Instructor: R. Karki   **Feb 14, 2003**

Note: All the equations carry equal marks.

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1. Calculate the voltage across the 1Ω resistor in Figure 1.
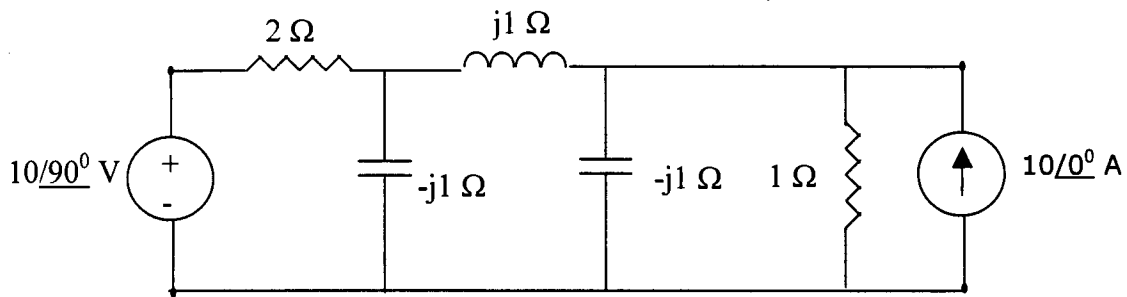
$6.67 \angle 0° V$

Figure 1

2. Find the instantaneous current through the 10Ω resistor in Figure 2 when the instantaneous current from the current source is 10 Amps?

    where:
        $i(t) = 10 \sin(\omega t + 90^0)$ amps
        $v(t) = 90 \sin \omega t$
        and both the sources are at 60 Hz frequency.
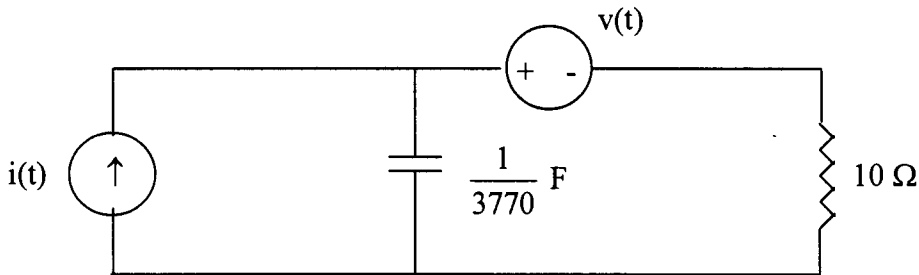
$0.5 A$

Figure 2

3. A 50 kVA transformer supplies a 20 kW heating load at unity power factor. How much additional inductive load at 0.8 power factor can the transformer carry?

$$26.0309 + j\,19.5232 \text{ VA}$$

4. Find the RMS value of the current through the 10 Ω resistor in Figure 3. The current waveform from the source can be expressed as:

i(t) = 10 + 100 Sin ωt
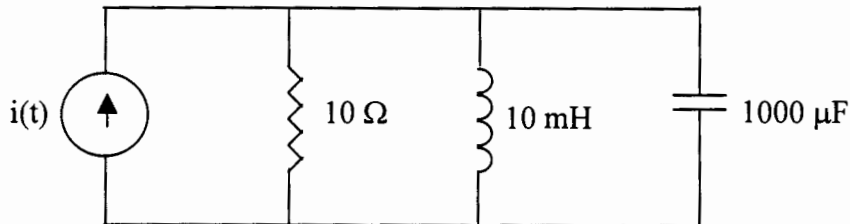
where ω is equal to the resonant angular frequency of the circuit in Figure 3.

Figure 3

$$I_{RMS} = 70.71 \text{ A}$$

The end.