R18

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

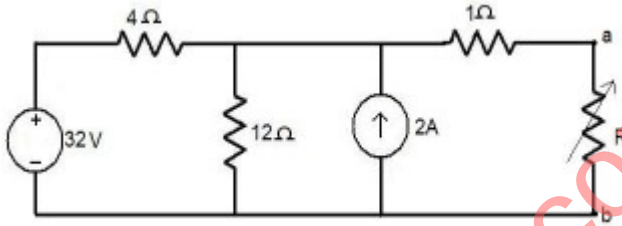

Figure: 1

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

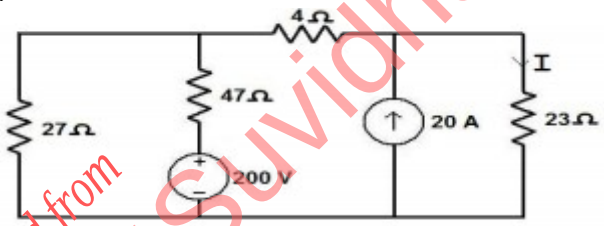

Figure: 2

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

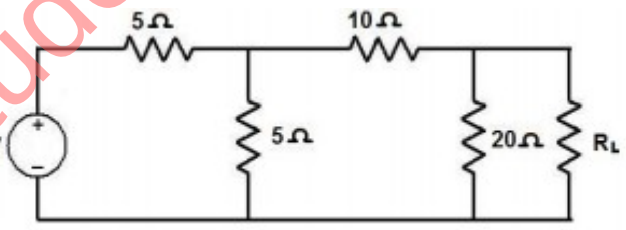

Figure: 3

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 = 20mH, 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 υ (t) = Vm sin wt. 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 = 3Ω, 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]

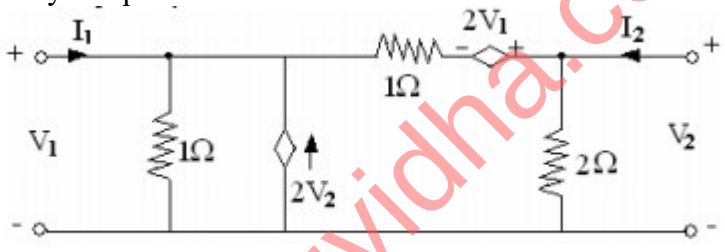

Figure: 4

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