

Code No: 153AP

R18

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]

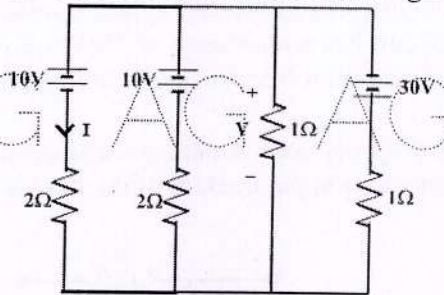


Figure: 1

- 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]

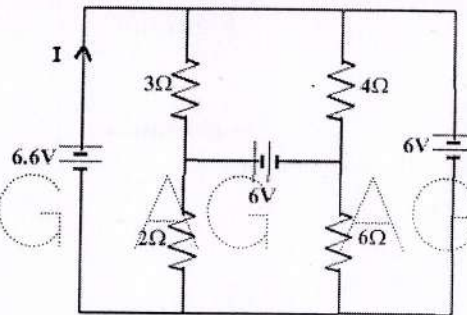


Figure: 2

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]

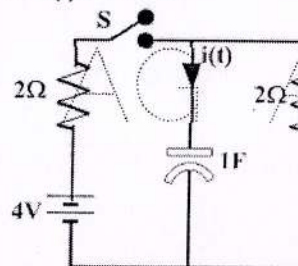


Figure: 3

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]

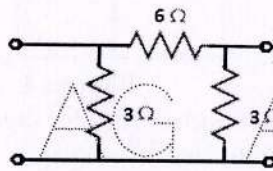


Figure: 4

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