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B.Tech.

THIRD SEMESTER EXAMINATION, 2004-2005

NETWORKS AND SYSTEMS

Time : 3 Hours   *Total Marks : 100*

Note : (i) *Attempt ALL the questions.*

1. Answer any three of the following:-   [8 x 3 = 24]

    (a) The reduced incidence matrix (A) of a graph is given below. Draw the graph and hence obtain the f-cutset matrix.

$$A = \begin{bmatrix} 0 & 0 & 1 & 1 & 1 & 0 & -1 \\ 0 & 1 & 0 & 0 & -1 & 1 & 1 \\ -1 & 0 & -1 & 0 & 0 & -1 & 0 \end{bmatrix}$$

    (b) For the network shown in fig.1 (b), draw the graph, write the tee set schedule and hence obtain the equilibrium equations on loop basis. Calculate the values of branch current and branch voltages.
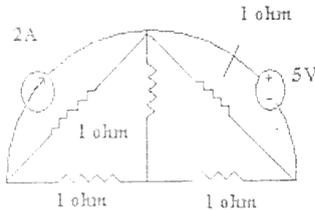

Fig 1 (b)

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(c) With the help of mathematical expressions the following forcing functions with their characteristic curves.

    (i)   A pulse starting at t=0 and lasting for 2 seconds

    (ii)   Unit ramp and delayed unit ramp.

    (iii) An impulse functions function occurring at t=a

    (iv) Gate functions.

(d) Two ramp functions are given by

$$f_1(t) = mt\, u(t)$$

$$f_2(t) = m(t-a)\, u(t-a)$$

where m and m are two slopes (+ve) and m>m. Draw the final wave form adding these two functions.

(e) Obtain the difference equation relating i_L and V_S for the circuit shown in fig 1 (e). Also find the expression for V_c in terms of V_S.
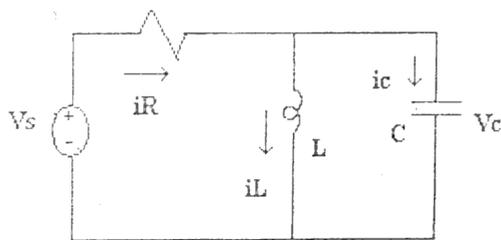

Fig 1(e)

Answer **any three** of the following:-

(a) Using superposition theorem. calculate the current through (2+j3) Ω impedance of the circuit shown in fig. 2 (a)
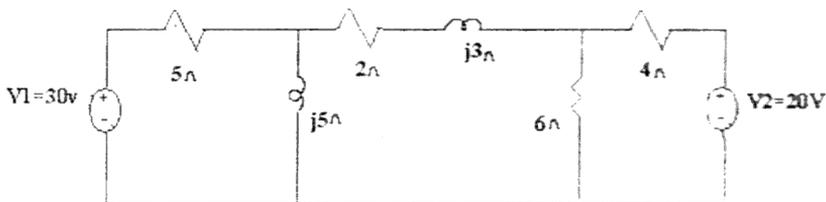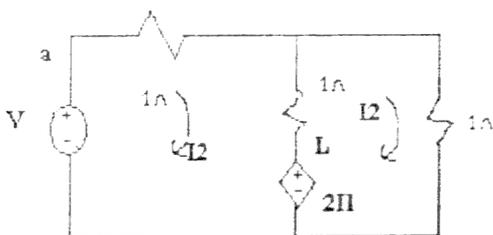

Fig 2(a)

(b) State Thevenin's theorem.

Find the Thevenin equivalent for the network shown in fig.2(b) at the right of terminal a-b and hence find the source current.

Fig 2(b)

(c) Using the concept of wave form analysis, obtain the waveform components of a isosceles triangular pulse in terms of ramp functions and find its Laplace transform.

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