

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 : $\begin{cases} 100 \text{ (Non-Grading)} \\ 70 \text{ (Grading)} \end{cases}$

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.

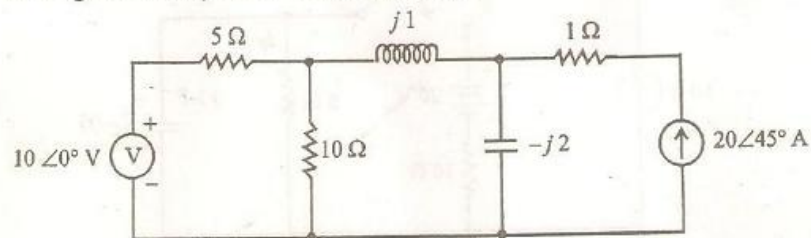


Fig. 1

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 $17\text{ k}\Omega$ 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.

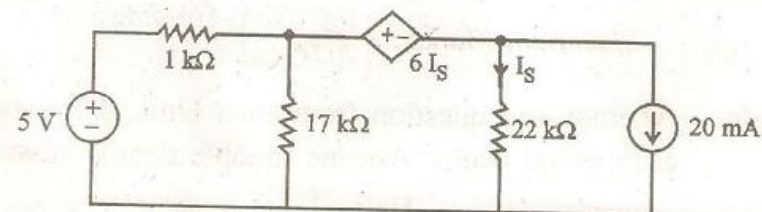


Fig. 2

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.

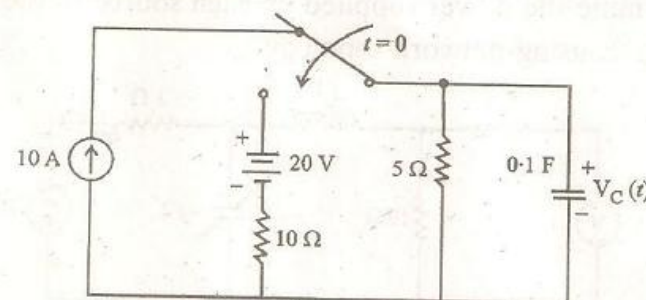


Fig. 3

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) $20u(t)$ (iii) $10e^{-6t}$.

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

- ④ 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} .