Total No. of Questions : 5] [Total No. of Printed Pages : 3

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305

B. E. (Third Semester) EXAMINATION, Dec., 2011

(Grading/Non-Grading System)

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

NETWORK ANALYSIS

Time : Three Hours

Maximum Marks : *100 (Non-Grading)* / *70 (Grading)*

Note : Attempt *one* question from each Unit. All questions carry equal marks. Assume suitable data if missing.

Unit – I

1. Define the following terms in context of network graphs, vertex, edge, directed graph, degree of a vertex, path, connected path, circuit, tree, branch, chord, co-tree, cutset, *f*-circuit and *f* cutset.

Or

Determine the power supplied by each source in the circuit in Fig. 1. using network topology.

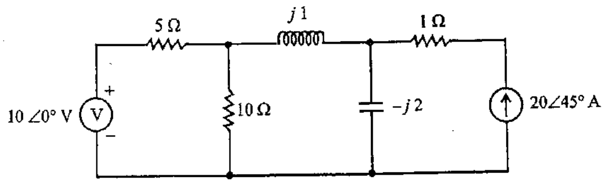

Fig. 1

P. T. O.

Unit – II

2. Show that in an a. c. circuit maximum power is transferred to a load whose impedance is equal to the conjugate of the Thevenin's impedance of the circuit as seen across the load terminals. If the load consists of only a resistance and no reactance, what should be the magnitude of the resistance for maximum power to be transferred to it ? Determine.

Or

Employ superposition theorem to determine the voltage across the 17 k Ω resistor in the figure shown below. If the maximum power rating of the resistor is 250 mW, what is the maximum positive voltage to which the 5-V source can be increased before the resistor overheats.

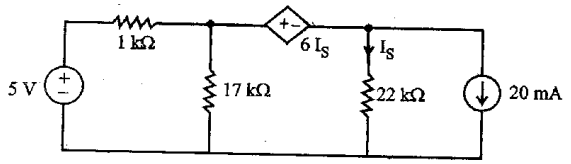

Fig. 2

Unit – III

3. Find $V_C(0^-)$ and $V_C(0^+)$ for the circuit shown below. Obtain the equation for $V_C(t)$ for $t > 0$. Solve for $V_C(t)$ using Laplace transforms.

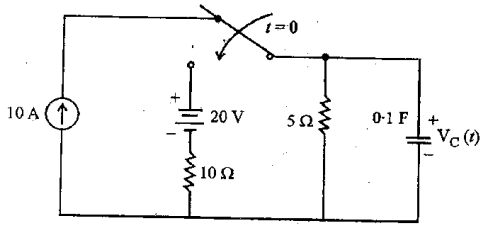

Fig. 3

Or

The transfer function of an LTI system having an input $i(t)$ and an output $v(t)$ is given by :

$$H(s) = \frac{8(s+1)}{(s+20)}$$

Determine (a) forced response (b) complete response $i(t)$ of the system if $v(t)$ is equal to (i) 20 (ii) $20\,u(t)$ (iii) $10\,e^{-6t}$.

Unit – IV

4. Show that the total area under the curve of the response of a high pass RC circuit due to a pulse input is zero.

Or

Show that the square wave response of a high pass RC circuit contains no d.c. component at steady state irrespective of the amount of dc present in the input.

Unit – V

5. Determine the relationship between (i) Y-parameters and h-parameters. (ii) Z-parameters and t-parameters.

Or

A typical two-port network is characterized by the equations $2V_1 + 4I_2 = I_1$ and $V_2 + 6V_1 = 8I_2$. Determine Y_{11}, Z_{21} and h_{21}.