1.

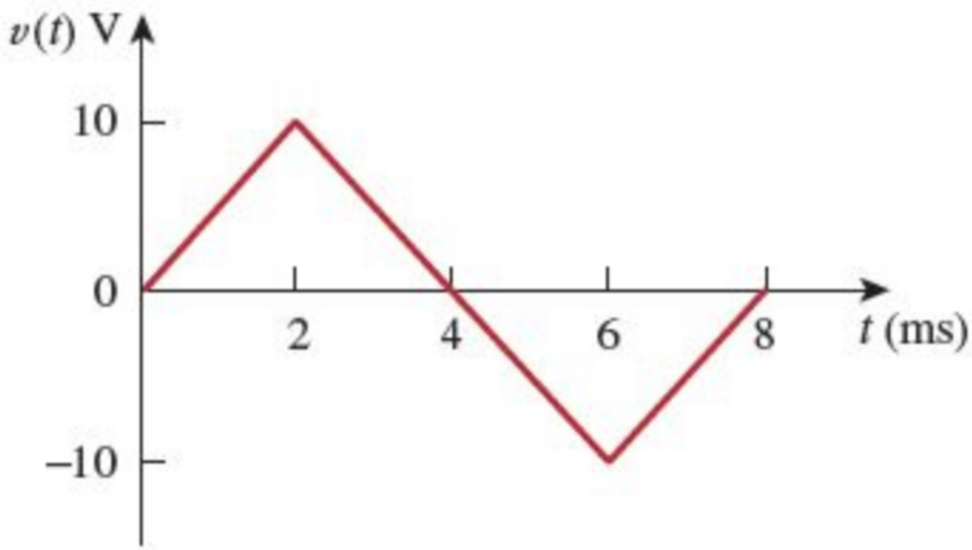
value:
10.00 points

A 50-μF capacitor has energy $\omega(t) = 10 \cos^2 377t$ J and consider a positive $v(t)$. Determine the current through the capacitor.

The current through the capacitor is [ ] sin(377t) A.

2. value: 10.00 points

The voltage across a 4-μF capacitor is shown in the given figure.



Find the currents for the ranges given below.

The currents at the given ranges are as follows:

For $0 < t < 2$ ms, $i_C(t) =$ ______ mA

For 2 ms $< t <$ 6 ms, $i_C(t) =$ ______ mA

For 6 ms $< t <$ 8 ms, $i_C(t) =$ ______ mA

3. value: 10.00 points

A capacitor has the terminal voltage

$$v = \begin{cases} 50\text{ V} & t \leq 0 \\ Ae^{-100t} + Be^{-600t}\text{ V}, & t \geq 0 \end{cases}$$

The capacitor has an initial current of 2 A.

Find the constants *A* and *B* if the capacitance is *C* = 4 mF.

The constants *A* and *B* are ______ and ______, respectively.

4.

value:
10.00 points

A capacitor has the terminal voltage

$$v = \begin{cases} 50 \text{ V} & t \le 0 \\ Ae^{-100t} + Be^{-600t} \text{ V}, & t \ge 0 \end{cases}$$

The capacitor has an initial current of 2 A.

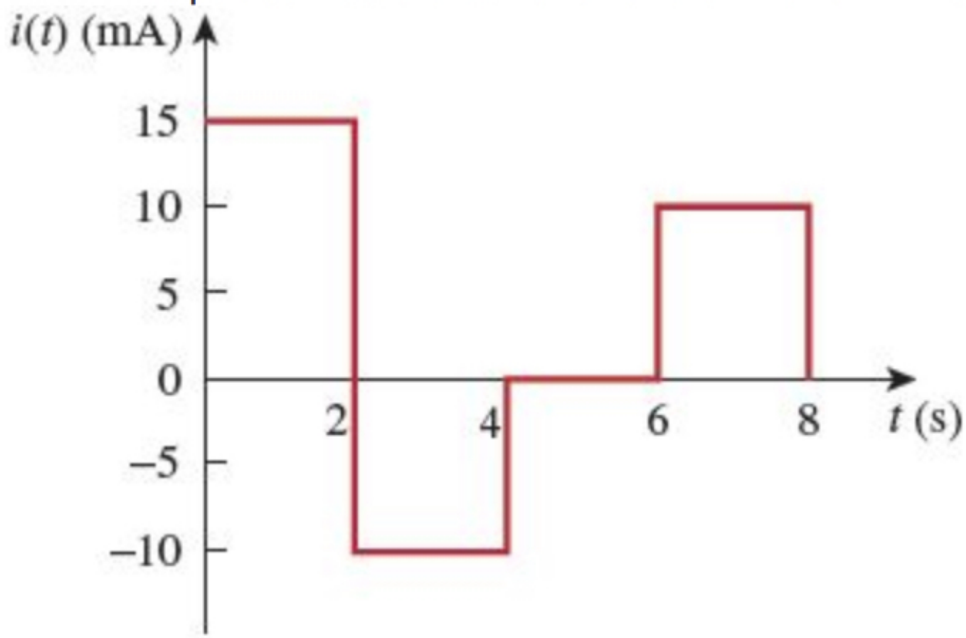
Find the capacitor current for $t > 0$, where the capacitance $C = 4$ mF.

The capacitor current is i = [ ] e^{-100t} + [ ] e^{-600t} A.

5.

value:
10.00 points

A 4-mF capacitor has the current waveform shown in the given figure. Assume that $v(0) = 10$ V.



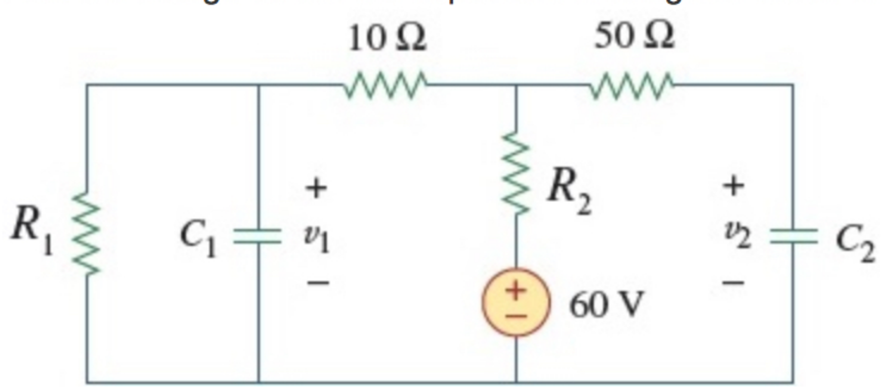
Find the value of voltage for 6 s < t < 8 s.

The value of voltage $v(t)$ = [( )t – ( )] V.

6.

value:
10.00 points

Find the voltage across the capacitors in the given circuit under dc conditions, where R_1 = 69 Ω and R_2 = 15 Ω.

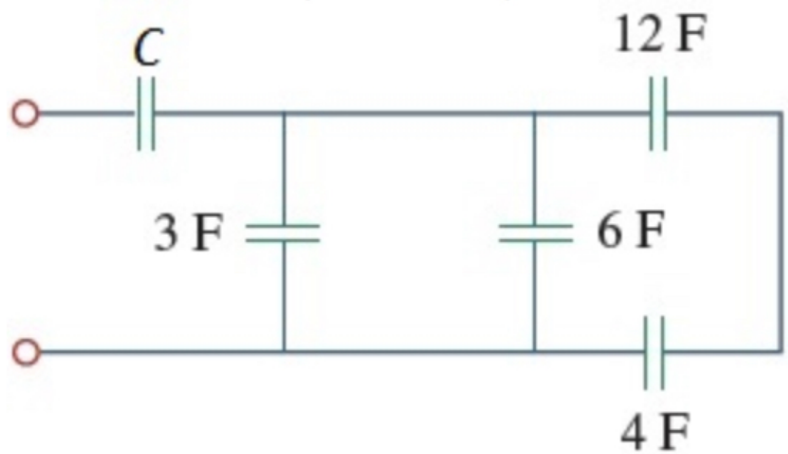


The voltage across the capacitors are v_1 = [ ] V and v_2 = [ ] V.

7.

value:
10.00 points

Determine the equivalent capacitance for the given circuit, where $C = 8$ F.

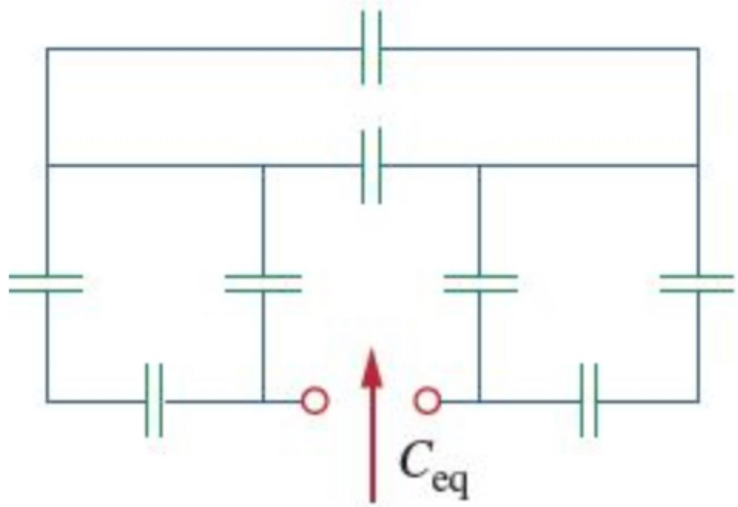


The equivalent capacitance is ______ F.

8.

value:
10.00 points

Find the equivalent capacitance in the given circuit if all capacitors are 16 μF.

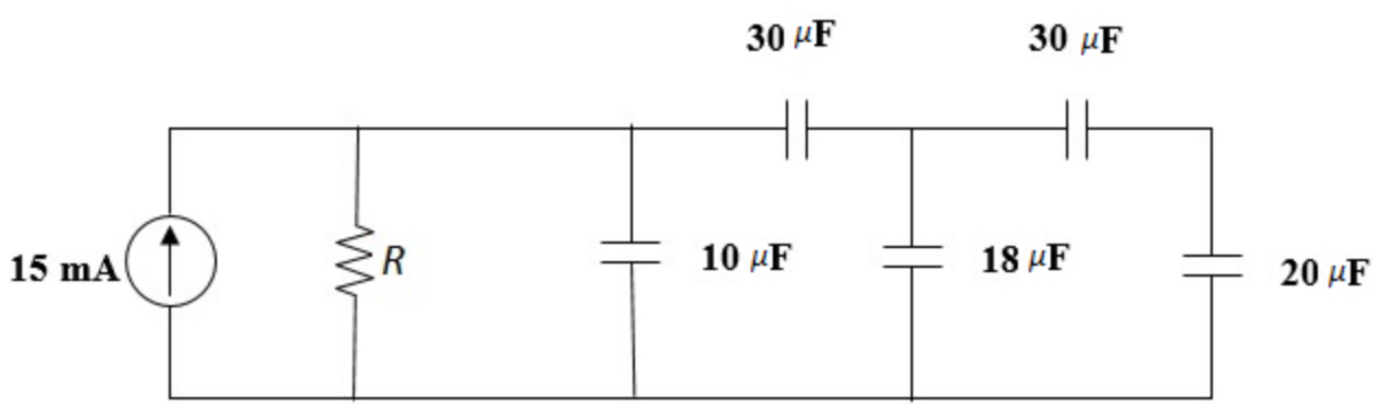


The equivalent capacitance is ______ μF.

9.

value:
10.00 points

In the given circuit, assume that the capacitors were initially uncharged and that the current source has been connected to the circuit long enough for all the capacitors to reach steady-state (no current flowing through the capacitors). Also assume that $R = 23\ \text{k}\Omega$.



Determine the voltage across each capacitor.

The voltage across each capacitor is as follows:

v_{10} = ____ V

v_{30} = ____ V

v_{18} = ____ V

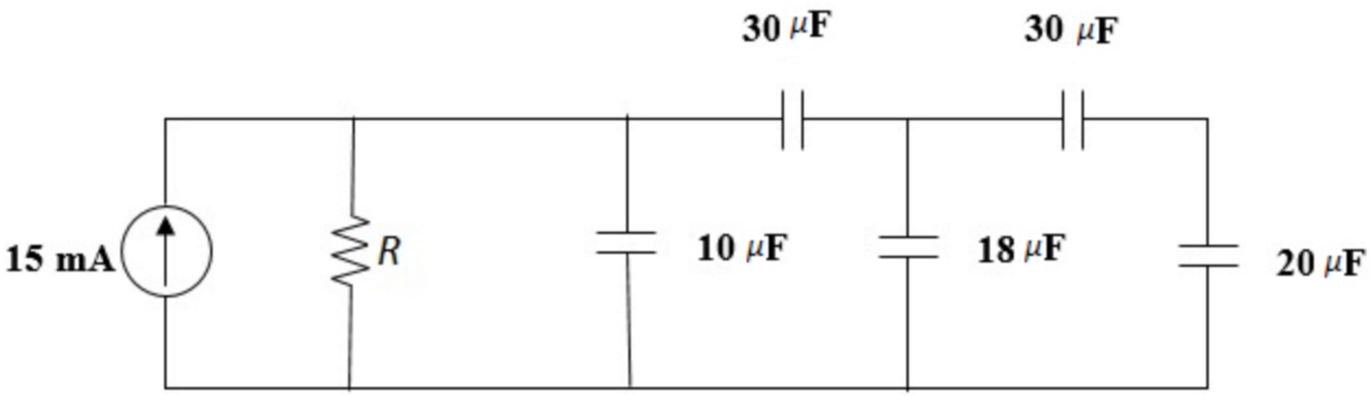
v_{30} = ____ V

v_{20} = ____ V

10.

value:
10.00 points

In the given circuit, assume that the capacitors were initially uncharged and that the current source has been connected to the circuit long enough for all the capacitors to reach steady-state (no current flowing through the capacitors). Also assume that $R = 23\ \text{k}\Omega$.



Determine the energy stored in each capacitor.

The energy stored in each capacitor is as follows:

w_{10} = ______ mJ
w_{30} = ______ mJ
w_{18} = ______ mJ
w_{30} = ______ mJ
w_{20} = ______ mJ

11.

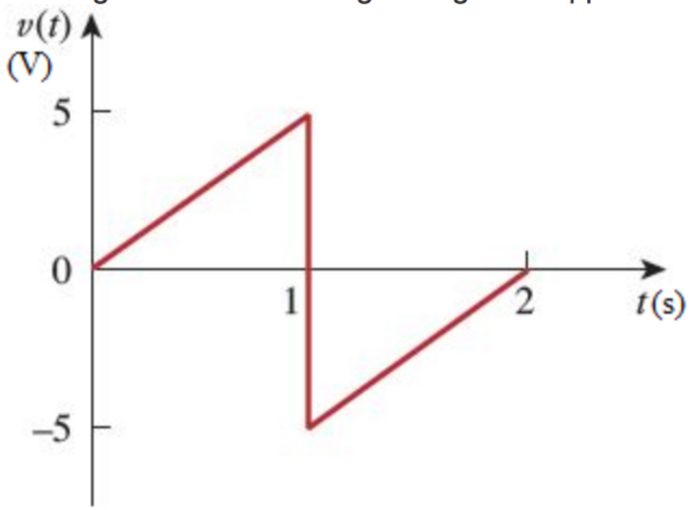
value:
10.00 points

The voltage across a 75-mH inductor is given by $v(t) = [5e^{-2t} + 2t + 4]$ V for $t > 0$. Determine the current $i(t)$ through the inductor. Assume that $i(0) =$ 0 A.

The current through the inductor is $i(t) = [-$ ______ $e^{-2t} +$ ______ $t^2 +$ ______ $+$ ______ $]$ A.

12. value:
10.00 points

If the voltage waveform in the given figure is applied to a 26-mH inductor, find the inductor current $i(t)$ for $0 < t < 2$ s. Assume $i(0) = 0$.



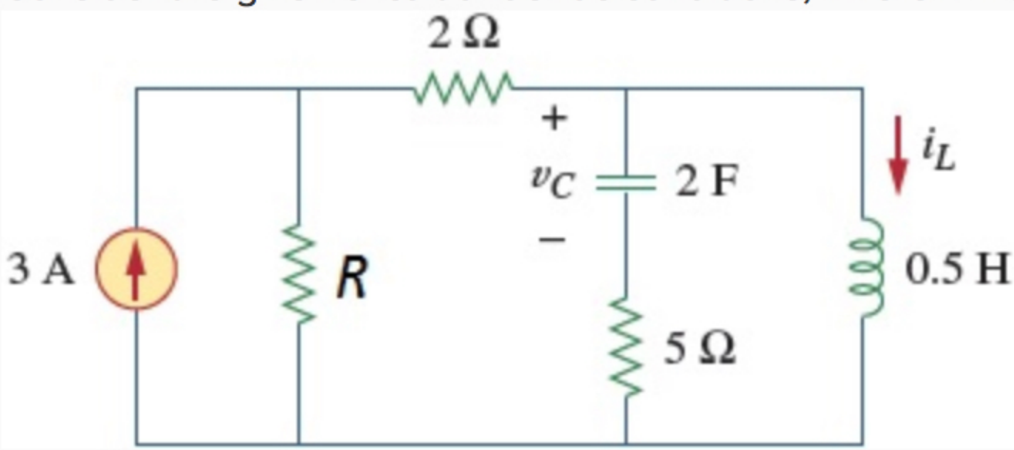
The inductor current for $0 < t < 1$ s is $i(t)$ = (______) t^2 A

The inductor current for $1 < t < 2$ s is $i(t)$ = [______ – ______ t + ______ t^2] A.

13.

value:
10.00 points

Consider the given circuit under dc conditions, where $R = 3\ \Omega$.

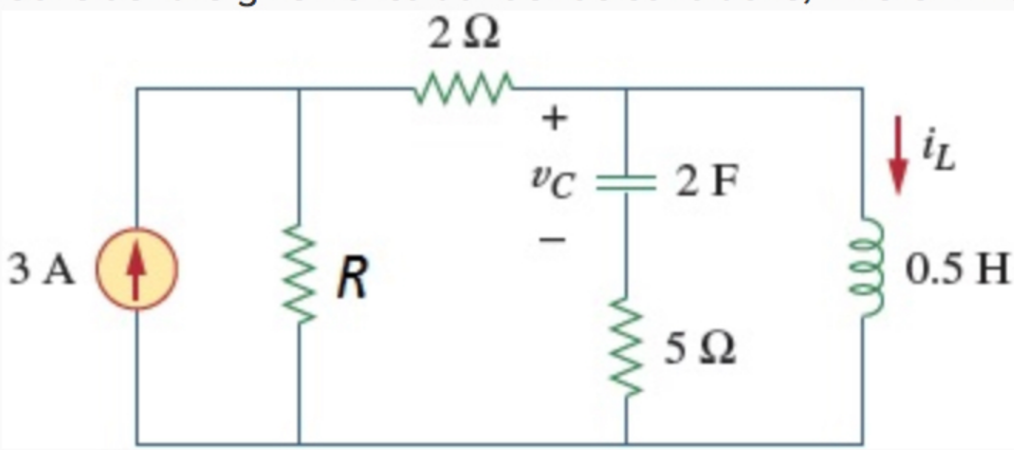


Find the voltage v_C.

The voltage v_C is ______ V.

14. value:
10.00 points

Consider the given circuit under dc conditions, where $R = 3\ \Omega$.



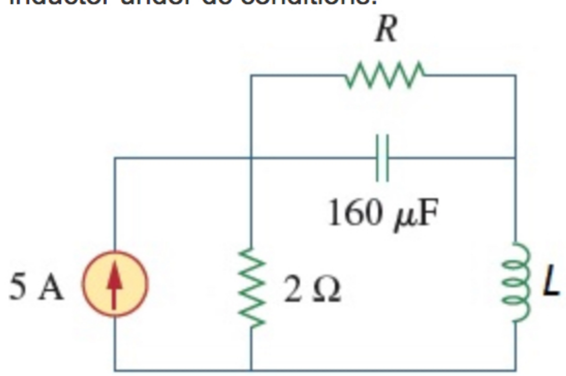
Find the energy stored in the inductor.

The energy stored in the inductor is ______ J.

15.

value:
10.00 points

Consider L = 15 mH in the given circuit and calculate the value of R that will make the energy stored in the capacitor the same as that stored in the inductor under dc conditions.

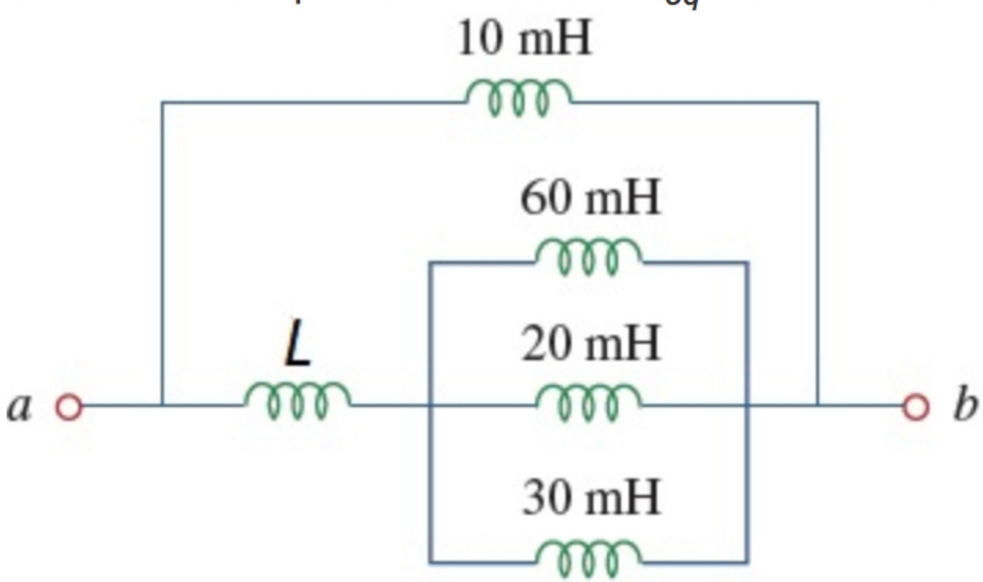


The value of R that will make the energy stored in the capacitor the same as that stored in the inductor under dc conditions is ______ Ω.

16.

value:
10.00 points

Determine the equivalent inductance L_{eq} at terminals *a*-*b* of the given circuit, where L = 13 mH.

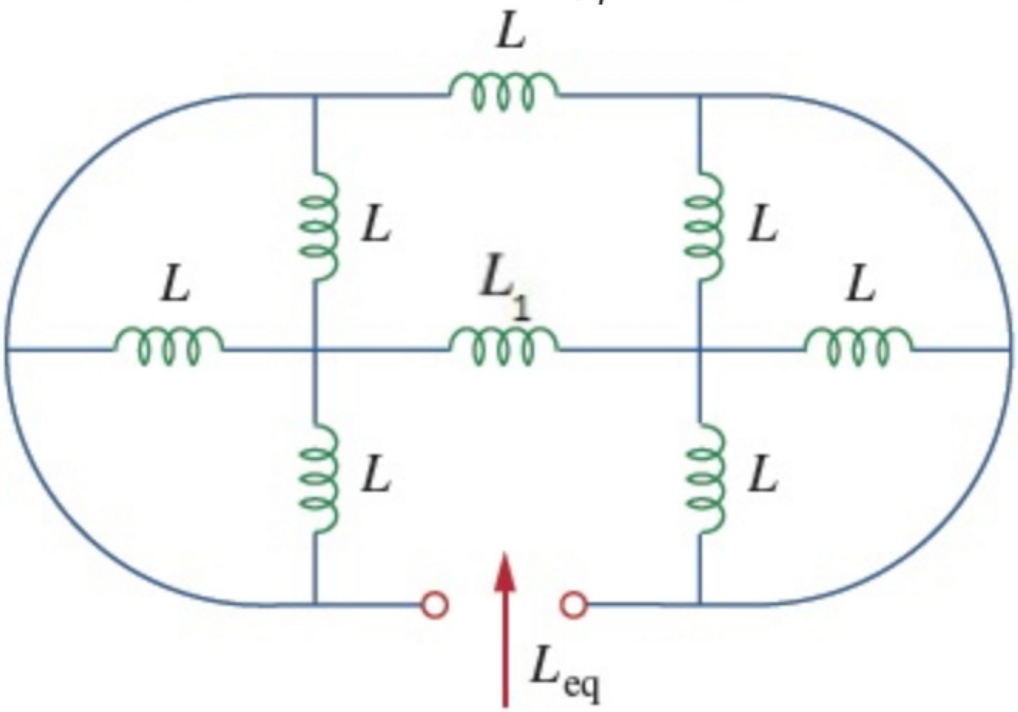


The equivalent inductance L_{eq} at terminals *a*-*b* of the circuit is [ ] mH.

17.

value:
10.00 points

Find the equivalent inductance L_{eq} in the given circuit, where L = 5 H and L_1 = 61 H.

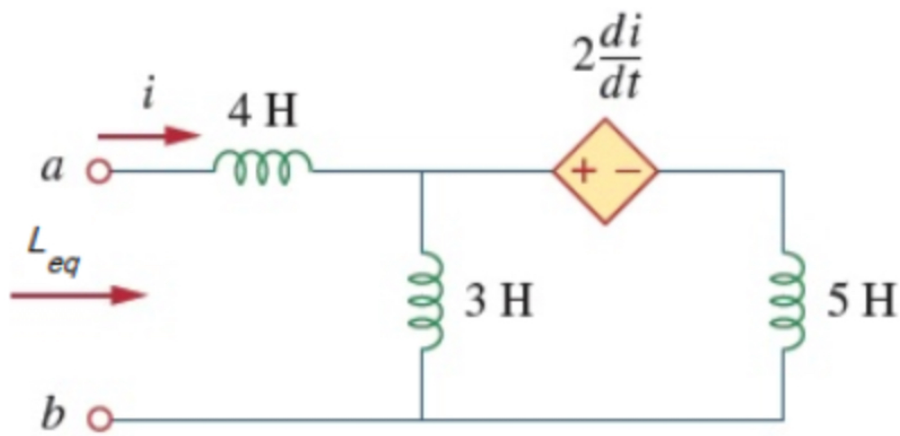


The equivalent inductance L_{eq} in the circuit is ______ H.

18.

value:
10.00 points

Determine the equivalent inductance L_{eq} that may be used to represent the inductive network of the given figure at the terminals.

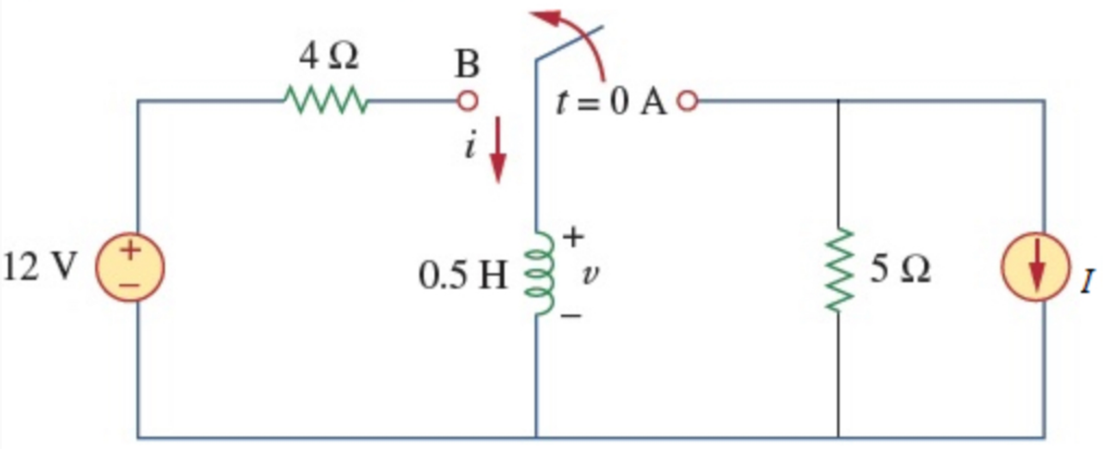


The equivalent inductance L_{eq} used to represent the inductive network is [ ] H.

19.

value:
10.00 points

The switch in the given figure has been in position *A* for a long time. At $t = 0$, the switch moves from position *A* to *B*. The switch is a make-before-break type so that there is no interruption in the inductor current. Consider the value of current $I = 4$ A.



Find the current $i(t)$ for $t > 0$.

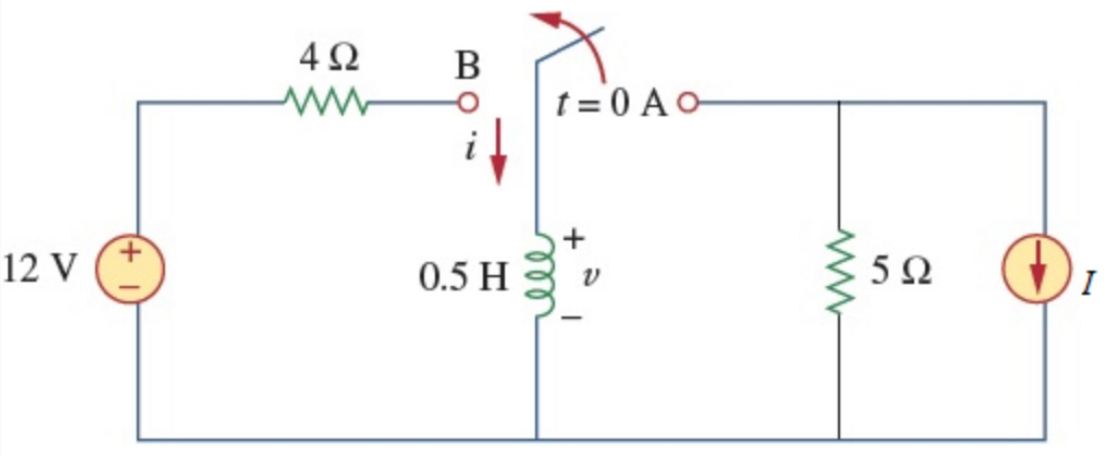
The current $i(t)$ is ([ ] – [ ] $e^{-[\ ]t}$) A.

20.

value:

10.00 points

The switch in the given figure has been in position *A* for a long time. At $t = 0$, the switch moves from position *A* to *B*. The switch is a make-before-break type so that there is no interruption in the inductor current. Consider the value of current $I = 4$ A.



Find the voltage *v*(*t*) long after the switch is in position *B*.

The voltage *v*(*t*) long after the switch is in position *B* is ______ V.