Tutorial 8

Q.1.

Note that there is no mutual coupling between the 5 H and 6 H inductors in the circuit of Fig. 13.50. (*a*) Write a set of equations in terms of $\mathbf{I}_1(j\omega)$, $\mathbf{I}_2(j\omega)$, and $\mathbf{I}_3(j\omega)$. (*b*) Find $\mathbf{I}_3(j\omega)$ if $\omega = 2$ rad/s.

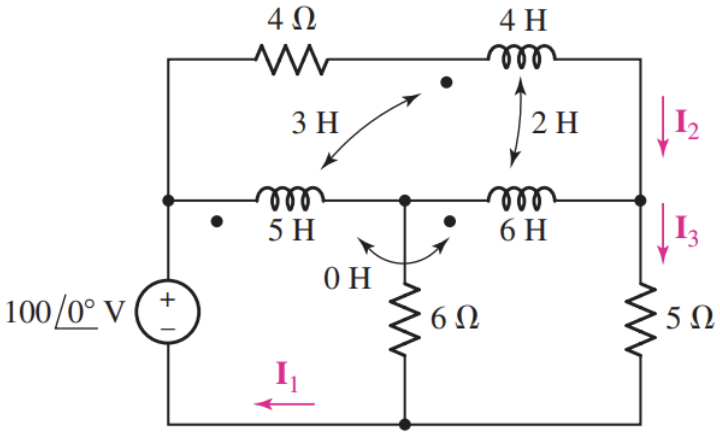


FIGURE 13.50

Q.2.

Consider the circuit represented in Fig. 13.55. The coupling coefficient $k = 0.75$. If $i_s = 5 \cos 200t$ mA, calculate the total energy stored at $t = 0$ and $t = 5$ ms if (*a*) *a*-*b* is open-circuited (as shown); (*b*) *a*-*b* is short-circuited.

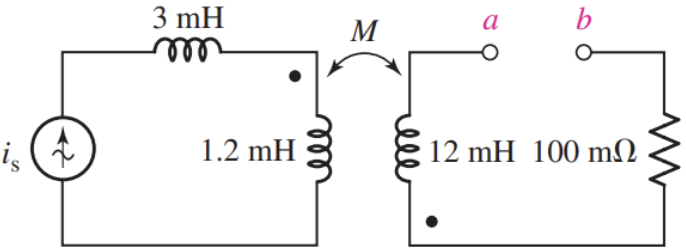
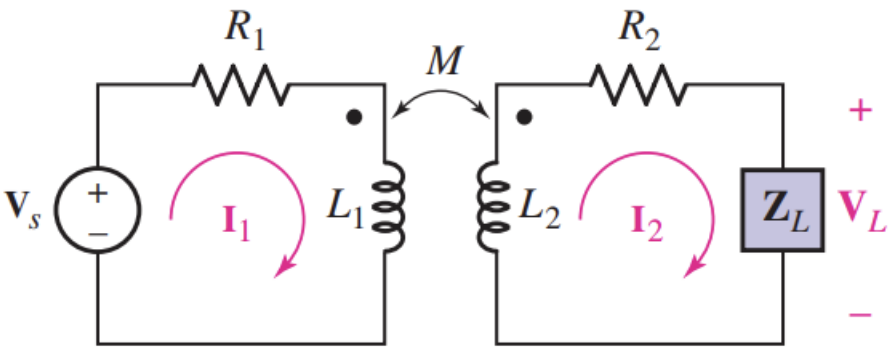


FIGURE 13.55

Q.3.

Assume the following values for the circuit depicted schematically in Fig. 13.16: $R_1 = 10\ \Omega$, $R_2 = 1\ \Omega$, $L_1 = 2\ \mu$H, $L_2 = 1\ \mu$H, and $M = 500$ nH. Calculate the input impedance for $\omega = 10$ rad/s if $\mathbf{Z}_L$ is equal to (*a*) 1 Ω; (b) j Ω; (c) $-j$ Ω; (*d*) $5/\underline{33^\circ}\ \Omega$.



Q.4.

For the circuit of Fig. 13.61, determine an expression for (*a*) $\mathbf{I}_L/\mathbf{V}_s$; (*b*) $\mathbf{V}_1/\mathbf{V}_s$.

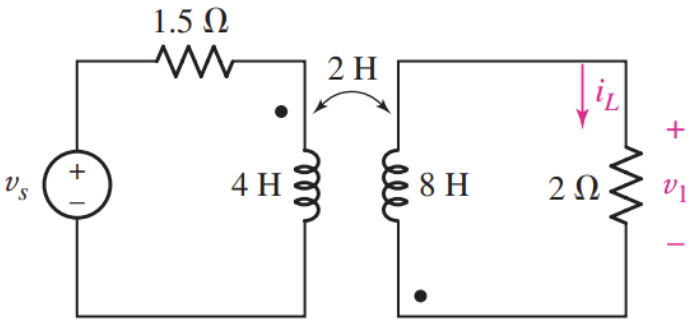


FIGURE 13.61

Q.5. For the circuit of Fig. 13.62, if vs = 8 cos 1000t V, calculate vo.

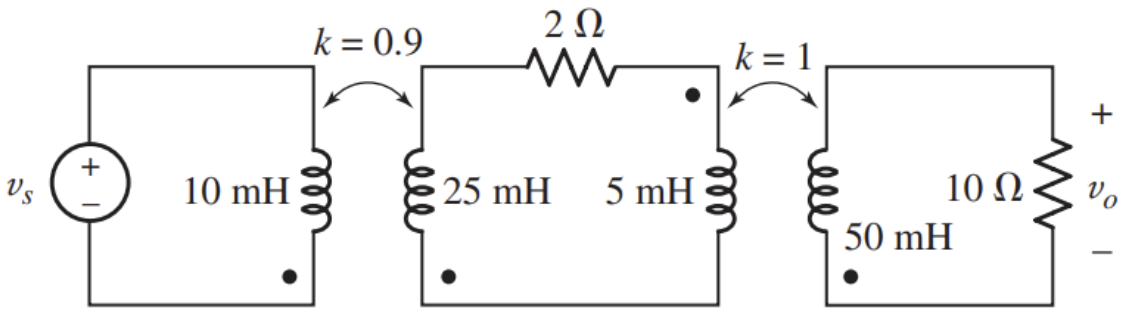


FIGURE 13.62