

B.TECH
(SEM-III) THEORY EXAMINATION 2019-20
NETWORK ANALYSIS & SYNTHESIS

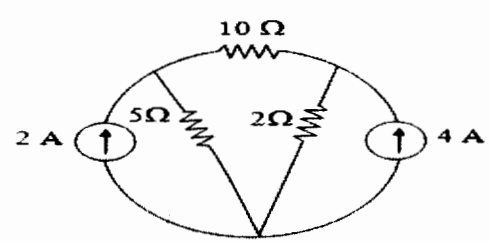
Time: 3 Hours

Total Marks: 100

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

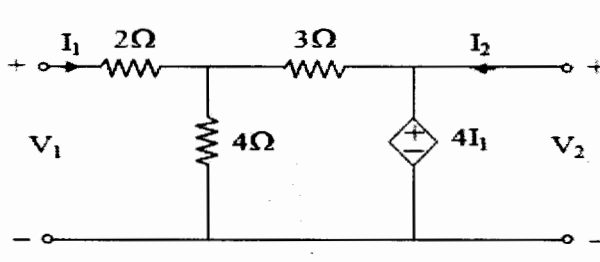
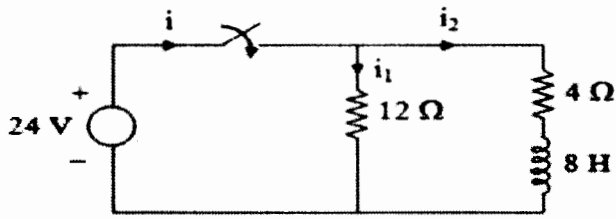
SECTION A

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

Qno.	Question	Marks
a.	Explain the concept of Complex Frequency.	2
b.	Define "Transfer function" of a network.	2
c.	State two properties of the R-C driving point Impedance function.	2
d.	Find the Laplace transform of $\underline{x}(t) = e^{-at} \sin \omega_0 t$	2
e.	Find Current in 10ohm resistor as shown in fig: 	2
f.	Draw the Dual Circuit of Parallel RLC circuit with Current Source.	2
g.	What are the Dependent & Independent terms in the Z- parameter?	2
h.	State Compensation Theorem.	2
i.	Give examples of Active & Passive elements in a Network.	2
j.	Draw the Frequency Resonance Curve of Parallel Resonance R-L-C Circuit.	2

SECTION B

2. Attempt any three of the following:

Qno.	Question	Marks
a.	Find Y and Z parameters of the networks as shown in fig 	10
b.	Explain Low pass Filter, High Pass Filter, Band Pass Filter, Band Reject Filter.	10
c.	Find the current i_2 for $t > 0$ in the circuit shown below as shown in fig 	10

d.	Explain Maximum Power Transfer Theorem related to AC Circuits.	10
e.	Calculate the inverse Laplace Transform $h(t)$ of given transfer function	10
$H(s) = \frac{s^2 + 5s - 9}{(s + 1)(s^2 - 2s + 10)}$		

SECTION C

3. Attempt any one part of the following: (10 × 1 = 10)

Qno.	Question	Marks
a.	A Series R-L circuit has constant voltage V applied at t=0. At what time does $V_R = V_L$ happens.	10
b.	A periodic waveform whose one period is shown in fig. Determine the trigonometric Fourier series coefficients.	10

4. Attempt any one part of the following: (10 × 1 = 10)

Qno.	Question	Marks
a.	Calculate the Inverse Laplace Transform using Convolution Integral.	10
$F(s) = \frac{1}{(s + a)(s + b)}$		
b.	For the Continuous time periodic signal	10
$x(t) = 1 + \cos \frac{2\pi}{3} t + 4 \cos \frac{5\pi}{3} t$		
Determine the Fundamental frequency ω_0 & exponential Fourier series coefficients.		

5. Attempt any one part of the following: (10 × 1 = 10)

Qno.	Question	Marks
a.	For the given circuit in fig, the value of given voltage V_0 across 4Ω resistance.	10

b.	Calculate the Fourier transform of $\cos \omega_0 t$. Also Sketch its spectrum.	10
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6. Attempt any one part of the following: (10 × 1 = 10)

Qno.	Question	Marks
a.	Calculate the Short Circuit Admittance Parameter of the given circuit in fig. <div style="text-align: center; margin: 10px 0;"> </div>	10
b.	Prove that for a symmetric network $Z_{11} = Z_{22}$, where Z_{11} & Z_{22} are Z-parameters.	10

7. Attempt any one part of the following: (10 × 1 = 10)

Qno.	Question	Marks
a.	Calculate the impedance $Z(s)$, if Driving point impedance $Z(s)$, of a network has pole-zero location as shown in fig. Also $Z(0) = 3$ <div style="text-align: center; margin: 10px 0;"> </div>	10
b.	A Practical DC Current source provides 20kW to a 50 load & 20kW to a 200 load. Calculate the maximum power that can draw from it.	10