



PAPER ID-411306

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Subject Code: KEE403

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BTECH
(SEM IV) THEORY EXAMINATION 2023-24
NETWORKS ANALYSIS & SYNTHESIS

TIME: 3 HRS**M.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**

Q no.	Question	Marks	CO
a.	What is a basic loop and a basic cut set in graph theory?	02	1
b.	Describe the concept of duality in graph theory.	02	1
c.	State and explain the Superposition theorem.	02	2
d.	Describe the maximum power transfer theorem.	02	2
e.	What is the role of initial conditions in transient circuit analysis?	02	3
f.	Explain the time constant for RL and RC network.	02	3
g.	Differentiate between driving point and transfer functions.	02	4
h.	Describe the Z parameters of a two-port network.	02	4
i.	What are the properties of LC driving point functions?	02	5
j.	Describe the fundamental differences between passive and active filters.	02	5

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

a.	For the graph shown in Fig., write the incidence matrix, tieset matrix and f-cutset matrix	10	1
b.	Find Norton's equivalent network to the terminal A-B in Fig	10	2



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c.	In the network of Fig., the switch is open for a long time and it closes at $t = 0$. Find $i(t)$.	10	3
d.	Examine the symmetry and reciprocity conditions in the given circuit diagram. Also find out Y-parameters.	10	4
e.	Examine whether the given immittance functions are Positive Real Function (PRF) or not. $F(s) = (s+2)/(s+1)$, (b) $F(s) = (s^2+6s+8)/(s+1)(s+3)$	10	5

SECTION C

3. Attempt any one part of the following:

1 x 10 = 10

a.	Illustrate the use of tie set matrix to find the current i in the given circuit-	10	1
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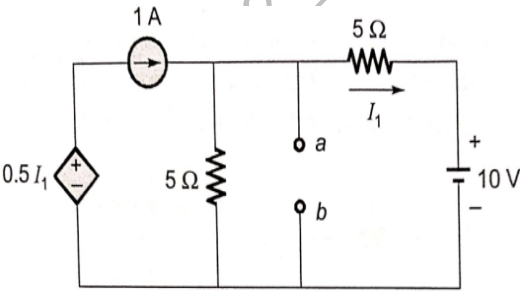
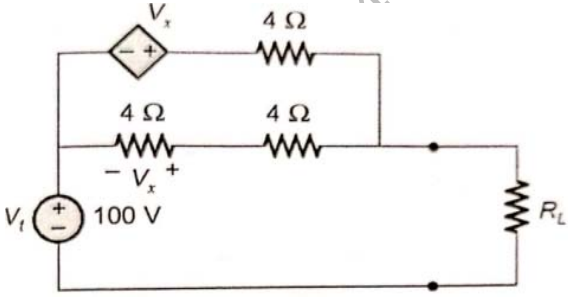
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b.	The reduced incidence matrix of an oriented graph is $A = \begin{bmatrix} 0 & -1 & 1 & 0 & 0 \\ 0 & 0 & -1 & -1 & -1 \\ -1 & 0 & 0 & 0 & 1 \end{bmatrix}$ (a) Draw the graph (b) How many trees are possible for this graph? (c) Write the Tie set and Cut set matrices	10	1
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4. Attempt any *one* part of the following:

1 x 10 = 10

a.	Evaluate the Thevenin's equivalent voltage (V_{th}) and Thevenin's equivalent resistance (R_{th}) across ab terminals- 	10	2
b.	Calculate the value of load current in $R_L = 2 \text{ ohm}$ using Thevenin's and Norton's theorem. 	10	2

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

1 x 10 = 10

a.	Find the Laplace transform (LT) of unit impulse signal, $e^{-at} u(t)$, unit ramp, and unit parabolic functions.	10	3
b.	In the network of Fig., the switch is closed at $t = 0$. Obtain the expression for current $i(t)$ for $t = 0$	10	3



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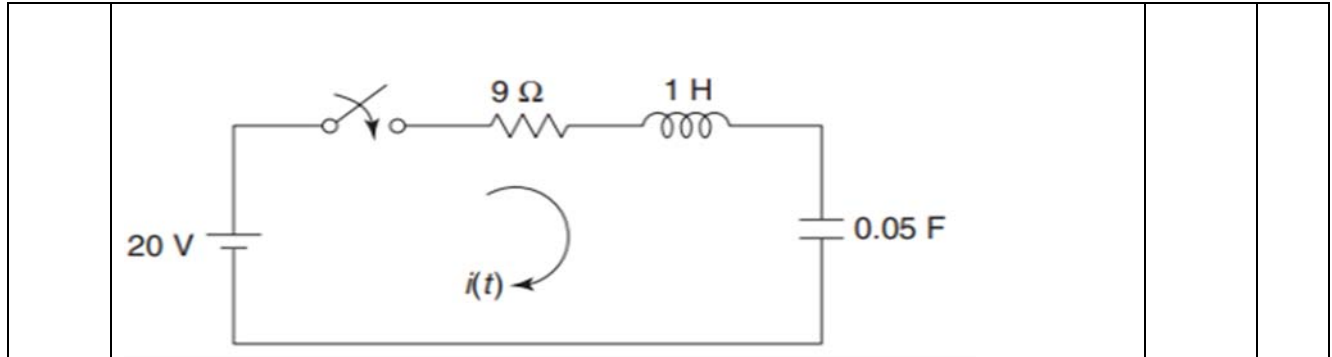
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6. Attempt any *one* part of the following:

1 x 10 = 10

a.	Explain the cascade and series interconnection among the network and describe the symmetricity and reciprocity for the resultant network.	10	4
b.	Find Y-parameters, h-parameter and Z-parameter and ABCD parameter for the network given below	10	4

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

1 x 10 = 10

a.	Indicate which of the following functions are either R-C, R-L or L-C impedance functions and give reason for your answer.	10	5
	(a) $Z(s) = \frac{s^3 + 2s}{s^4 + 4s^2 + 3}$ (b) $Z(s) = \frac{s^2 + 6s + 8}{s^2 + 4s + 3}$ (c) $Z(s) = \frac{s^2 + 4s + 3}{s^2 + 6s + 8}$ (d) $Z(s) = \frac{s^2 + 5s + 6}{s^2 + s}$ (e) $Z(s) = \frac{s^4 + 5s^2 + 6}{s^3 + s}$		
b.	Derive the relation of cut off frequency, L and C for constant K type high pass filter.	10	5