

Printed Pages – 8

Roll No.

B028314(028)

**B. Tech. (Third Semester) Examination,
Nov.-Dec. 2021**

(AICTE Scheme)

(Electronics and Telecommunicaton Engg. Branch)

NETWORK THEORY

Time Allowed : Three hours

Maximum Marks : 100

Minimum Pass Marks : 40

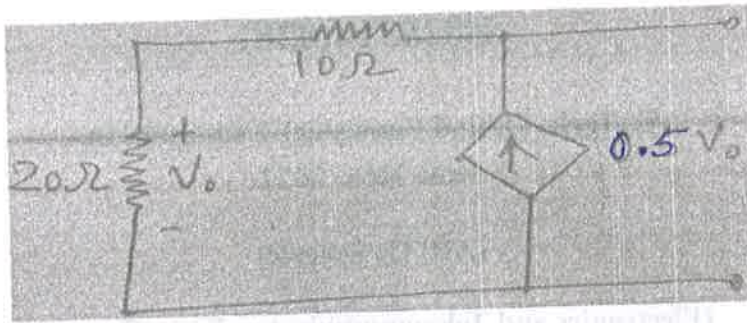
Note : Attempt all questions. Part (a) of each question is compulsory and carries 4 marks. Solve any two parts from part (b), (c) & (d) and carries 8 marks each.

Unit-I

1. (a) Write down the condition for maximum power transfer.

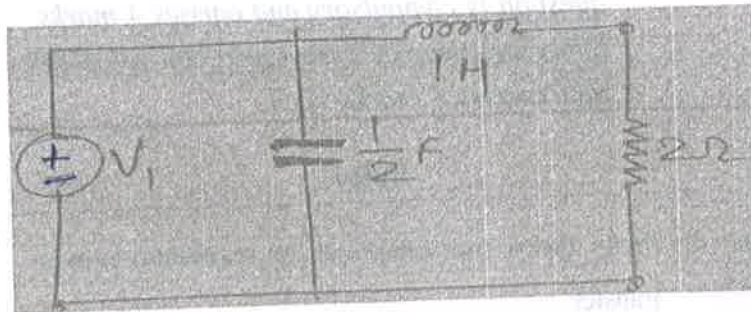
[2]

- (b) Find out the Thevenin's equivalent circuit for the given network :



- (c) The network shown in below figure is operated in the sinusoidal steady state, with the element values given and $V = 100 \cos 2t$. Determine :

- (i) The complex power delivered by the source.
- (ii) The effective current in each of the passive elements.



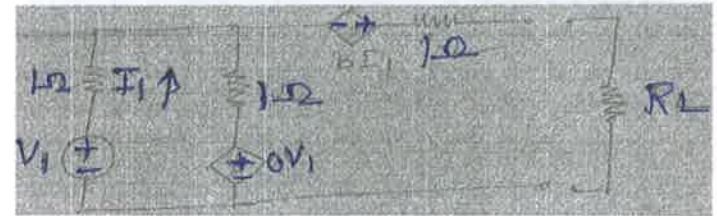
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[3]

- (d) For the given network shown that :

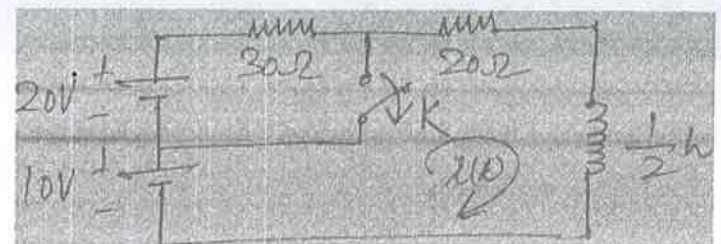
$$V_{\theta} = \frac{V_1}{2} [1 + a - ab] \text{ and } z_{\theta} = \frac{3-b}{2}$$

where V_{θ} = Thevenin's volt, z_{θ} = Thevenin's resistance.



Unit-II

2. (a) What is the behaviour of inductor and capacitor under transient and steady state condition?
- (b) Derive and explain the step response of RC circuit.
- (c) The network of the figure reaches a steady state with the switch K open. At $t = 0$ the switch K is closed. Find $i(t)$ for numerical values given and sketch the current waveform. Also indicate the value of time constant.

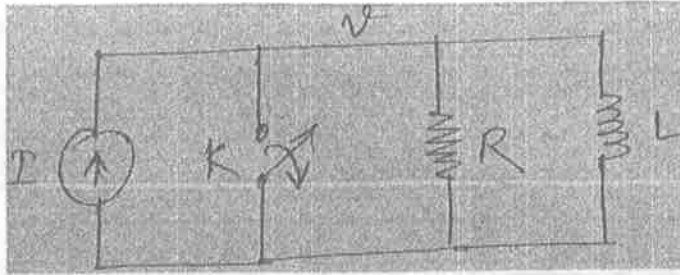


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[4]

- (d) K is opened at $t = 0$, solve for V , dv/dt and d^2v/dt^2 at $0+$, If $I = 1 \text{ A}$, $R = 100 \Omega$, $L = 1 \text{ H}$.



Unit-III

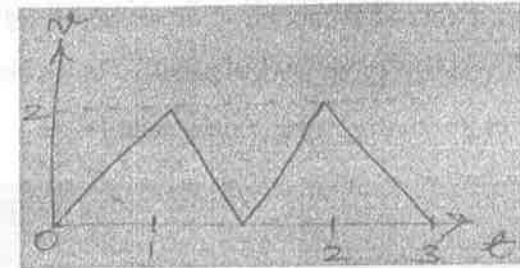
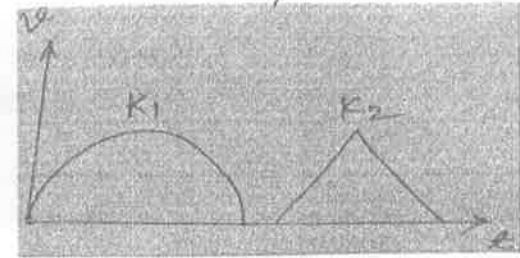
3. (a) Define initial and final value theorem.
 (b) In the series RLC circuit shown, the applied voltage is $V(t) = \sin t$ for $t > 0$. For the elements values specified, find $i(t)$. The switch is closed at $t = 0$.



- (c) Synthesize the following waveforms and find out the Laplace transform.

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- (d) State and prove Convolution Theorem. How does it useful for analysis of electrical network?

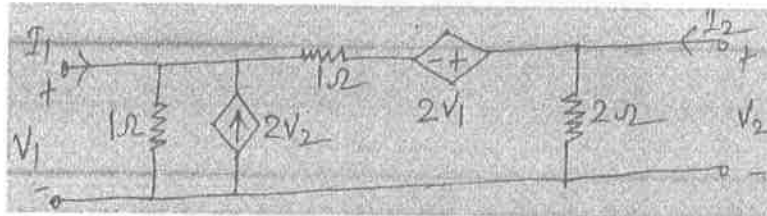
Unit-IV

4. (a) Give the equations of h parameter.
 (b) The figure shown contains both a dependent current and dependent voltage source. For the element values given, determine the Y and Z parameters :

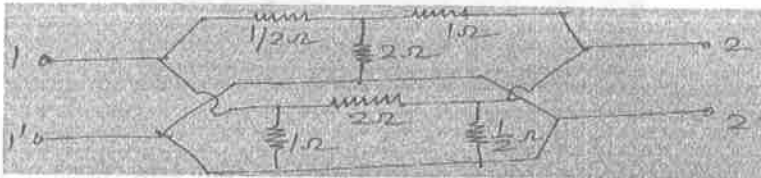
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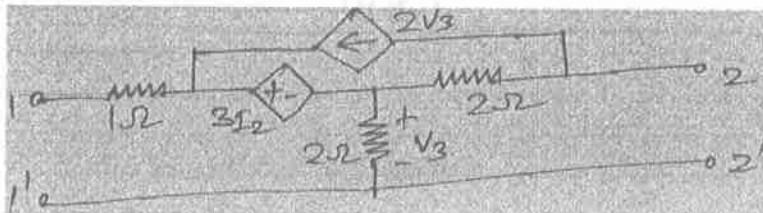
[6]



(c) The network shown below consists of a resistive T and a resistive Π network in parallel. For the element values given, determine Y parameters :



(d) Determine Z and Y parameter for the given circuit :



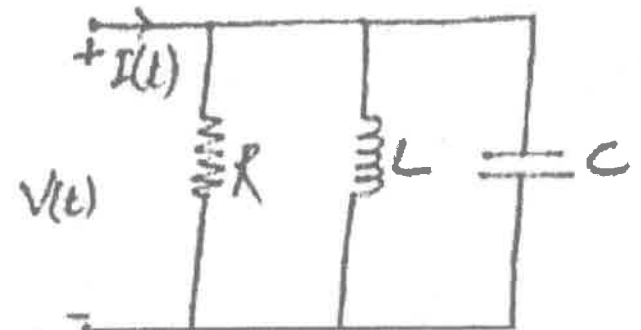
Unit-V

5. (a) What is a Sinusoid?

[7]

(b) Explain the basic principle behind sinusoidal steady state analysis. Also give the steps to be followed to find the steady state value of $i(t)$ in R-L circuit for a given excitation of $V = V \cos \omega t$, where V is the real time constant.

(c) For the given network find current.



Find : $I(t) = ?$

Given : $R = 1/3 \Omega$

$L = 1/4 \text{ H}$

$C = 3 \text{ F}$

$V(t) = \sin 2t$

[8]

(d) Draw the phasor diagram of RL, RC and RLC circuit.

