

Code No: 153AP

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, October - 2020

ELECTRICAL CIRCUIT ANALYSIS

(Electrical and Electronics Engineering)

Time: 2 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) State and Explain superposition theorem in detail.
 b) Using Nodal analysis, find V and I in the circuit below figure 1. [6+9]

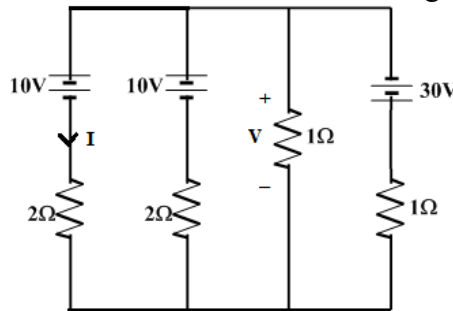


Figure: 1

- 2.a) State and Explain Maximum power transfer theorem in detail.
 b) Using superposition theorem, find 'I' in the circuit below figure 2. [6+9]

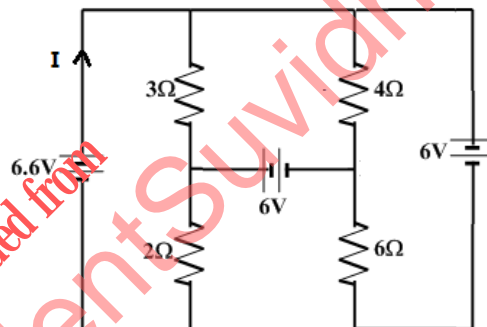


Figure: 2

3. Derive the expression for the complete response for current in a series RLC circuit excited by DC supply by closing the switch at $t=0^+$. [15]
- 4.a) Derive the expression for the complete response for the voltage across inductor in parallel RL circuit excited by sinusoidal supply.
 b) In the circuit shown below figure 3, the switch S is opened at $t=0$. Prior to that, switch was closed. Derive the current $i(t)$ for $t>0$. [7+8]

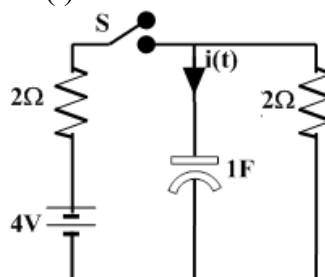


Figure: 3

- 5.a) Prove that the line voltage is $\sqrt{3}$ times the phase voltage in three phase star connected balanced system
- b) A coil with an internal resistance of $1\ \Omega$ is connected in parallel to a capacitor of $10\ \text{mF}$. The circuit takes a current of $1\ \text{A}$ when connected to a $100\ \text{V}$, $50\ \text{Hz}$ supply. Determine the current in the inductor when the supply is $50\ \text{V}$, $60\ \text{Hz}$. [8+7]
- 6.a) Derive the expression for effective value of symmetrical square waveform whose side is 'A'
- b) Each phase of a star-connected load comprises a resistance of $10\ \Omega$ and a $10\ \text{mH}$ inductor in series. Determine active power, reactive power and apparent power that will be consumed by the load when connected across a $450\ \text{V}$, $50\ \text{Hz}$, 3 phase supply. [7+8]
- 7.a) What are the basic properties inverse Laplace transforms? Explain.
- b) A parallel RLC circuit has a resistance of $10\ \Omega$, a capacitance of $5\ \text{mF}$, and an inductance of $20\ \text{mH}$. Find the resonant frequency and half power frequencies. [8+7]
- 8.a) Derive the relationship between impedance and admittance parameters.
- b) Determine the transmission parameters of the network below figure 4. [6+9]

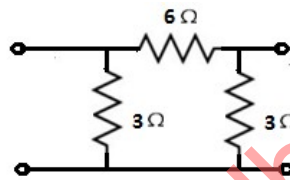


Figure: 4

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