PAPER ID-311574

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

BTECH
(SEM III) THEORY EXAMINATION 2023-24
NETWORK ANALYSIS AND SYNTHESIS

TIME: 3HRS **M.MARKS: 70**

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

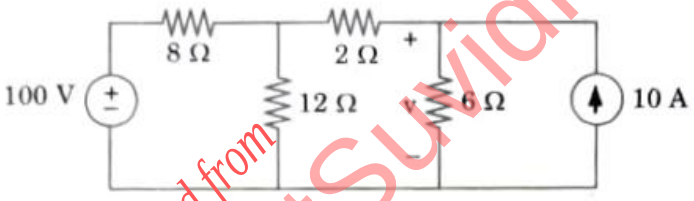
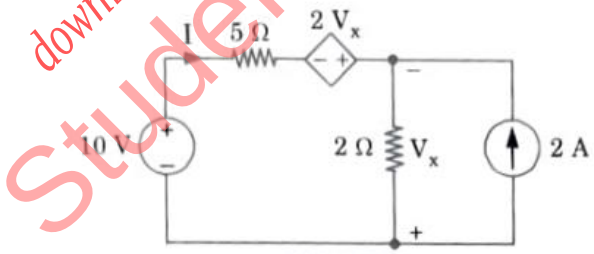
SECTION A

1. Attempt *all* questions in brief. **2 x 7 = 14**

Q no.	Question	Marks	CO
a.	What is node analysis, and how is it different from mesh analysis?	2	1
b.	Explain the significance of reactance in network analysis.	2	1
c.	State the superposition theorem.	2	2
d.	Define reciprocity theorem.	2	2
e.	Define singularity functions.	2	3
f.	Explain the concept of poles and zeros in network functions.	2	4
g.	What are the characteristics of band-reject filters?	2	5

SECTION B

2. Attempt any *three* of the following: **7 x 3 = 21**

Q no.	Question	Marks	CO
a.	For the circuit shown in Fig., determine the voltage using nodal analysis. 	7	1
b.	Calculate the current I shown in Fig. by using superposition theorem. 	7	2
c.	Explain step response of series RC circuit.	7	3
d.	Describe the concept of symmetry in two-port networks. Discuss how symmetry affects the port parameters and overall behavior of the network.	7	4
e.	State and prove convolution theorem.	7	5

SECTION C

3. Attempt any *one* part of the following: **7 x 1 = 7**

Q no.	Question	Marks	CO
a.	Write the mesh current equations in the circuit shown in Fig., and determine the currents.	7	1

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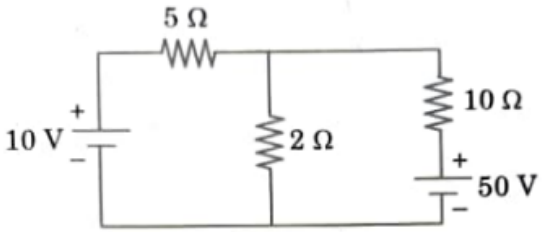
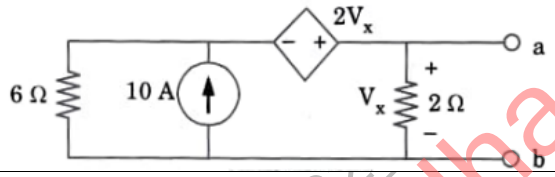
			
b.	What do you mean by "duality of graph of the network"? Also mention its utilities and drawbacks.	7	1

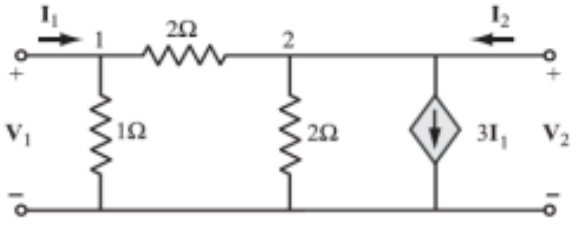
4. Attempt any *one* part of the following: 7 x 1 = 7

Q no.	Question	Marks	CO
a.	State reciprocity theorem in AC network.	7	2
b.	Find the Norton equivalent circuit of the circuit in Fig. at terminals a-b 	7	2

5. Attempt any *one* part of the following: 7 x 1 = 7

Q no.	Question	Marks	CO
a.	Write the Laplace transforms of: i. Unit impulse ii. Unit step ii. Unit ramp and iv. Parabolic functions.	7	3
b.	What is inverse Laplace transform? Calculate inverse Laplace Transform of e^{-5s} U(s).	7	3

6. Attempt any *one* part of the following: 7 x 1 = 7

Q no.	Question	Marks	CO
a.	Explain the concept of cascading two-port networks. Discuss any limitations or issues that may arise when cascading networks.	7	4
b.	Determine the y and z parameters for a two-port network. 	7	4

7. Attempt any *one* part of the following: 7 x 1 = 7

Q no.	Question	Marks	CO
a.	Explain quality factor. Also give relationship between bandwidth and quality factor of the circuit.	7	5
b.	Derive as expression for parallel resonance and mention its salient features.	7	5