

Tutorial 9

NOTE: Kindly refer to table I and II on page no. 559 and 561 respectively.

Q.1. State the complex frequency or frequencies associated with each function:

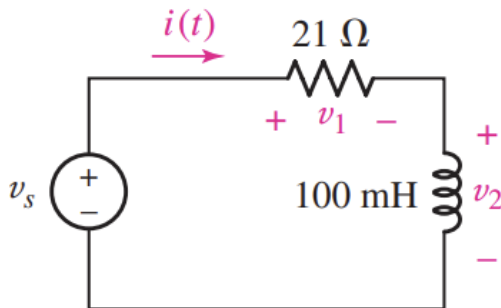
(a) $f(t) = 5e^{-7t} \cos 80t$

(b) $g(t) = (4e^{-2t} - e^{-t}) \cos(4t - 95^\circ)$

Q.2. The following voltage sources $Ae^{Bt} \cos(Ct + \theta)$ are connected (one at a time) to a 280 resistor. Calculate the resulting current at $t = 0$, 0.1, and 0.5 s, assuming the passive sign convention: (a) $A = 1$ V, $B = 0.2$ Hz, $C = 0$, $\theta = 45^\circ$

Q.3.

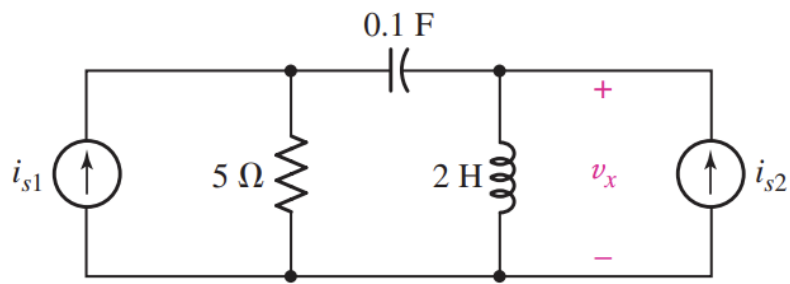
If the complex frequency describing the circuit of Fig. 14.11 is $s = -150 + j100 \text{ s}^{-1}$, determine the time-domain voltage which corresponds to a frequency-domain voltage $\mathbf{V}_2 = 5 \angle -25^\circ \text{ V}$.



■ **FIGURE 14.11**

Q.4.

Let $i_{s1} = 20e^{-3t} \cos 4t \text{ A}$ and $i_{s2} = 30e^{-3t} \sin 4t \text{ A}$ in the circuit of Fig. 14.14.
(a) Work in the frequency domain to find \mathbf{V}_x . (b) Find $v_x(t)$.



■ **FIGURE 14.14**

Q.5.

Without recourse to Eq. [15], obtain an expression for $f(t)$ if $\mathbf{F}(s)$ is given by

(a) $\frac{1}{s}$; (b) $1.55 - \frac{2}{s}$; (c) $\frac{1}{s + 1.5}$; (d) $\frac{5}{s^2} + \frac{5}{s} + 5$. (Provide some brief explanation of how you arrived at your solution.)