(4)   For the given denominator polynomial of a network function, verify the stability of the network by Routh criterion $Q(s) = s^3 + 2s^2 + 8s + 10$

(5)   Define Step & Impulse signal. Draw waveform & write equation of both signals.

(6) Derive Z_{11} and Z_{21} for the given circuit
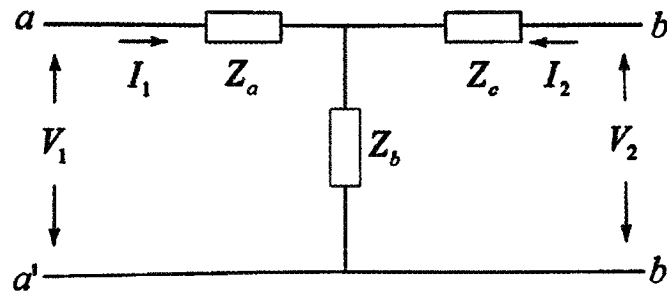
(7) Define Low Pass Filter & Band Pass Filter. Draw its attenuation characteristic.

(8) Use initial & final value theorems to find the initial & final values of $f(t)$ for following function :

$$F(s) = \frac{4s^2 + 7s + 1}{s(s+1)^2}$$

(9) Draw the T- and π – section circuit for constant k-type Low Pass Filter.

(10) What is Attenuator & Equalizer ? List different types of Attenuator & Equalizer.
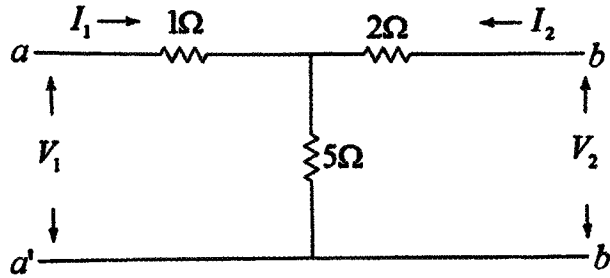
2   Answer the following : (Any **Two**)

(1) Determine the current 'i' if the circuit is driven by a   7 voltage source as shown in fig. below. The initial value of voltage across the capacitor & the initial current through the inductor both are zero.
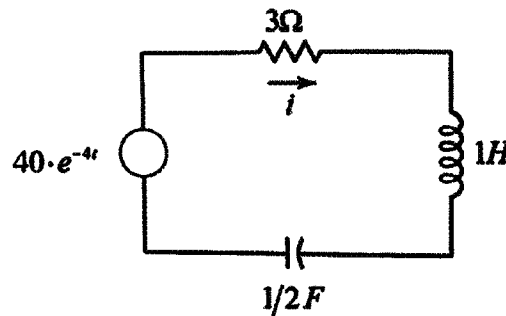
(2) Explain Lattice Phase Equalizer.   7

(3) Derive different Y-parameters for a linear two port   7 network.

3 Answer the following :

(1) Find the transmission parameters for circuit shown   **7**
below

(2) Explain Band Elimination Filter.   **7**

OR

3 Answer the following :

(1) The driving point impedance of RL network is   **7**
given as

$$Z(s) = \frac{5(s+1)(s+4)}{s(s+3)+(s+5)}$$

Determine Foster Form-1 for the network.

(2) Derive equation for characteristic impedance, Z_{0T} **7**
for T-network filter. Also prove that $Z_{0T} = \sqrt{Z_{oc} \times Z_{sc}}$

4 Answer the following :

(1) Derive ABCD parameters in terms of Z-parameters   **7**
& Y-parameters.

(2) Design k-type band pass filter having a design   **7**
impedance of 500Ω and cut-off frequencies 1 KHz and
10 KHz. Also draw its circuit.

5 Answer the following : (Any **Two**)

(1) Find short circuit admittance parameters for the   **7**
circuit shown below
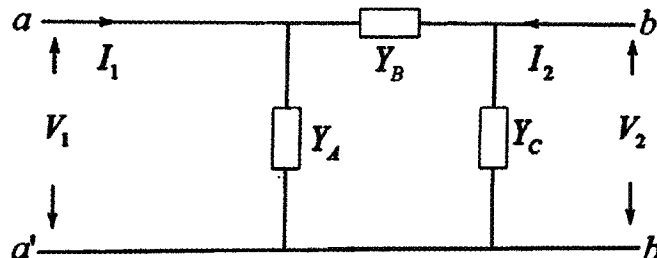
(2) Explain natural response of RC circuit.   **7**

(3) The driving point impedance of an LC network is   **7**
given by $Z(s) = \dfrac{2s^5 + 12s^3 + 16s}{s^4 + 4s^2 + 3}$

Determine 1st Cauer form of network.

(4) Explain Bridged-T Attenuator.   **7**

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