

Printed Pages – 8

Roll No.

328354(28)

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

(New Scheme)

(Electronics & Telecommunication Engg. Branch)

NETWORK ANALYSIS & SYNTHESIS

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Part (a) of every question is compulsory and carries 2 marks. Attempt any two from (b), (c) & (d) and carry 7 marks. Assume suitable data if needed.

Unit-I

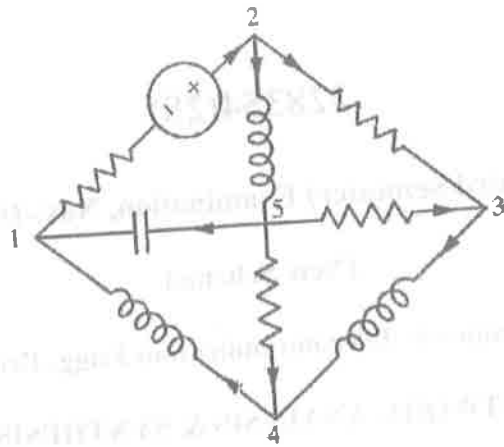
1. (a) Define tree and co-tree.

2

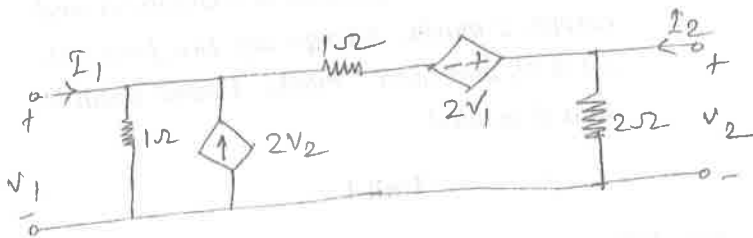
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- (b) For the given network, obtain the corresponding incidence matrix : 7



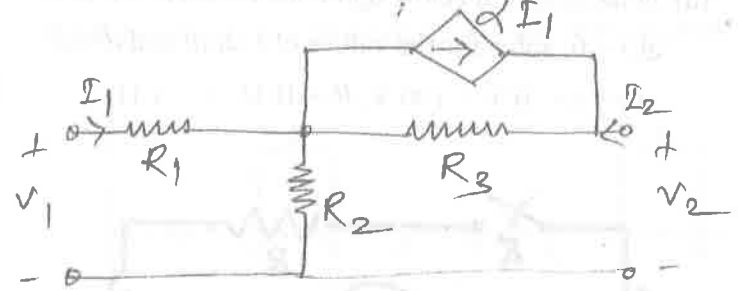
- (c) The figure shown contains both a dependent current and dependent voltage source. For the element values given, determine the Y and Z parameters : 7



- (d) Determine h parameters for the given network : 7

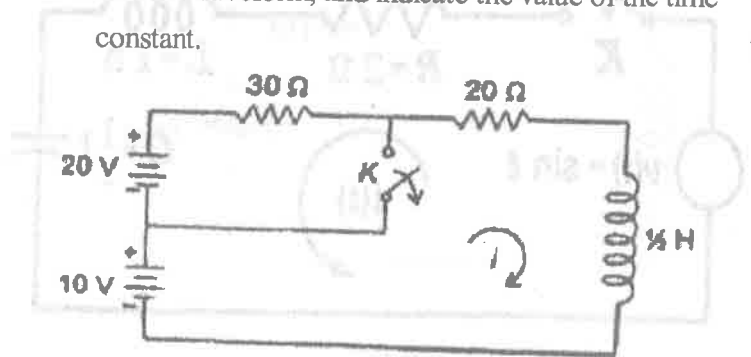
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[3]



Unit-II

2. (a) What do you understand by transient and steady state response? 2
- (b) Derive the expression for unit step response of $R - L$ circuit and sketch the waveform of current $i(t)$. 7
- (c) The network of the figure reaches a steady state with the switch K open. At $t = 0$, switch K is closed. Find $i(t)$ for the numerical values given, sketch the current waveform, and indicate the value of the time constant. 7

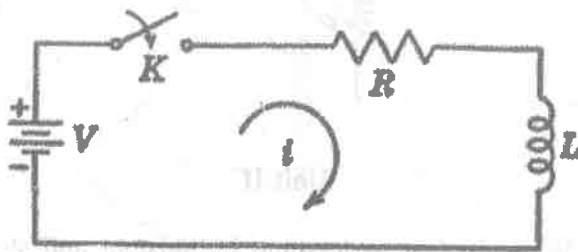


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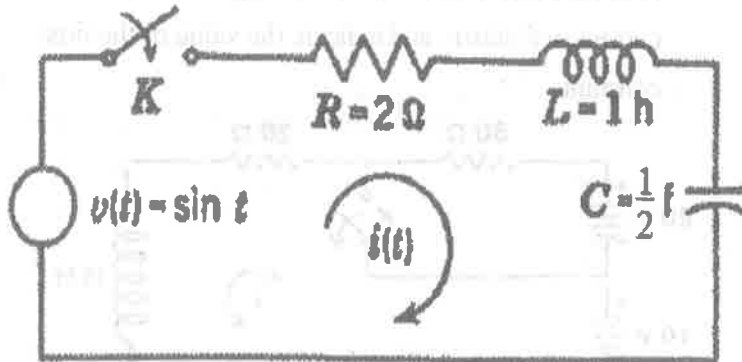
[4]

- (d) In the circuit of below figure the switch K is closed at $t = 0$, solve for the values of i , di/dt and d^2i/dt^2 at $t = 0+$. If $V = 100$ V, $R = 10\Omega$, $L = 1$ H. 7



Unit-III

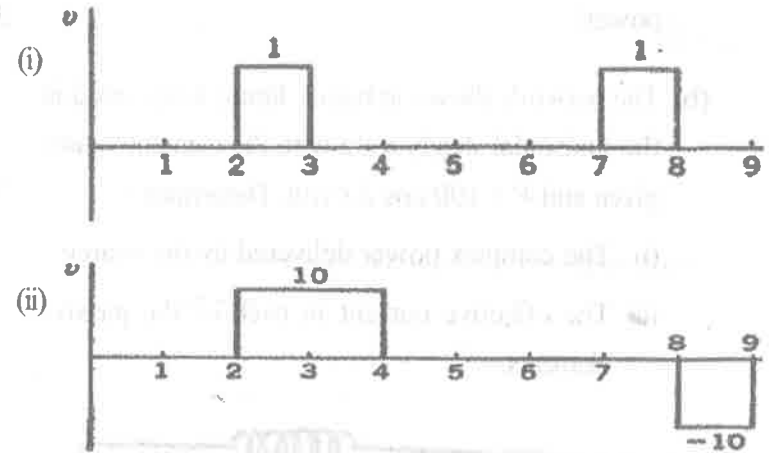
3. (a) What is initial and final value theorem? 2
 (b) In the series R-L-C circuit shown, the applied voltage is $v(t) = \sin t$ for $t > 0$. For the element values given, find $i(t)$, if the switch K is closed at $t = 0$. 7



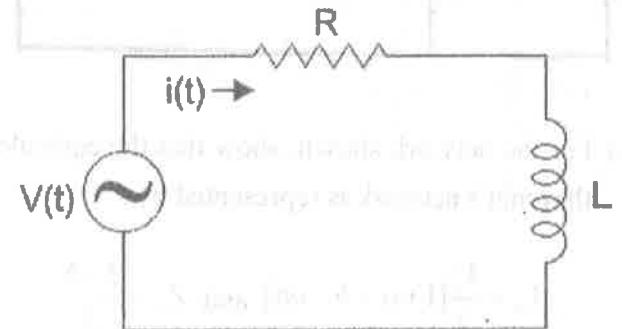
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[5]

- (c) Write an equation for the non recurring waveform shown in below figures in term of unit step functions : 7



- (d) Explain the steps to be followed to find the steady state value of the current $i(t)$ in a given RL circuit if $V(t) = V \cos \omega t$, where V is positive real constant. 7



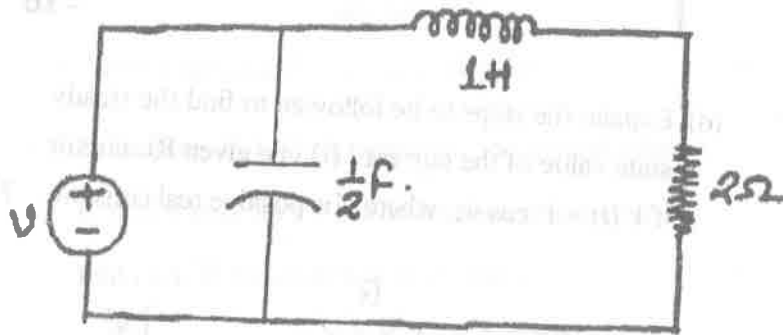
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Unit-IV

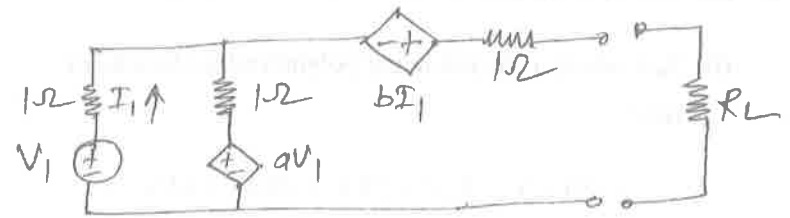
4. (a) What is the condition for transfer of maximum power? 2
- (b) The network shown in below figure is operated in the sinusoidal steady state with the element values given and $V = 100 \cos 2t$ volt. Determine : 7
- (i) The complex power delivered by the source.
 - (ii) The effective current in each of the passive elements.



- (c) For the network shown, show that the equivalent thevenin's network is represented by : 7

$$V_0 = \frac{V_1}{2} [1 + a + b - ab] \text{ and } Z_0 = \frac{3 - b}{2}$$

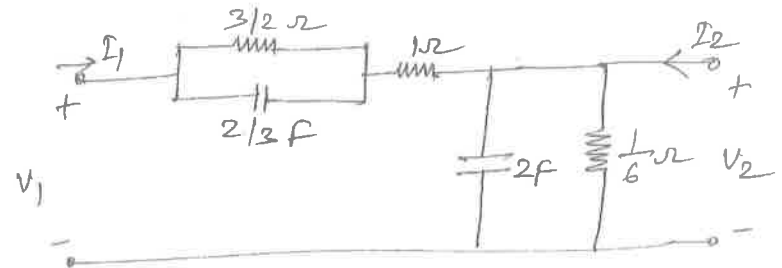
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- (d) For the given network shown in below figure show that :

$$Y_{12} = \frac{K(S+1)}{(S+2)(S+4)}$$

And determine the value and sign of K. 7



Unit-V

5. (a) What are the conditions for a function to be P.R.F.? . 2

(b) Test whether the following polynomial is Hurwitz or not? 7

$$P(S) = S^5 + 8S^4 + 24S^3 + 28S^2 + 23S + 6$$

(c) Synthesis the network in Foster form I and II. 7

$$Z(S) = \frac{(S^2 + 1)(S^2 + 9)}{S(S^2 + 4)}$$

(d) Synthesize the network in Cauer form I and II. 7

$$Z(S) = \frac{S^4 + 10S^2 + 9}{S^3 + 4S}$$