

Roll No:

--	--	--	--	--	--	--	--	--	--	--	--

BTECH
(SEM III) THEORY EXAMINATION 2024-25
NETWORK ANALYSIS AND SYNTHESIS

TIME: 3 HRS

M.MARKS: 100

Note: Attempt all Sections. In case of any missing data; choose suitably.

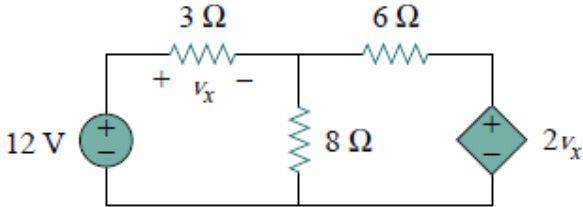
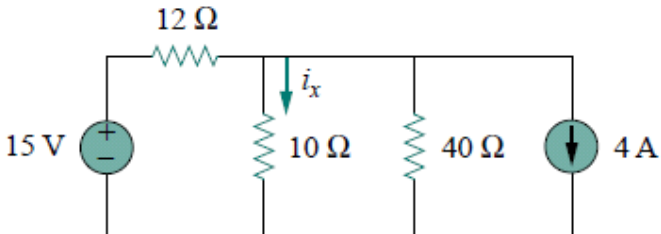
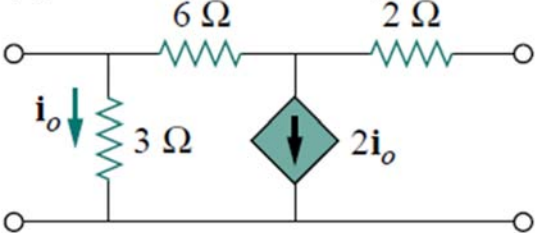
SECTION A

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

Q no.	Question	CO	Level
a.	Explain Kirchoff's voltage law.	1	K2
b.	Describe the term- Node, Junction and Branch	1	K2
c.	State Superposition theorem.	2	K1
d.	State Tellegen's theorem.	2	K1
e.	Explain steady state response and transient response.	3	K2
f.	State Dirichlet's conditions for a function to be expanded as a Fourier series.	3	K1
g.	Explain singularity function with suitable example.	4	K2
h.	Define initial and final value theorem.	4	K1
i.	Define transfer function of a network.	5	K1
j.	Illustrate the impedance parameter of a two-port network.	5	K3

SECTION B

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

a.	For the given circuit, apply source transformation to find V_x . 	1	K3
b.	Calculate i_x in the below circuit using superposition theorem. 	2	K3
c.	Explain the time scaling and time reversal property of Fourier transform.	3	K2
d.	Determine the Laplace transform of – (i) Unit impulse function (ii) Unit Step function (iii) unit ramp function	4	K3
e.	Determine the y parameters for the following circuit. 	5	K3

Roll No:

--	--	--	--	--	--	--	--	--	--

BTECH
(SEM III) THEORY EXAMINATION 2024-25
NETWORK ANALYSIS AND SYNTHESIS

TIME: 3 HRS

M.MARKS: 100

SECTION C

3. Attempt any one part of the following: 10 x 1 = 10

a.	Calculate v and i in the circuit by applying node analysis.	1	K3
b.	Use mesh analysis to determine i_o in the following circuit.	1	K3

4. Attempt any one part of the following: 10 x 1 = 10

a.	Find the Norton equivalent circuit of the following circuit.	2	K3
b.	Determine the value of R_L for maximum power transfer in the circuit. Also determine the maximum power delivered to load R_L .	2	K3

5. Attempt any one part of the following: 10 x 1 = 10

a.	Determine the Fourier series of the square wave shown in below figure. Also plot the amplitude and phase spectra.	3	K3

Roll No:

--	--	--	--	--	--	--	--	--	--	--	--

BTECH
(SEM III) THEORY EXAMINATION 2024-25
NETWORK ANALYSIS AND SYNTHESIS

TIME: 3 HRS

M.MARKS: 100

b.	Derive the Fourier transform of a single rectangular pulse of width τ and height A , shown in below figure.	3	K3

6. Attempt any one part of the following: 10 x 1 = 10

a.	Derive the step response of series RC circuit	4	K3
b.	The switch in following figure has been in position A for a long time. At $t = 0$, the switch moves to B . Determine $v(t)$ for $t > 0$.	4	K3

7. Attempt any one part of the following: 10 x 1 = 10

a.	Illustrate the resonance phenomenon in a parallel RLC circuit in detail.	5	K4
b.	Explain band stop filter and plot its frequency response curve.	5	K4