Code No: R09220205 | R09 | SET-1

B.Tech II Year - II Semester Examinations, April-May, 2012
NETWORK THEORY
(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks

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1.a) Discuss relationship between line and phase quantities in star and delta connected systems.

b) A 400 V, 3-Ø balanced source is connected to an unbalanced mesh connected impedances of $Z_{ab} = 10\angle 45^0\Omega$, $Z_{bc} = 20\angle 20^0\Omega$, $Z_{ca} = 30\angle -53^0\Omega$. Determine the line currents and the total active & reactive power. [5+10]

2.a) Derive an expression for response in a R-C circuit excited by a d.c. source.

b) A current of source shown in Figure.1 supplies a current
i(t)=0, $t \le 0$
= t, t>0.
Find $V_0(t)$. Use time domain method. [5+10]

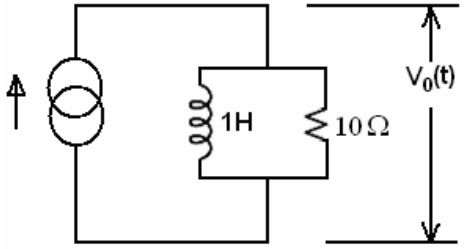

Figure.1

3. a) Derive an expression for response in a R-L series circuit for a sinusoidal excitation. Use Laplace transform approach.

b) For the circuit given below in Figure.2, the applied voltage is V(t) = 10 Sin(200t+60^0). Find the current through the circuit for $t \ge 0$. Assume zero initial condition. Use time domain approach. [5+10]

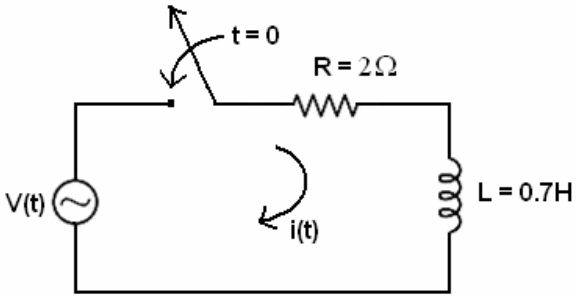

Figure.2

4.a) Express y-parameters in terms of h-parameters.

b) Find the A B C D parameters for the circuit shown in Figure.3. [7+8]

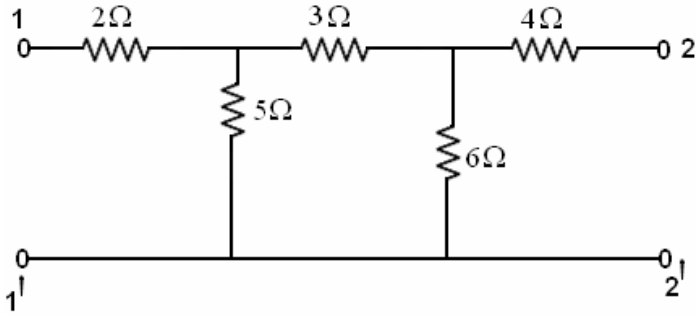

Figure.3

5.a) What is a pole-zero plot? What is its significance? Explain time domain behaviour from pole zero plot.

b) Find $\frac{v_2(s)}{v_1(s)}$ for the network shown in Figue.4. [7+8]

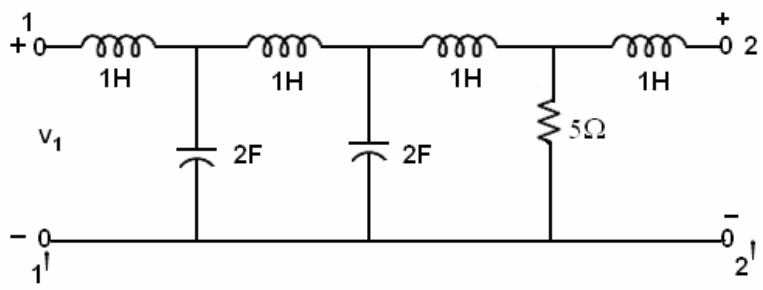

Figure.4

6.a) Explain the design procedure for a constant K low pass filter and its characteristics.

b) Find the component values of a constant K LPF having characteristic impedance $Z_0 = 500\Omega$ and cut off frequency of $f_c = 500$ Hz. Find the frequency at which this filter produces an alternation constant of 38.2 dB. [7+8]

7.a) Obtain the Fourier series expression of the wave form shown in Figure.5.

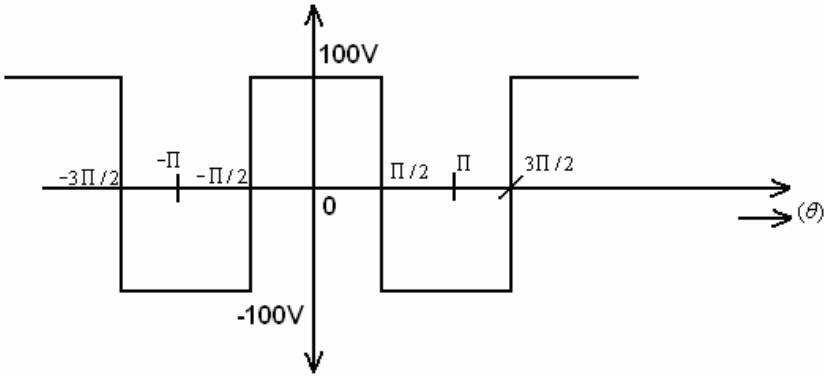

Figure.5

b) For the non recurring cosine pulse $V = V_0 \cos t$ shown in the Figure.6, determine Fourier transform. Sketch continous amplitude and phase spectra. [7+8]

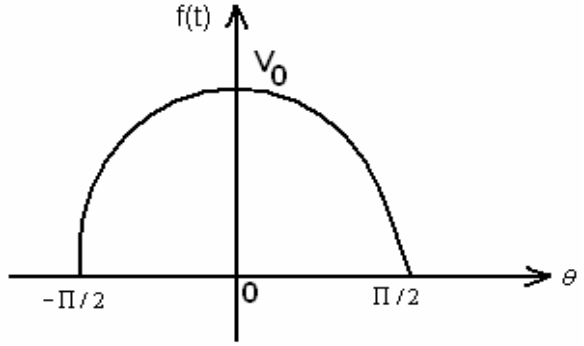

Figure.6

8.a) Write short notes on:
a) Transmission parameters of cascaded networks
b) m-derived filters
c) Driving point functions. [5+5+5]

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Code No: R09220205 | R09 | SET-2

B.Tech II Year - II Semester Examinations, April-May, 2012
NETWORK THEORY
(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks

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1.a) Derive the expressions for power using two wattmeter method.
b) Discuss about the readings of wattmeters in two wattmeter method due to effect of power factor. [10+5]

2.a) What are initial conditions? Explain the procedure to evaluate initial conditions.
b) The switch in the Figure.1 has been connected to the 12 V source for a long time. At t = 0, the switch is thrown to 24 V source. Then
i) Determine $i_L(0)$ and $v_c(0)$
ii) Write the differential equation governing $v_c(t)$ for t>0
iii) Compute the steady state value of $v_c(t)$. [5+10]

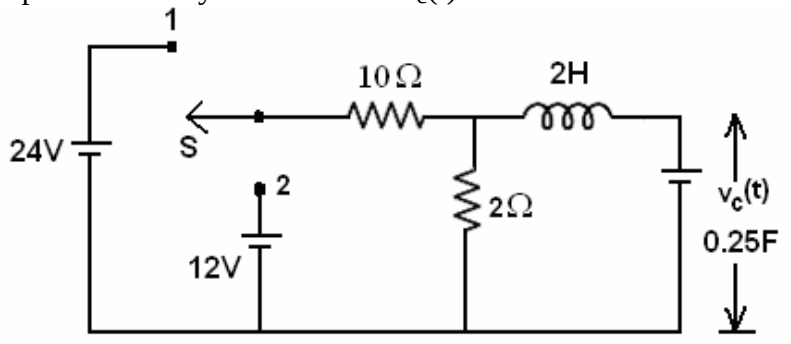


Figure.1

3.a) Derive the expression for the response of an RLC series circuit for sinusoidal excitation.
b) For the circuit shown in Figure.2 determine the particular solution for i(t) through the circuit. Assume zero initial conditions. [5+10]

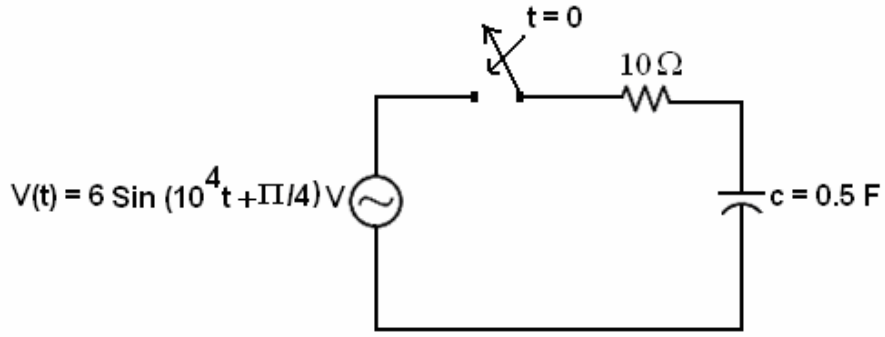
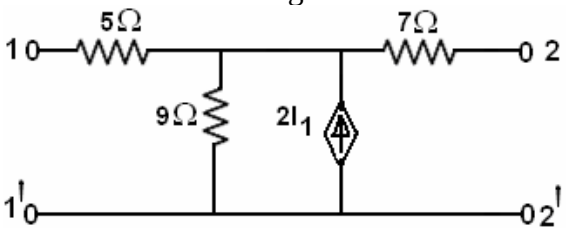


Figure.2

4.a) Express Z-parameters in terms of h-parameters.
b) Find y-parameters for the circuit in Figure.3. [7+8]



Fgure.3

5.a) Define and explain the following
i) port ii) driving point functions
ii) Tranfer functions iv) poles
v) zeroes.

b) Find Y_{12} for the circuit in Figure.4. [10+5]

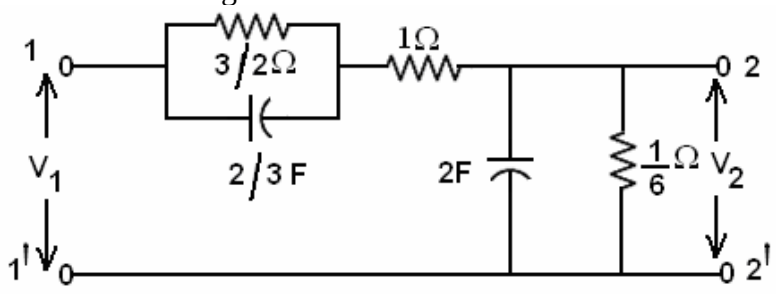


Figure.4

6.a) Give the analysis for the design of constant K band elimination filter and explain its characteristics.

b) Design a constant K band elimination filter with cut off frequency 1750 Hz to 4250 Hz and a characteristic impedance of 250Ω. [8+7]

7.a) State and explain Fourier Theorem.

b) Find the Fourier series of the wave form shown in Figure.5.

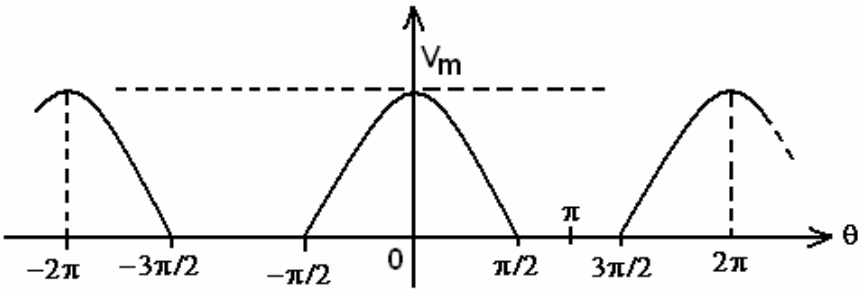


Figure.5

c) Find g(w) for the following function. [5+5+5]

$$f(t) = 0 \qquad -\infty \le t \le -T$$
$$= \left(1+\frac{t}{T}\right) \qquad -T \le t \le 0$$
$$= \left(1-\frac{t}{T}\right) \qquad 0 \le t \le T$$
$$= 0 \qquad t > T$$

8. Write short notes on
a) Composite filters
b) Necessary conditions for transfer functions
c) Properties of Fourier tranforms. [5+5+5]

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Code No: R09220205 | R09 | SET-3

B.Tech II Year - II Semester Examinations, April-May, 2012
NETWORK THEORY
(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks

\- - -

1.a) Draw the phasor diagram for a 3-Ø motor whose power is measured by two wattmeter method.
b) Derive the expression for the instantaneous power measured in the above case. [8+7]

2.a) Derive an expression for response of R-L-C series circuit excited by a D.C. excitation.
b) In the circuit shown in the Figure.1 below, the voltage across the circuit is $e_g(t) = 2.5$ t volts. What are the values of i(t) and $V_L(t)$ at 4s? [7+8]

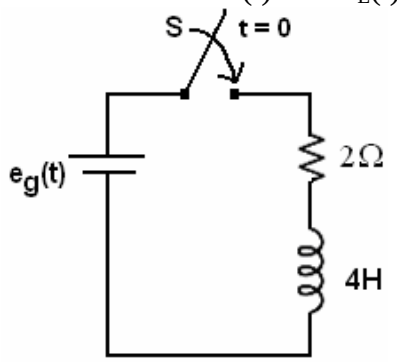

Figure.1

3. Derive an expression for the response in the system in Figure.2 by time domain and Laplace transform techniques. Cross check the answer.
$V(t) = 5Sin(10^3 t + \pi/6)$. [15]

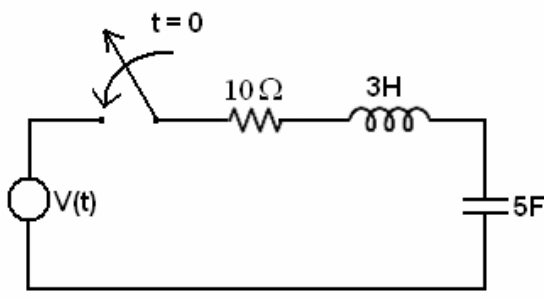

Figure.2

4.a) Express h-parameters in terms of ABCD parameters.
b) Find the Z-parameters for the circuit in Figure.3. [7+8]

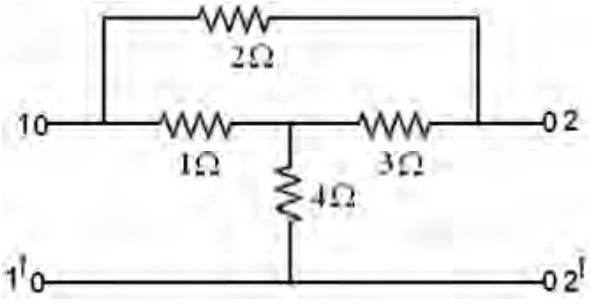

Figure.3

5.a) What is a transfer function? Explain the necessray conditions for transfer functions.

b) For the two port network shown in the Figure.4 find, $G_{12}\left[\frac{V_2(s)}{V_1(s)}\right]$. [5+10]

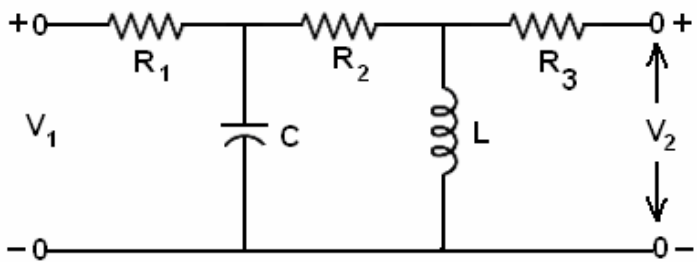

Figure.4

6.a) Give the analysis for the design of constant-K band pass filter.

b) Design a prototype band pass filter section having cut off frequencies of 2000 Hz and 5000 Hz and nominal characteristic impedance of 600Ω. [8+7]

7.a) Find the trigonometric Fourier series of Figure.5.

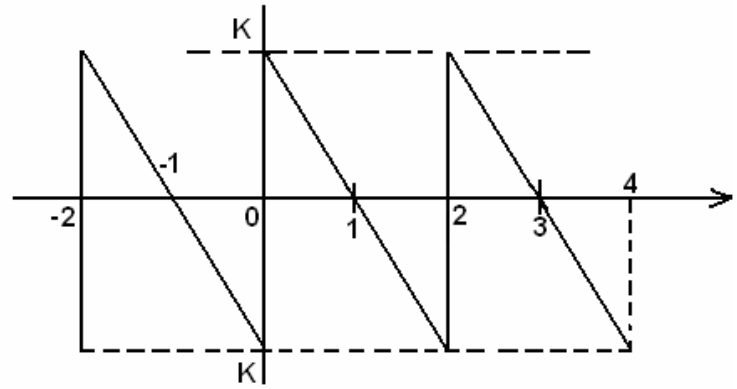

Figure.5

b) Find the Fourier transform of the following functions

i) $f(t) = e^{-a/t}$ for all t

ii) Unit impulse funciton $\delta(t)$. [7+8]

8. Write short notes on

a) m-derived low pass filter

b) Time domain response of pole zero plot

c) Consideration of symmetry in Fourier series evaluation. [5+5+5]

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Code No: R09220205 | R09 | SET-4

B.Tech II Year - II Semester Examinations, April-May, 2012
NETWORK THEORY
(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks
- - -

1.a) Explain the methods to determine active and reactive power in a 3-Ø circuit.
b) A star connected load of $Z_R = 6\Omega$, $Z_Y = j5\Omega$, $Z_B = j7\Omega$ is supplied by a 400V, 3-Ø symmetrical supply. Determine the line currents. The phase sequence is RYB. [7+8]

2.a) Derive the expression for the response in a R-L circuit for D.C. excitation. Define time constant.
b) For the circuit given in Figure.1, steady state conditions are reached for the switch K in position '1'. At t = 0, the switch is changed to position 2. Use the time domain method to determine the current through the inductor for all $t \geq 0^+$. [7+8]

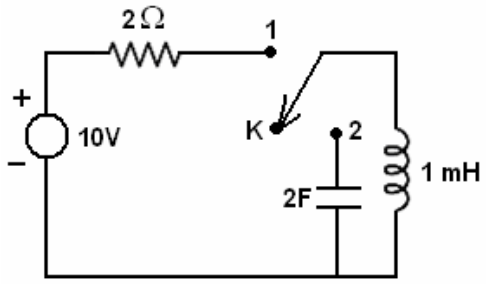

Figure.1

3.a) For the network shown in the Figure.2, steady state is reached with the switch open. At t = 0, the switch is closed. Determine current i(t) for $t \geq 0$.

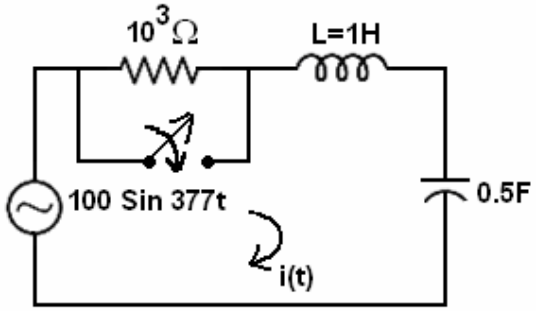

Figure.2

b) For the circuit shown in the Figure.3, find i(t). Assume zero initial condiitons. Use Laplace transform approach. The switch is closed at t = 0. [8+7]

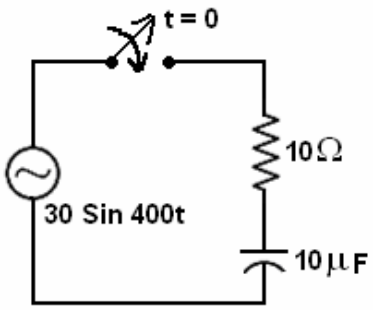

Figure.3

4.a) Express Z parameters in terms of ABCD parameters.

b) Find the h-parameters for the circuit in Figure.4. [7+8]

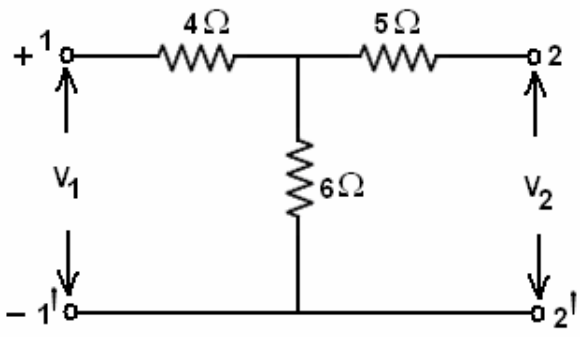

Figure.4

5.a) What is a driving point function? Explain the necessary conditions for driving point functions.

b) Find the transfer function $\frac{V_2(s)}{V_1(s)}$ for the circuit in Figure.5. [5+10]

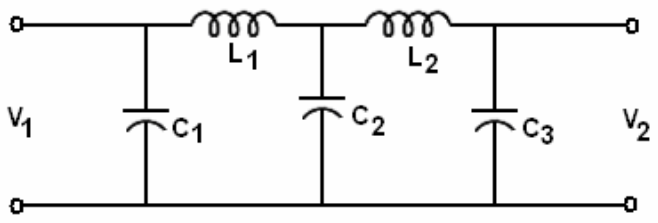

Figure.5

6.a) Explain the design procedure for constant K high pass filter for symmetrical T and Π sections and discuss its characteristics.

b) Find the component values of Π-section & T-section constant-K high pass filter having a cut off frequency of 8 kHz and nominal characteristic impedance of 500Ω. Find its characteristic impedance and phase constant at f = 12 kHz and attenuation at f = 1 kHz. [7+8]

7.a) Find the exponential Fourier series of the wave form in Figure.6.

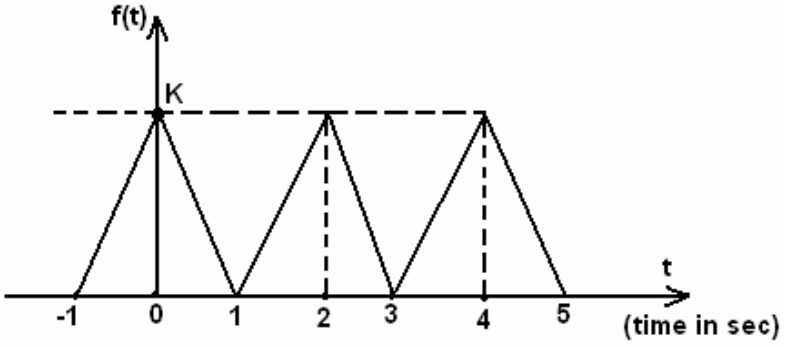

Figure.6

b) Find the Fourier transform of the exciting volatge

$v(t) = V_0 e^{-t}$ *for* $t \geq 0$

$= 0$ *for* $t < 0$.

Sketch approximately amplitude and phase spectra. [7+8]

8.a) Determine the ABCD parameters of two networks connected in cascade as shown in Figure.7.

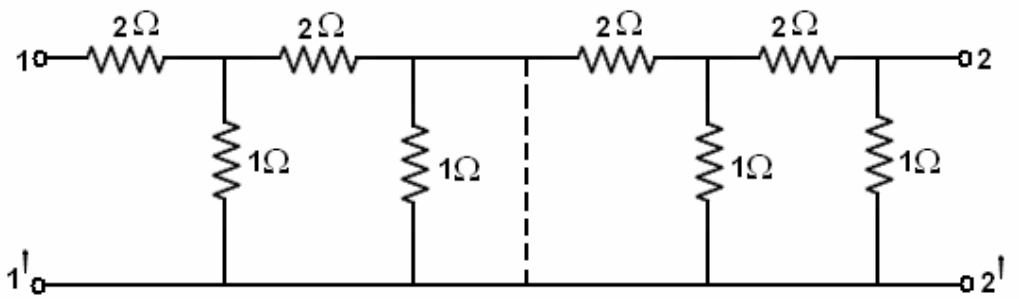

Figure.7

b) Explain the steps involved in composite filter design. [10+5]

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