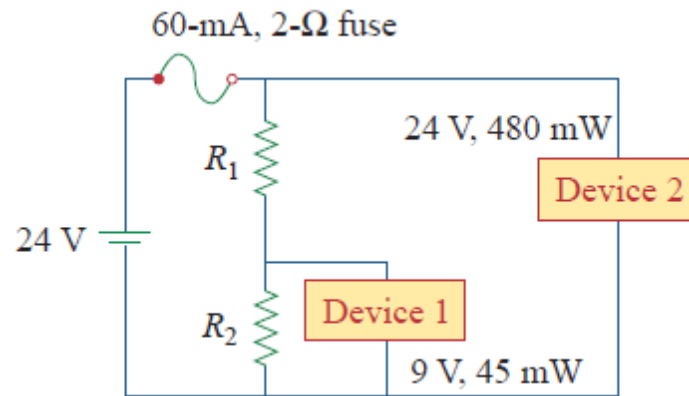
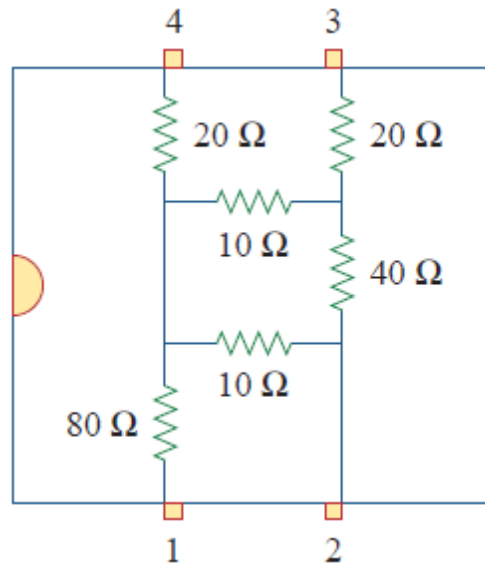

Problem – 1

Find the values of the resistors R_1 and R_2 needed to power the devices using a 24-V battery.



Problem – 2

The pin diagram of a resistance array is shown in Figure. Find the equivalent resistance between the following: (a) 1 and 2, (b) 1 and 3, (c) 1 and 4.



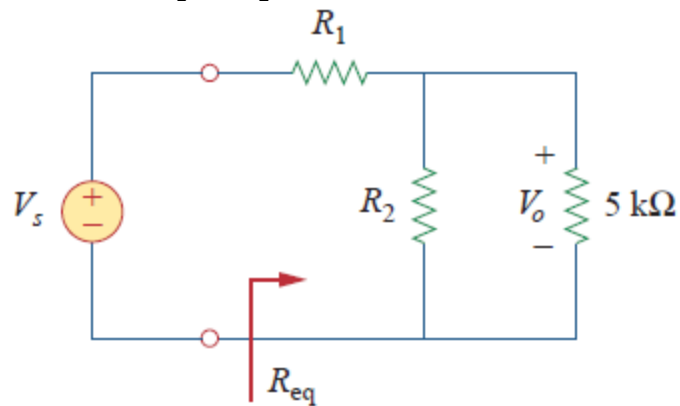
Problem – 3

A loudspeaker is connected to an amplifier as shown in Figure. If a 10- Ω loudspeaker draws the maximum power of 12 W from the amplifier, determine the maximum power a 4- Ω loudspeaker will draw.



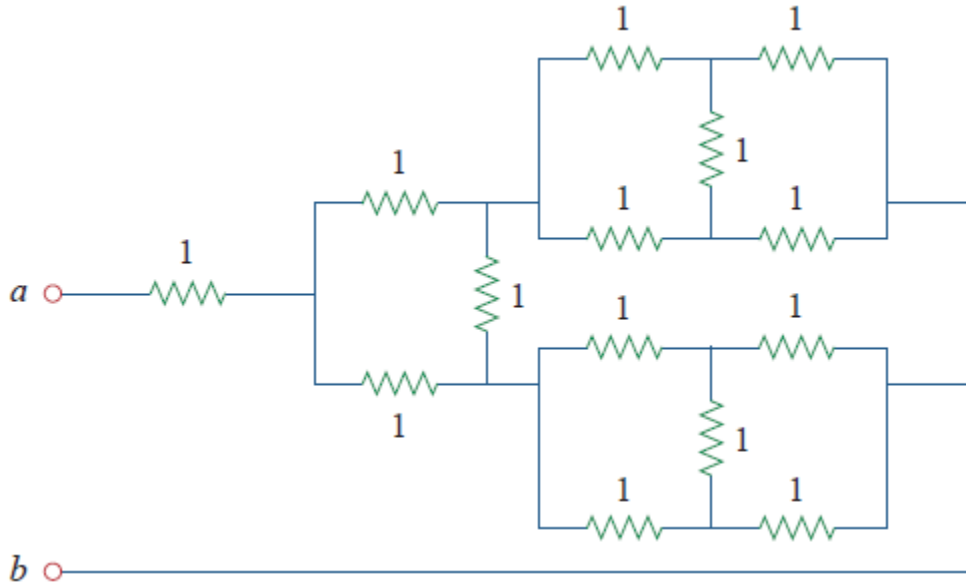
Problem – 4

The circuit must be designed to meet these two criteria: (a) $V_o/V_s = 0.05$ (b) $R_{eq} = 40k\Omega$
If the load resistor $5k\Omega$ is fixed, find R_1 and R_2 to meet the criteria.



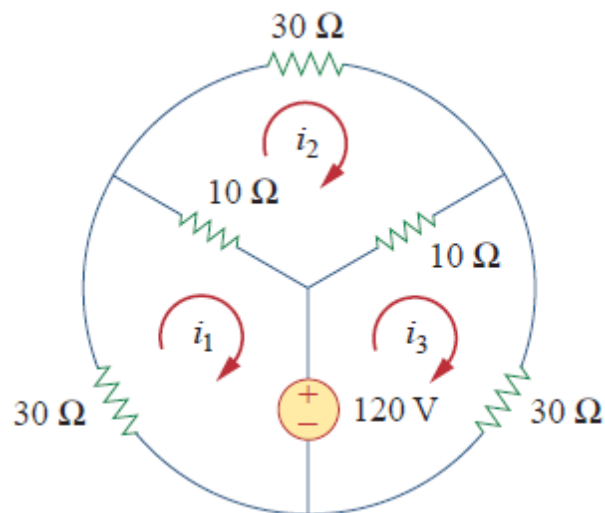
Problem – 5

Find R_{ab} in the four-way power divider circuit. Assume each element is 1Ω .



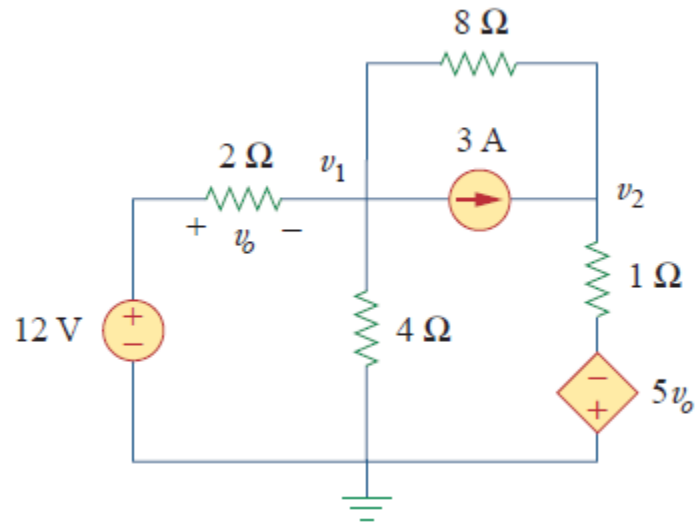
Problem – 6

Find i_1 , i_2 and i_3 in the circuit.



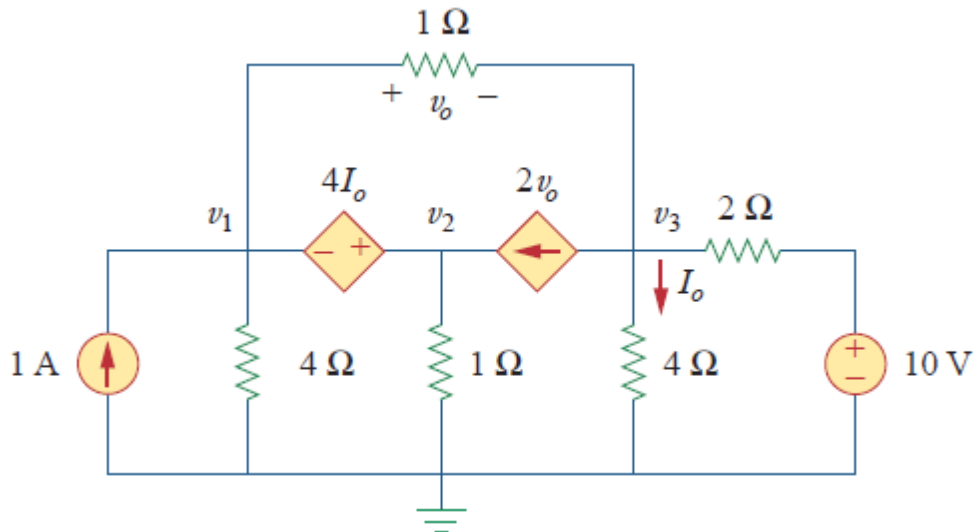
Problem – 7

Determine v_1 and v_2 in the circuit.



Problem – 8

Find the node voltages for the circuit.

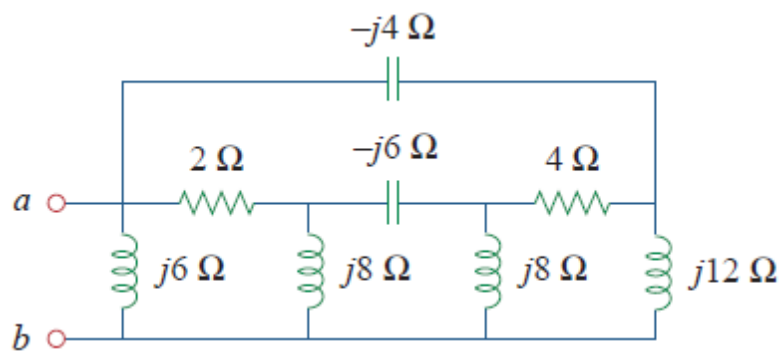


Problem – 9

An electric motor can be modeled as a series combination of a 12- Ω resistor and 200-mH inductor. If a current $i(t) = 2te^{-10t}$ flows through the series combination, find the voltage across the combination.

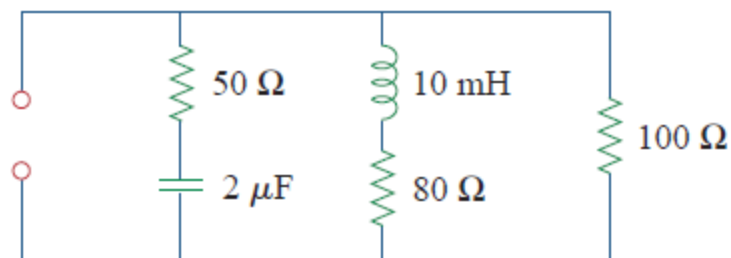
Problem – 10

Determine the equivalent impedance for a-b terminals.



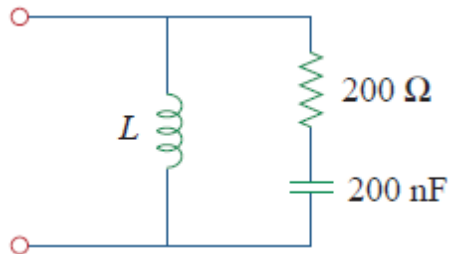
Problem – 11

What is the total (equivalent) impedance of the circuit at 2 kHz?



Problem – 12

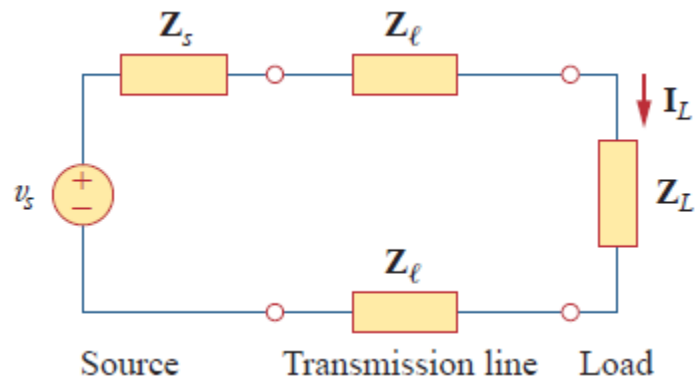
Calculate the value of an inductance L across the series RC combination so that the net impedance is resistive at a frequency of 50 kHz.



Problem – 13

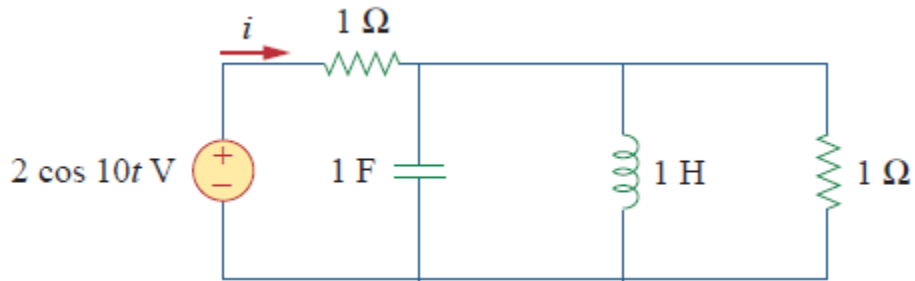
A power transmission system is modeled as shown in Figure. Find the load current I_L , if

- Source voltage $V_S = 115 V$
- Source impedance $Z_S = (2 + j) \Omega$
- Line impedance $Z_l = (0.8 + j0.6) \Omega$
- Load impedance $Z_L = (46.4 + j37.8) \Omega$



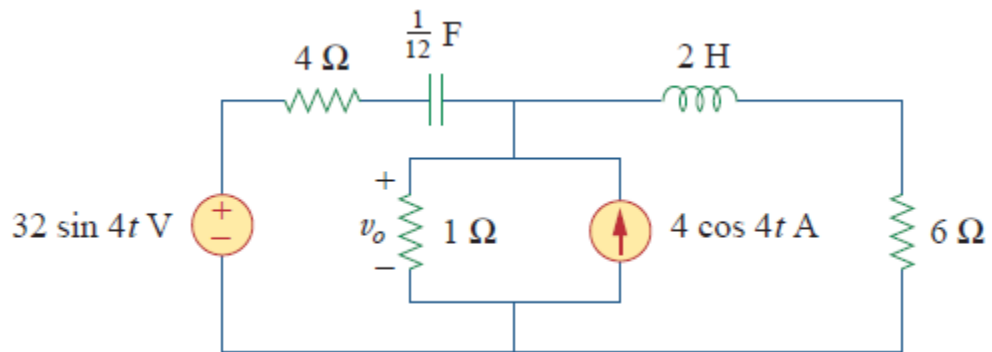
Problem – 14

Determine current i in the circuit.



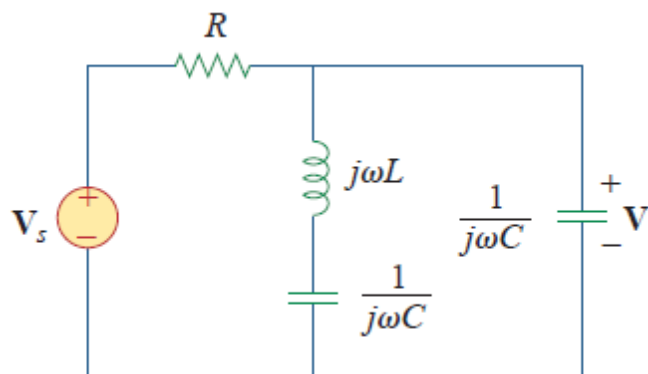
Problem – 15

Determine v_0 in the circuit.



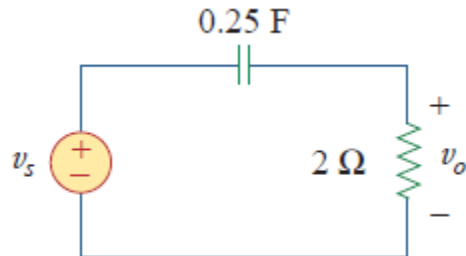
Problem – 16

Find V in the circuit.



Problem – 17

Find v_o for the circuit, assuming $v_s = (3 \cos 2t + 8 \sin 4t) V$.



Problem – 18

A transmitter delivers maximum power to an antenna when the antenna is adjusted to represent a load of 75Ω resistance in series with an inductance of $4 \mu H$. If the transmitter operates at 4.12 MHz, find its internal impedance.

Problem – 19

A factory has the following four major loads:

- 1) A motor rated at 5 hp, 0.8 pf lagging (1hp = 0.7457 kW).
- 2) A heater rated at 1.2 kW, 1.0 pf.
- 3) Ten 120-W lightbulbs.
- 4) A synchronous motor rated at 1.6 kVAR, 0.6 pf leading.

Calculate the total real and reactive power. Find the overall power factor.

Problem – 20

A coupling capacitor is used to block dc current from an amplifier as shown in Figure (The amplifier and the capacitor act as the source, while the speaker is the load.)

- At what frequency is maximum power transferred to the speaker?
- If $V_S = 4.6 V_{rms}$ how much power is delivered to the speaker at that frequency?

