

NETWORK ANALYSIS

(Common to ECE & EIE)

Time: 3 hours

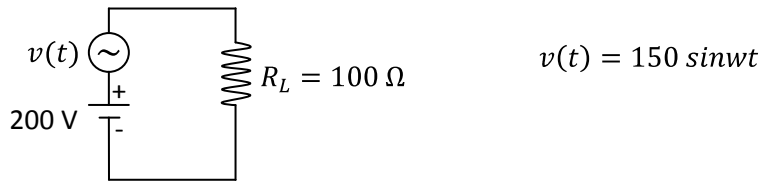
Max. Marks: 70

PART - A

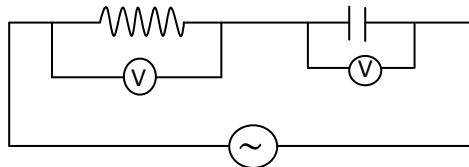
(Compulsory Question)

1 Answer the following: (10 X 02 = 20 Marks)

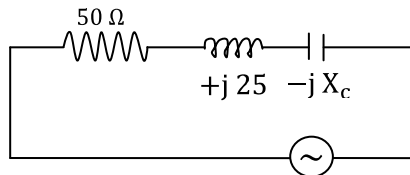
- (a) State super position theorem.
- (b) How can a voltage source be replaced by a current source?
- (c) Write down the equation of current for an RC circuit when it is supplied by a DC source.
- (d) What is the time constant of an RC circuit excited by a DC source?
- (e) A sinusoidal voltage source in series with a DC source is shown below. Determine the max current through and average voltage across R_L .



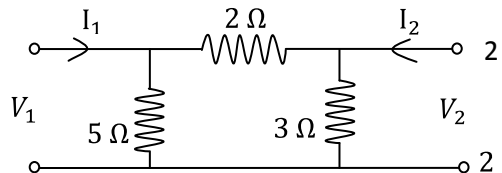
- (f) Determine the source voltage and phase angle when the voltage across the resistor is 20 V and the capacitor 30 V.



- (g) For the circuit shown below, determine the value of capacitive reactance and impedance at resonance.



- (h) Find the mutual impedance of the circuit shown below.



- (i) Define hybrid parameters.
- (j) What are called transmission parameters? Why are they called so?

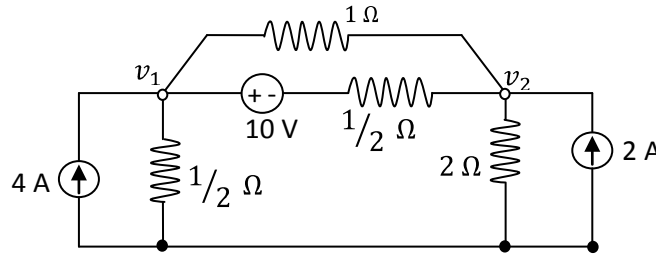
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PART - B

(Answer all five units, 5 X 10 = 50 Marks)

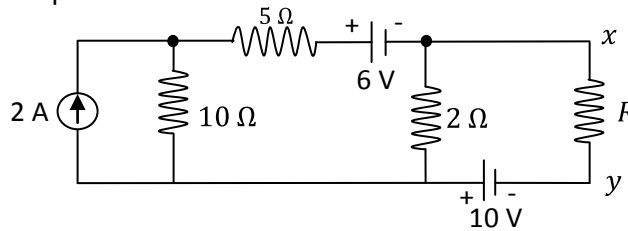
UNIT - I

- 2 Find the power loss in the resistors of the network shown below using nodal analysis.



OR

- 3 Find the value of R to have a maximum power transfer in the circuit shown below. Also obtain the amount of maximum power.



UNIT - II

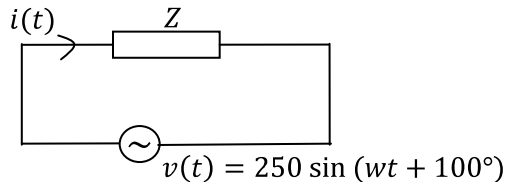
- 4 Analyze the DC response for RL circuits.

OR

- 5 Analyze the DC response for RC circuits.

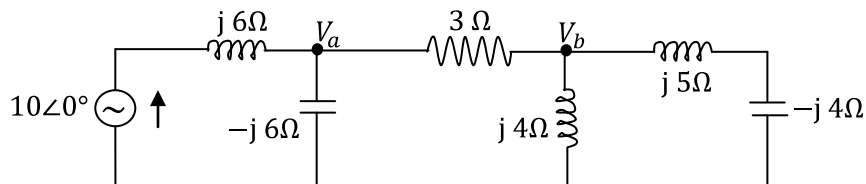
UNIT - III

- 6 For the circuit shown in the figure below, a voltage $v(t)$ is applied and the resulting current in the circuit $i(t) = 15 \sin(\omega t + 30^\circ) A$. Determine the active power, reactive power, power factor and the apparent power.



OR

- 7 In the network shown below, determine V_a and V_b .



UNIT - IV

- 8 A series circuit with $R = 10 \Omega$, $L = 0.1 H$ and $C = 50 \mu F$ has an applied voltage $V = 50 \angle 0^\circ$ with a variable frequency. Find the resonant frequency & the value of frequency at which maximum voltage occurs across the capacitor & inductor.

OR

- 9 Determine the quality factor of a coil for the series circuit consisting of $R = 10 \Omega$, $L = 0.1 H$ and $C = 10 \mu F$.

UNIT - V

- 10 Express the Z parameters of a two port network in terms of Y parameters.

- 11 Analyze constant K low pass filters.