Branch - E.C

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Total No. of Questions : 5] [Total No. of Printed Pages : 6

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305(N)

B. E. (Third Semester) EXAMINATION, Feb., 2010

(New Scheme)

(Common for EC, EE, EI, EX & BM Engg. Branch)

NETWORK ANALYSIS

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : Attempt *one* question from each Unit. Total *five* questions are to be attempted. All questions carry equal marks.

Unit – I

1. (a) Explain clearly with the help of examples the following terms used in network analysis : 10

   (i) Network graph

   (ii) Tree of a graph

   (iii) Cut-set and Tie-set matrix

   (b) Draw the dual for the network shown in fig. 1. 10

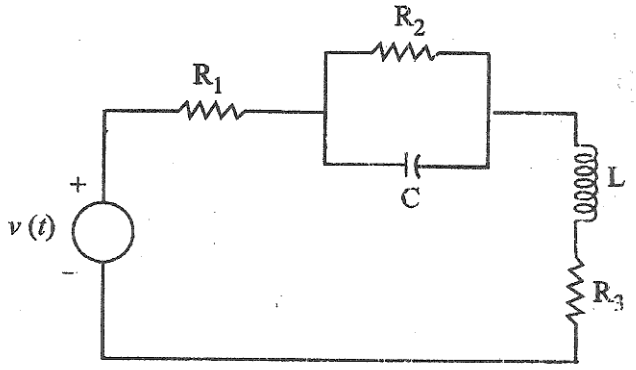

Fig. 1

P. T. O.

Or

(a) Discuss the initial conditions of the elements inductor and capacitor. Outline the procedure for evaluating initial conditions in network problems. 8

(b) In the network shown in fig. 2, the switch K is closed and a steady state is reached in the network. At $t = 0$, the switch is opened. Find an expression for the current in the inductor, $i_2(t)$. 12

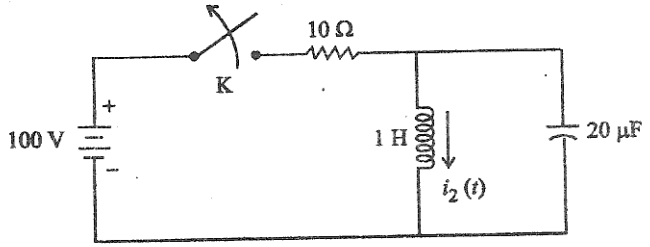

Fig. 2

Unit – II

2. (a) State and explain 'superposition theorem' and also write its limitations. 5

(b) Determine the current in the capacitor branch by the superposition theorem, in the network of fig. 3. 15

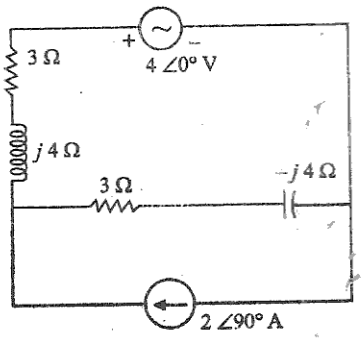

Fig. 3

Or

(a) State and explain the following : 6

(i) Reciprocity theorem (ii) Millman's theorem

(b) Find the Thevenin's equivalent circuit at terminals AB for the network shown in fig. 4. 14

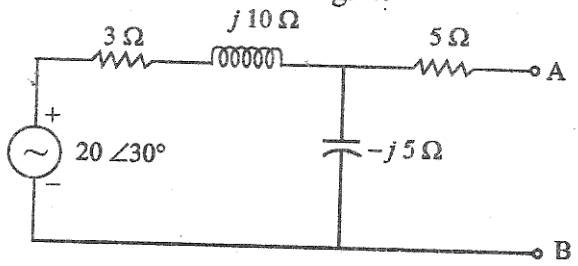

Fig. 4

Unit – III

3. (a) The waveform shown in fig. 5 occurs only once. Write an expression for $v(t)$. Find the transform $v(s)$ for $v(t)$. 8

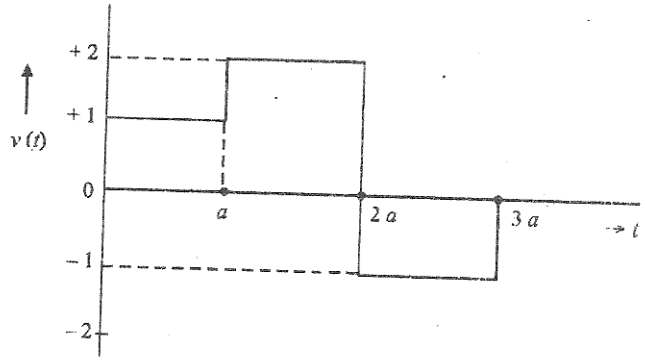

Fig. 5

(b) A unit impulse voltage $\delta(t-2)$ is applied to a series R-L network, where L = 1 H, R = 3 Ω. If the impulse is applied at $t = 0$, while the initial condition of the network is $i(0) = 0$, find $i(t)$. 12

Or

(a) Obtain the S-domain equivalent circuit for an inductor with initial current. 5

(b) Define 'unit impulse function' and derive its Laplace transform. 5

(c) If the capacitor is uncharged and the inductor current is zero at $t = 0-$, in the network shown in fig. 6, show that the transform of the generator current is : 10

$$I(s) = \frac{10(s^2 + s + 1)}{(s^2 + 1)(s^2 + 2s + 2)}$$

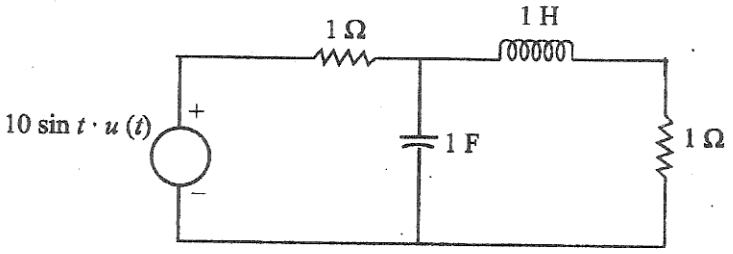

Fig. 6

Unit – IV

4. (a) What are the Dirichlet conditions for the Fourier series representation ? 4

(b) The waveform shown in fig. 7 consists of a train of isosceles triangles. For this waveform, determine the Fourier coefficients and plot the corresponding amplitude and phase spectra. 16

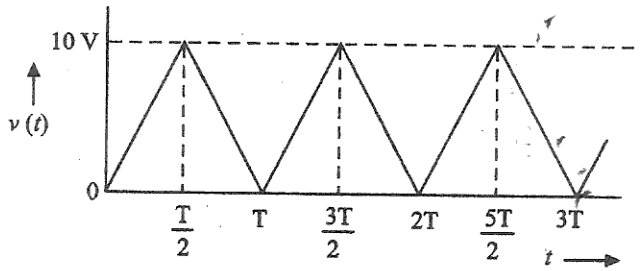

Fig. 7

Or

(a) Explain with the help of an example the 'half-wave symmetry'. 5

(b) Find the trigonometric Fourier series for the square wave shown in fig. 8 and plot the line spectrum. 15

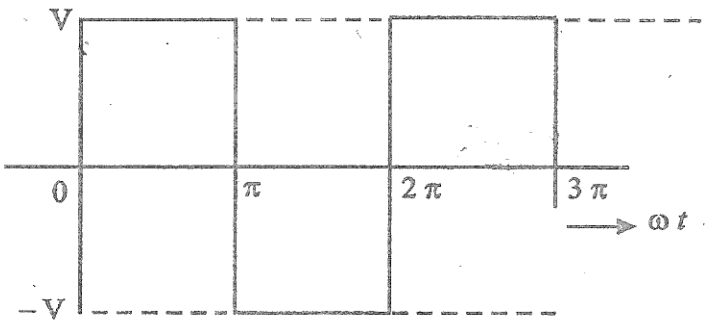

Fig. 8

Unit – V

5. (a) Define the terms 'transfer admittance' and 'voltage ratio transfer function' with reference to two-port networks. 6

(b) Find the open circuit transfer impedance $\frac{V_2(s)}{I_1(s)}$ and open circuit voltage ratio $\frac{V_2(s)}{V_1(s)}$ for the network shown in fig. 9. 14

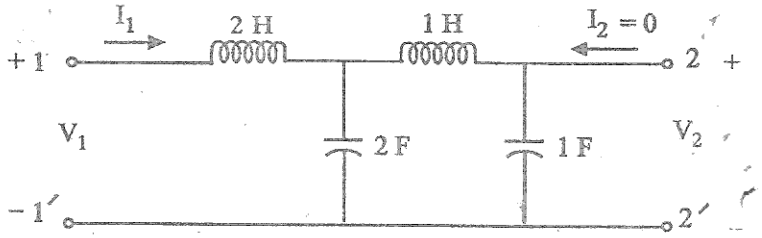

Fig. 9

Or

(a) What are the 'open circuit impedance' parameters of two-port networks ? How can the 'transmission

parameters' be obtained from the 'open circuit impedance' parameters ? 10

(b) *Find the transmission* parameters (A, B, C, D) for the network shown in fig. 10. *10*

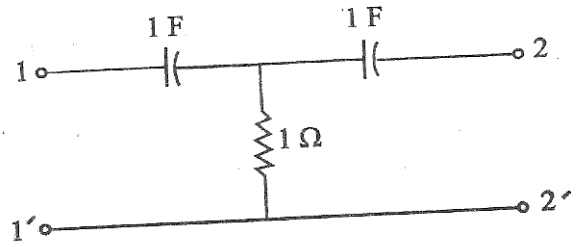

Fig. 10