PAPER ID-311220

Subject Code: KEC303

Roll No: | | | | | | | | | | | | | |

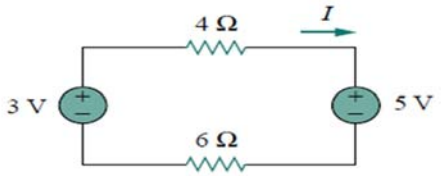
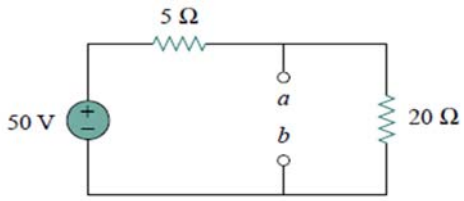
B TECH
(SEM-III) THEORY EXAMINATION 2020-21
NETWORK ANALYSIS AND SYNTHESIS

Time: 3 Hours ***Total Marks: 100***

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

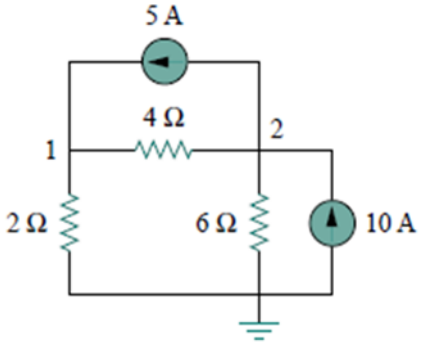
SECTION A

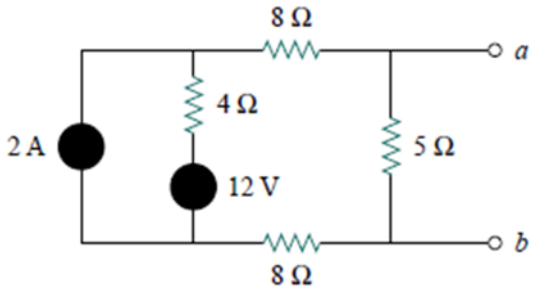
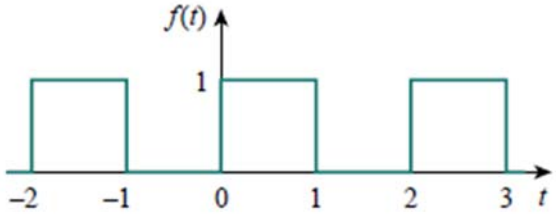
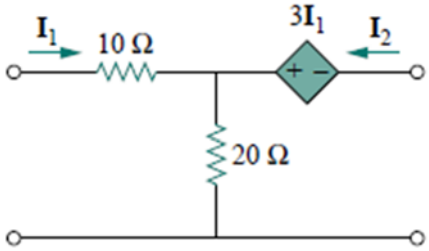
1. Attempt *all* questions in brief. **2 x 10 = 20**

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

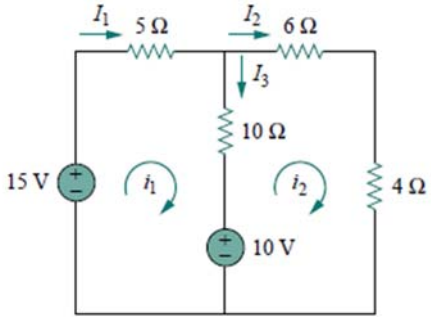
2. Attempt any *three* of the following: **10 x 3 = 30**

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

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

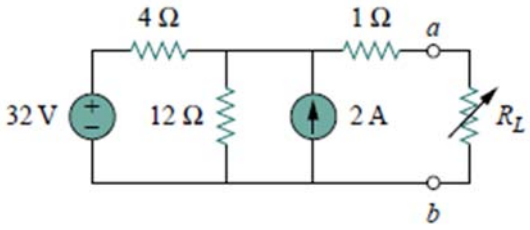
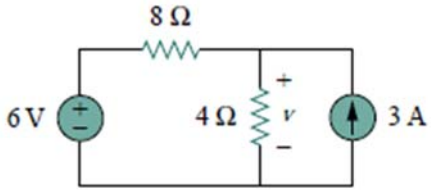
SECTION C

3. Attempt any *one* part of the following:

a.	For the circuit in Figure 7, find the branch currents I_1, I_2, and I_3 using mesh analysis.  Figure 7	10	1
b.	Describe the following terms with example. i. Junction Point	10	1

	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 *a-b*.  Figure 8	10	2
b.	Use the superposition theorem to find v in the circuit in Figure 9.  Figure 9	10	2

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. $$x(t) = t^2 e^{-3t} u(t)$$	10	4
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