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328354(28)

B. E. (Third Semester) Examination, April-May 2021

(New Scheme)

(Et & T 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.*

Unit-I

1. (a) Give the equations of *h* parameter. 2

(b) Find out the cut set and tie set matrics for the given graph. 7

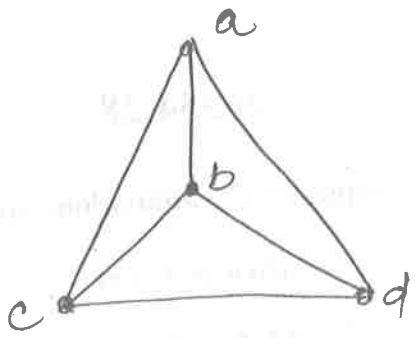

Fig. 1 (b)

(c) Find out the y and z parameters for given electrical network. 7

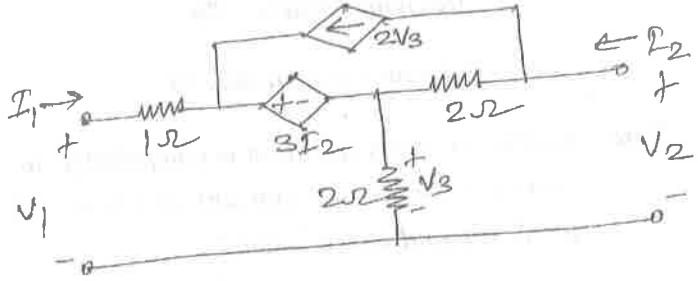

Fig. 1 (c)

(d) For the given network, determine the value of V_1 and V_2 .

If

$$Y_{11} = Y_{22} = 2\Omega^{-1}$$

$$Y_{21} = 2\Omega^{-1}, \quad Y_{12} = 1\Omega^{-1}$$

and the current source I_a = 1 Amp. 7

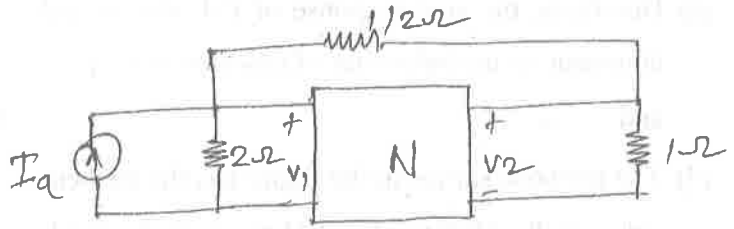

Fig. 1 (d)

Unit-II

2. (a) How does inductor and capacitor behave at $t = 0$ and $t = \infty$. 2

(b) The network shown below is in the steady state with the switch K closed. At $t = 0$ the switch is opened. Determine the voltage across the switch V_K and $\frac{dV_k}{dt}$ at $t = 0^+$. 7

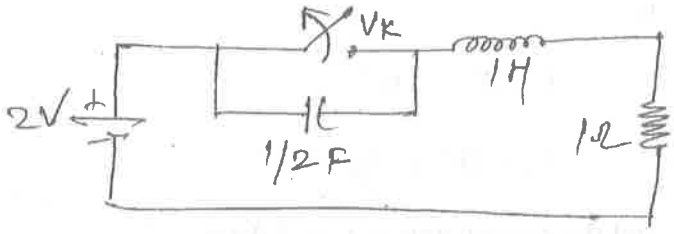

Fig. 2 (b)

(c) Determine the step response of R-L circuit and comment on the behaviour of inductor at $t = 0$ and $t = \infty$. 7

(d) The network shown in the figure has the element value as $R = 1000\,\Omega$, $L = 1$ H, $C = 0{\cdot}1\,\mu$F and V = 100 volt. The switch K is changed from position a to b at $t = 0$. At $t = 0^+$, determine $i, \frac{di}{dt}$ & $\frac{d^2i}{dt^2}$. 7

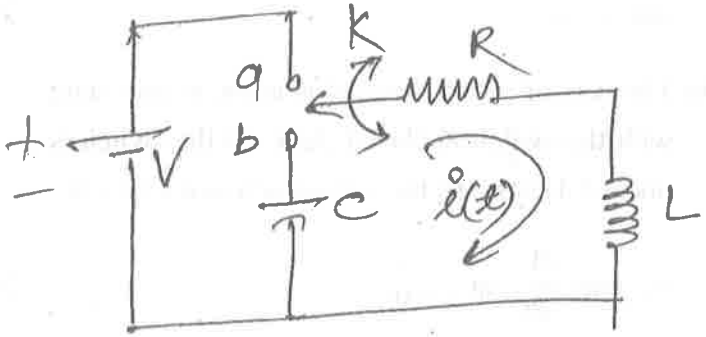

Fig. 2 (d)

Unit-III

3. (a) What is initial and final value theorem? 2

(b) Determine the equations of given waveforms. 7

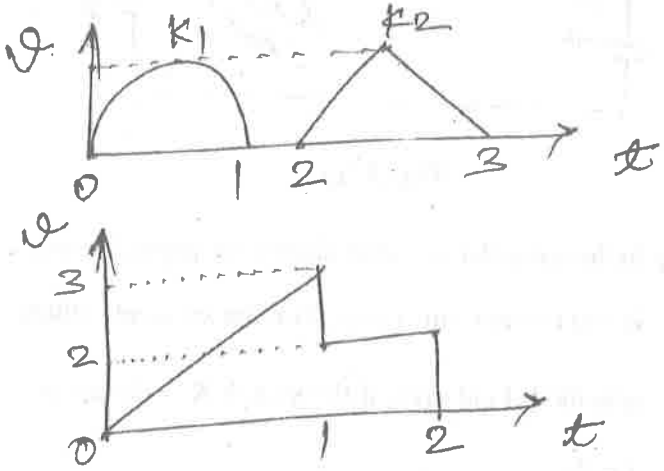

Fig. 3 (b)

(c) The network of the figure reaches a sheady state with the switch K open. At $t = 0$, switch K is closed. Find $i(t)$ for numerical values given, sketch the current waveform and indicate the value of the time constant. 7

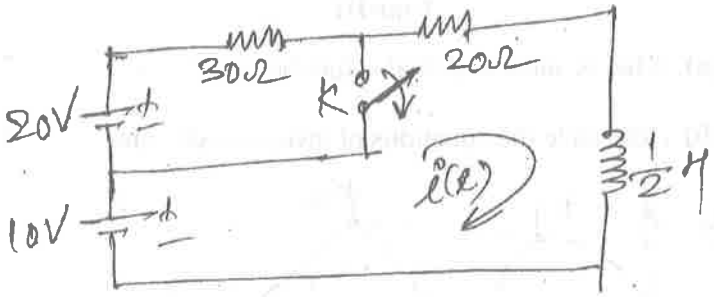

Fig. 3 (c)

(d) In the series R-L-C circuit shown, the applied voltage is $v(t) = \sin t$ for $t = 0$. For the element values specified. Find $i(t)$, if the switch K is closed at $t = 0$. 7

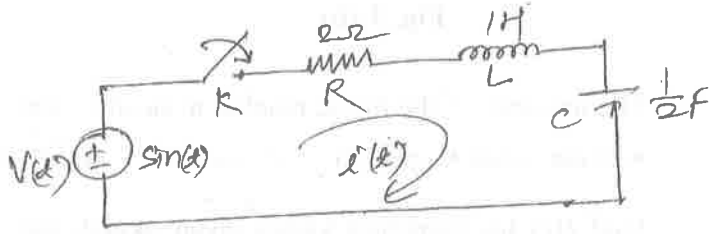

Fig. 3 (d)

Unit-IV

4. (a) Give the condition for maximum power transfer across load. 2

(b) For the network shown below, determine the Thevenin's equivalent network for the load R_L. 7

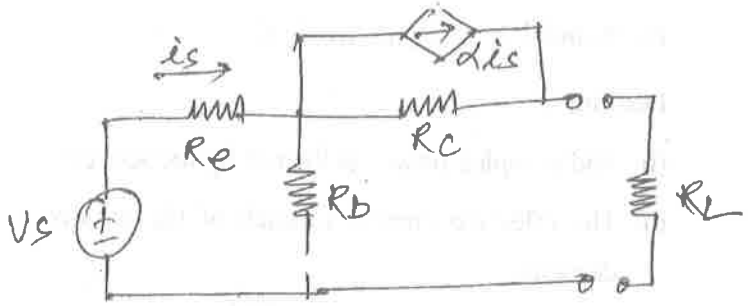

Fig. 4 (b)

(c) For the given network shown in below figure, show that : 7

$$Y_{12} = \frac{k(s+1)}{(s+2)(s+4)}$$

and determine the value of sign of K.

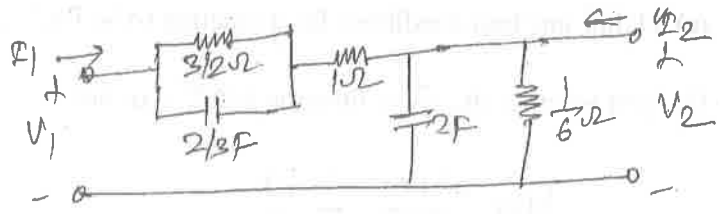

Fig. 4 (c)

(d) The network shown in below figure is operated in the sinusoidal steady state , with the element value given and $V = V = 100\cos^2 t$ V. 7

Determine :

(i) The complex power delivered by the source

(ii) The effective current in each of the passive elements.

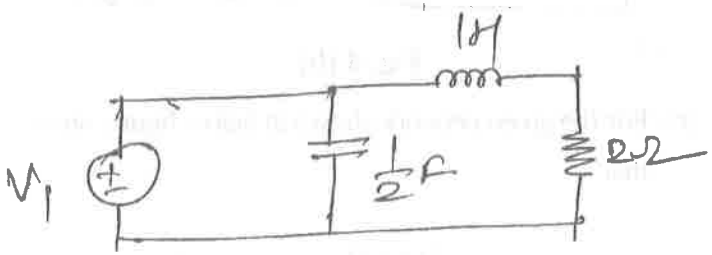

Fig. 4 (d)

Unit-V

5. (a) Define any two conditions for a function to be PRF. 2

(b) Test whether the given function is P.R.F. or not.

$$f(s) = \frac{s^3 + 6s^2 + 7s + 3}{s^2 + 2s + 1}$$ 7

(c) For the given impedance function, obtain forster form I and II. 7

$$z(s) = \frac{(s^2+1)(s^2+9)}{s(s^2+4)}$$

(d) Find out the cauer form I and II for given impedance function : 7

$$z(s) = \frac{s^4 + 10s^2 + 9}{s^3 + 4s}$$