



Paper id: 252567

Roll No:

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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.

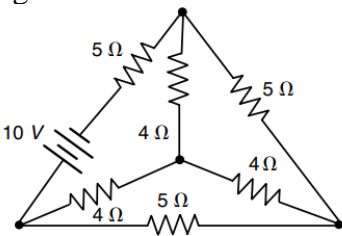
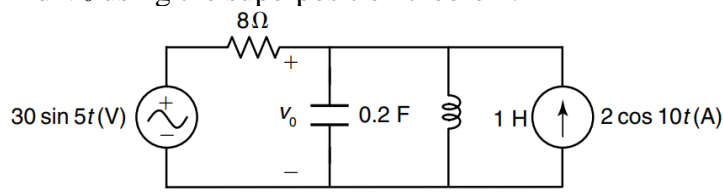
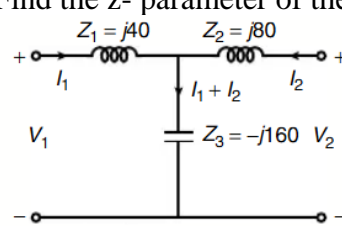
02 x 7 = 14

| 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 200Ω . Draw T and π section of the filter. | 5 | K4 |



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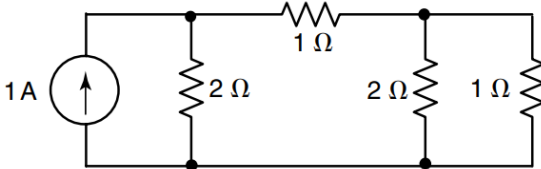
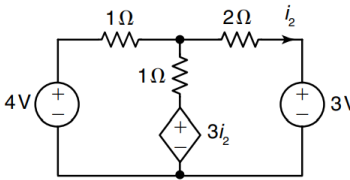
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SECTION C

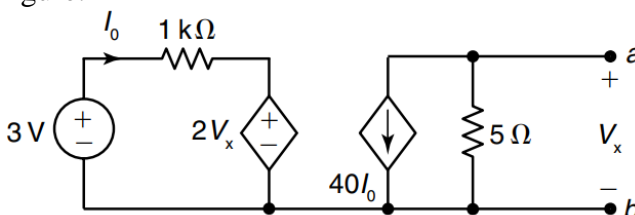
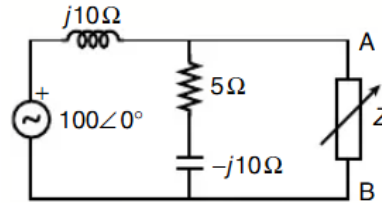
3. Attempt any one part of the following:

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 |



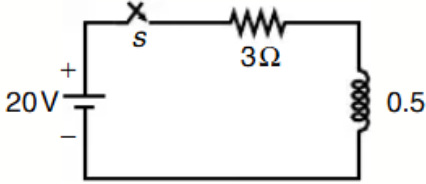
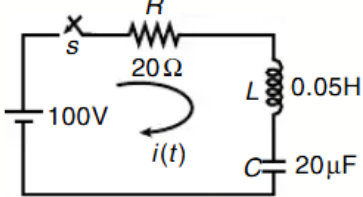
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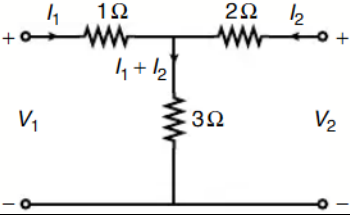
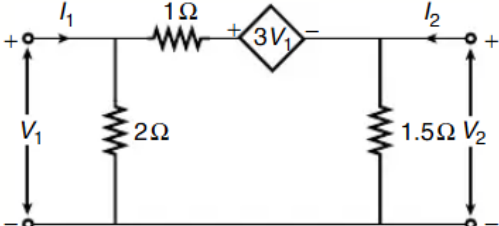
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|----|--|---|----|
| |  | | |
| b. | <p>The circuit shown in figure consist of resistance, inductance and capacitance in series with 100V constant source. When the switch is closed t=0, find the transient current.</p>  | 3 | K3 |

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 $AD - BC = 1$</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 |