



Paper id: 252567

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**BTECH**  
**(SEM IV) THEORY EXAMINATION 2024-25**  
**NETWORKS ANALYSIS & SYNTHESIS**

TIME: 3 HRS

M.MARKS: 70

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

**SECTION A**

**1. Attempt all questions in brief.**

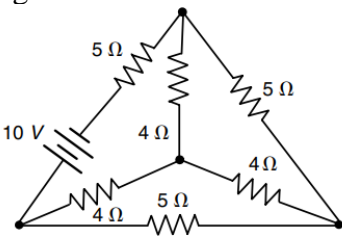
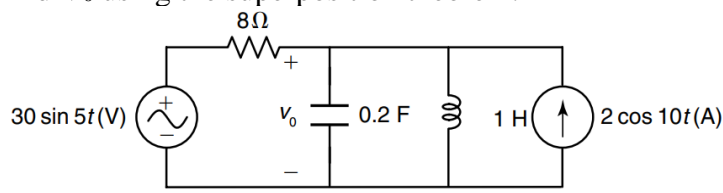
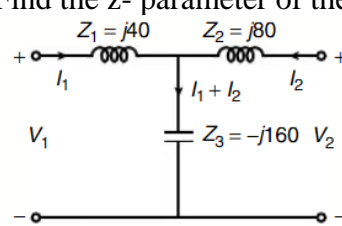
**02 x 7 = 14**

Q no.	Question	CO	Level
a.	Define Link and co-tree.	1	K2
b.	State reciprocity theorem.	2	K2
c.	Differentiate between natural response and force response.	3	K2
d.	Derive condition for maximum power transfer.	2	K2
e.	State the compensation theorem.	2	K2
f.	Discuss the properties of RC driving point function.	4	K2
g.	Differentiate between active filter and passive filter.	5	K2

**SECTION B**

**2. Attempt any three of the following:**

**07 x 3 = 21**

Q no.	Question	CO	Level
a.	Write the incidence matrix and cut-set matrix for the network shown in figure. 	1	K2
b.	Find $V_0$ using the superposition theorem. 	2	K3
c.	A constant voltage of 100V is applied at $t = 0$ to a RC series circuit having $R = 5M\Omega$ , $C = 20\mu F$ . Assuming no initial charge to the capacitor, find current $i$ and the voltage across R and C.	3	K3
d.	Find the z- parameter of the given network shown in figure. 	4	K3
e.	Design a constant K type low pass filter of 2000Hz and a zero-frequency characteristics impedance of $200\Omega$ . Draw T and $\pi$ section of the filter.	5	K4



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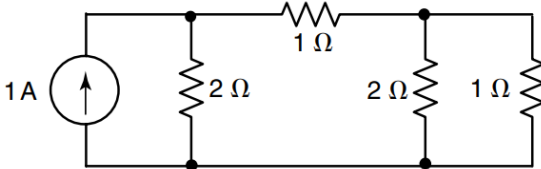
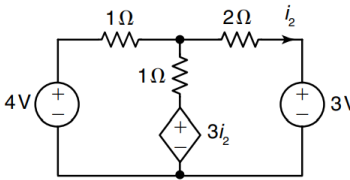
TIME: 3 HRS

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**SECTION C**

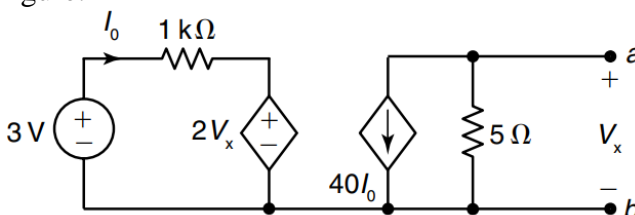
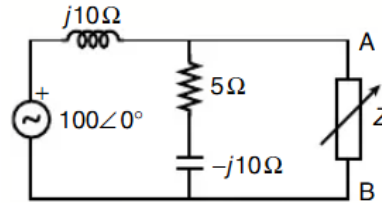
**3. Attempt any one part of the following:**

**07 x 1 = 07**

Q no.	Question	CO	Level
a.	For the network shown in figure, give fundamental cut-set matrix and hence find KCL equation. 	1	K3
b.	The network shown in figure using loop method of analysis, determine current in all the branches indicating their directions, use graph theory method. 	1	K3

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

**07 x 1 = 07**

Q no.	Question	CO	Level
a.	Find the Thevenin's equivalent between terminal a and b of the circuit in figure. 	2	K3
b.	Determine the value of load impedance ZL for which maximum power will be delivered to this load from the source in the circuit shown in figure. 	2	K3

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

**07 x 1 = 07**

Q no.	Question	CO	Level
a.	In given circuit shown, switch is closed at t=0. Find the current in the circuit at any time t using Laplace transform.	3	K2



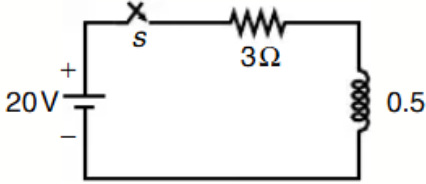
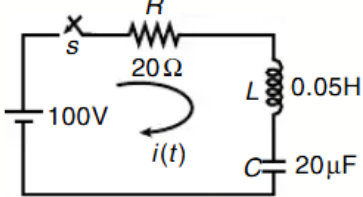
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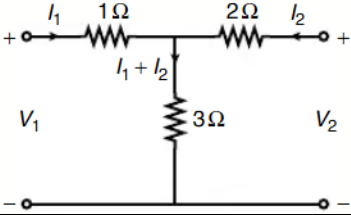
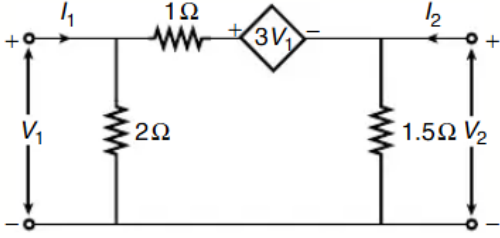
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b.	<p>The circuit shown in figure consist of resistance, inductance and capacitance in series with 100V constant source. When the switch is closed t=0, find the transient current.</p> 	3	K3

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

**07 x 1 = 07**

Q no.	Question	CO	Level
a.	<p>Find transmission parameter of network in figure. Further prove that <math>AD - BC = 1</math></p> 	4	K3
b.	<p>Determine the Y- Parameter for the network shown in figure.</p> 	4	K3

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

**07 x 1 = 07**

Q no.	Question	CO	Level
a.	<p>Test whether the following polynomial is Hurwitz or not.</p> $F(s) = \frac{2s^4 + 6s^3 + 11s^2 + 10s + 5}{s^4 + 5s^3 + 8s^2 + 9s + 6}$	5	K4
b.	<p>Find Cauer form -I and Cauer form -II of the following</p> $Z(s) = \frac{s(s^2 + 3)(s^2 + 5)}{(s^2 + 2)(s^2 + 4)}$	5	K4