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B TECH
(SEM-III) THEORY EXAMINATION 2020-21
NETWORK ANALYSIS AND SYNTHESIS

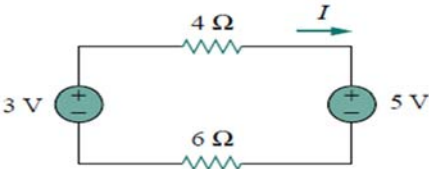
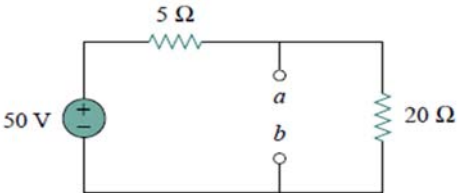
Time: 3 Hours

Total Marks: 100

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

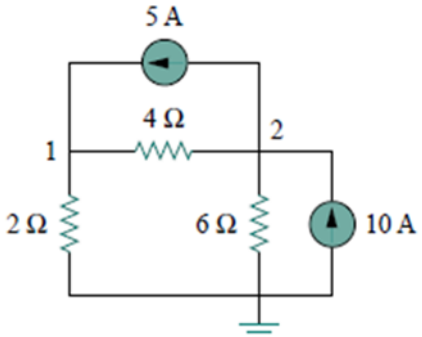
SECTION A

1. Attempt all questions in brief. 2 x 10 = 20

Q no.	Question	Marks	CO
a.	Describe the following terms: Tree, Co-Tree, Twig and link.	2	1
b.	Find the current I in the circuit shown in the Figure 1.  Figure 1	2	1
c.	Describe and state Superposition theorem with suitable example.	2	2
d.	Find Thevenin voltage across terminals a and b of the circuit shown in the Figure 2.  Figure 2	2	2
e.	Illustrate why we use Fourier Transform and what is the drawback of Fourier Transform.	2	3
f.	Demonstrate time reversal property of Fourier transform.	2	3
g.	Describe the Singularity function with suitable example.	2	4
h.	Demonstrate time shifting property of Laplace transform.	2	4
i.	Describe the Band pass filter with suitable example.	2	5
j.	Illustrate the Impedance parameter of a two-port network.	2	5

SECTION B

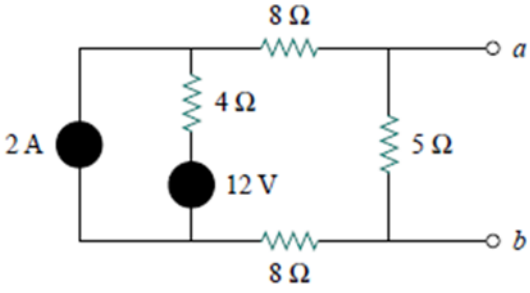
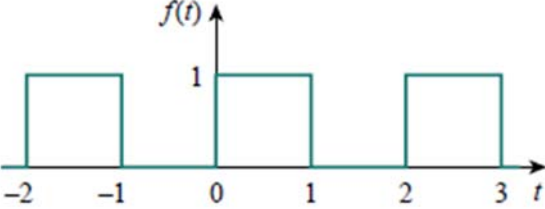
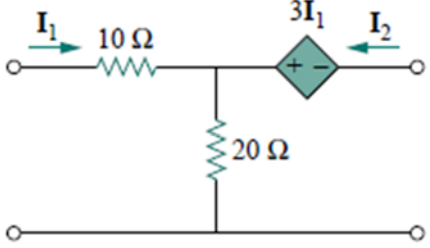
2. Attempt any three of the following: 10 x 3 = 30

Q no.	Question	Marks	CO
a.	Identify the node voltages in the circuit shown in Figure 3.  Figure 3	10	1



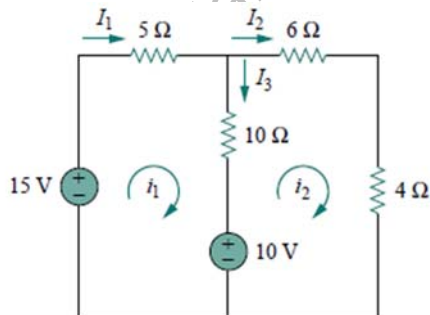
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<p>b.</p>	<p>Find the Norton equivalent circuit of the circuit in Figure 4.</p>  <p style="text-align: center;">Figure 4</p>	<p>10</p>	<p>2</p>
<p>c.</p>	<p>Describe the Fourier series of the waveform shown in Figure 5.</p>  <p style="text-align: center;">Figure 5</p>	<p>10</p>	<p>3</p>
<p>d.</p>	<p>Find the Laplace transform for the given signal.</p> $x(t) = e^{at}u(t) * e^{at}u(t)$ <p>where * represents the time convolution.</p>	<p>10</p>	<p>4</p>
<p>e.</p>	<p>Find the transmission parameters for the two-port network in Figure 6.</p>  <p style="text-align: center;">Figure 6</p>	<p>10</p>	<p>5</p>

SECTION C

3. Attempt any one part of the following:

<p>a.</p>	<p>For the circuit in Figure 7, find the branch currents I_1, I_2, and I_3 using mesh analysis.</p>  <p style="text-align: center;">Figure 7</p>	<p>10</p>	<p>1</p>
<p>b.</p>	<p>Describe the following terms with example.</p> <p>i. Junction Point</p>	<p>10</p>	<p>1</p>



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	ii. Node		
	iii. Branch		
	iv. Active and Passive Network		
	v. Linear and Non-Linear Network		

4. Attempt any one part of the following:

a.	Find the Thevenin equivalent circuit of the circuit shown in Figure 8, to the left of the terminals <i>a-b</i> .	10	2
<p>Figure 8</p>			
b.	Use the superposition theorem to find <i>v</i> in the circuit in Figure 9.	10	2
<p>Figure 9</p>			

5. Attempt any one part of the following:

a.	Find out the Fourier Transform for the Gate function (Rectangular pulse). Also draw the magnitude spectrum of the output.	10	3
b.	Demonstrate time convolution and time scaling property of Fourier transform. Also mention their significance.	10	3

6. Attempt any one part of the following:

a.	Find the Laplace transform for the given signal and calculate the ROC.	10	4
$x(t) = t^2 e^{-3t} u(t)$			
b.	Derive the expression for source free RLC circuit and discuss all three cases: Overdamped response, Underdamped response, and critical damped response.	10	4

7. Attempt any one part of the following:

a.	Illustrate the high pass filter. Derive the expression for transfer function of a high pass filter and plot the curve.	10	5
b.	Obtain the relation for Y and H parameters of a two-port network, when Z-parameter is given.	10	5