

Code No: 153AP

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, March - 2021

ELECTRICAL CIRCUIT ANALYSIS

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 75

Answer any five questions

All questions carry equal marks

- 1.a) Find the Thevenin's equivalent circuit of the circuit shown in figure 1 across the terminals ab. And also find the current through $R_L = 16$ ohm.

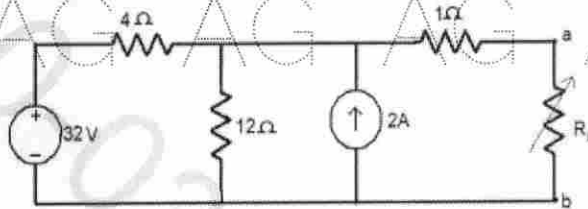


Figure: 1

- b) Compute the current in 23 ohm resistor using super position theorem for the circuit shown in figure 2. [8+7]

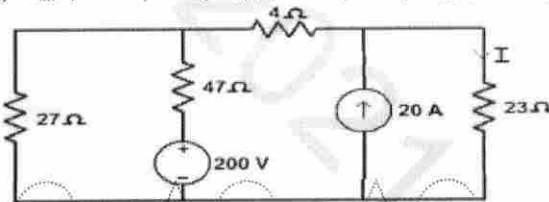


Figure: 2

- 2.a) Find the value of R_L so that maximum power is delivered to the load resistance shown in figure 3.

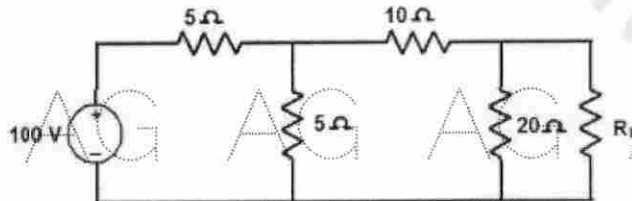


Figure: 3

- b) Define duality and explain in detail about the dual networks. [8+7]
3. Derive an expression for current response of RLC series circuit transient for unit step input. [15]
- 4.a) For a source free RLC series circuit, the initial voltage across C is 10V and the initial current through L is zero. If $L = 20$ mH, $C = 0.5$ microfarad and $R = 100$ ohm. Evaluate $i(t)$.
- b) Obtain the current expression in a R L series circuit when it is excited by $v(t) = V_m \sin \omega t$. Also, draw the waveform for power. [8+7]

- 5.a) Define RMS value and Average value of an alternating quantity. Determine these values for a half wave rectified sine wave.
- b) A three phase delta connected load has $Z_{ab} = (100+j0)$ ohms, $Z_{bc} = (-j100)$ ohms and $Z_{ca} = (j70.7)$ ohms is connected to a balanced 3 phase 400V supply. Determine the line currents I_a , I_b and I_c . Assume the phase sequence abc. [8+7]

6. Explain the following:

- a) Dot convention in coupled circuits.
 b) Ideal transformer.
 c) Complex power in a 1- ϕ circuit.

[5+5+5]

7. A series RLC circuit with $R = 3\Omega$, $L = 1H$ and $C = 0.5F$, is excited by a unit step voltage. Obtain the expression for $I(t)$ using Laplace Transform method. Assume that the circuit is initially relaxed. Sketch the variation of $I(t)$ and state whether the circuit is over damped, or under damped or critically damped. [15]

8.a) Obtain the expression for Y-parameters in terms of transmission parameters.

b) Determine the Hybrid parameters for the Two Port network shown in figure 4. [6+9]

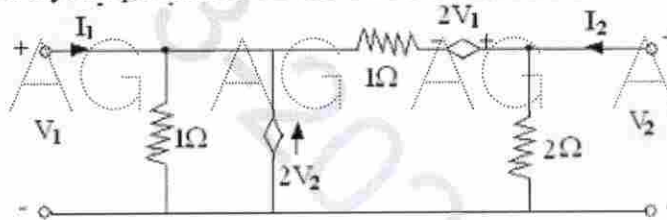


Figure: 4

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