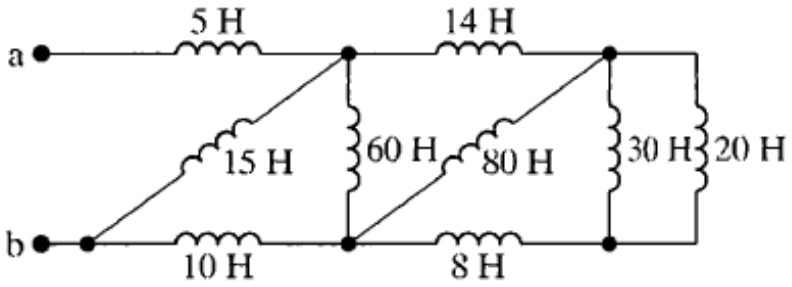
6.20 PSPICE MULTISIM Assume that the initial energy stored in the inductors of Fig. P6.20 is zero. Find the equivalent inductance with respect to the terminals a,b.

Figure P6.20



Solution:

P 6.20 $30\|20 = 12\,\text{H}$

$80\|(8+12) = 16\,\text{H}$

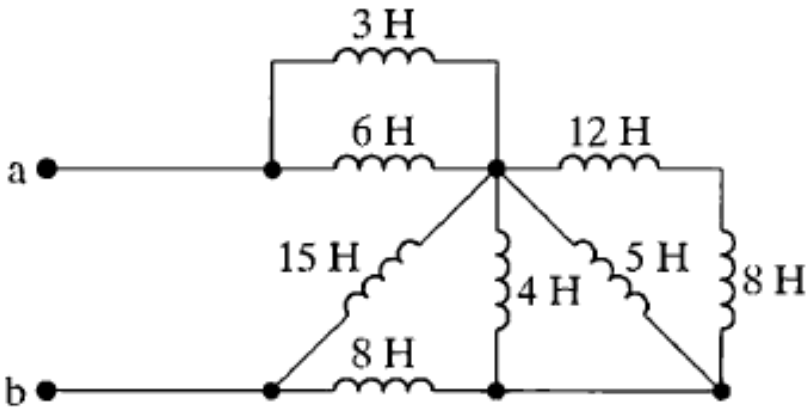
$60\|(14+16) = 20\,\text{H}$

$15\|(20+10) = 20\,\text{H}$

$L_{ab} = 5 + 10 = 15\,\text{H}$

6.21 Assume that the initial energy stored in the inductors of Fig. P6.21 is zero. Find the equivalent inductance with respect to the terminals a,b.

Figure P6.21



Solution:

P 6.21 $5 \| (12 + 8) = 4\,\text{H}$

$4 \| 4 = 2\,\text{H}$

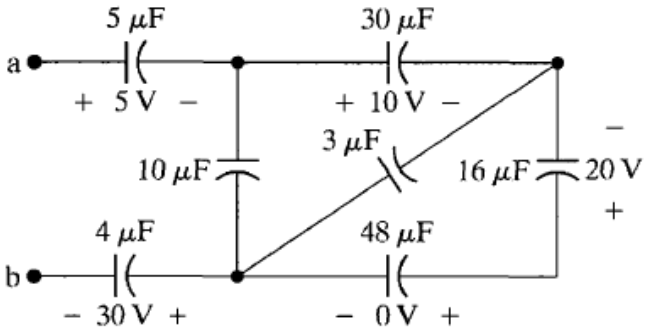
$15 \| (8 + 2) = 6\,\text{H}$

$3 \| 6 = 2\,\text{H}$

$6 + 2 = 8\,\text{H}$

6.26 Find the equivalent capacitance with respect to the terminals a,b for the circuit shown in Fig. P6.26.

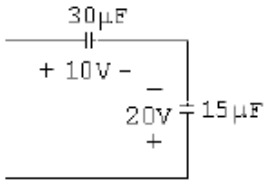
Figure P6.26



Solution:

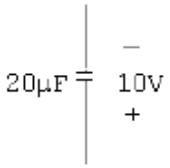
P 6.26 $\dfrac{1}{C_1} = \dfrac{1}{48} + \dfrac{1}{16} = \dfrac{1}{12}; \qquad C_1 = 12\,\mu\text{F}$

$C_2 = 3 + 12 = 15\,\mu\text{F}$

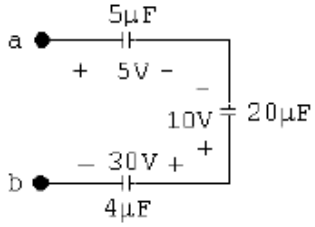


$\dfrac{1}{C_3} = \dfrac{1}{30} + \dfrac{1}{15} = \dfrac{1}{10}; \qquad C_3 = 10\,\mu\text{F}$

$C_4 = 10 + 10 = 20\,\mu\text{F}$



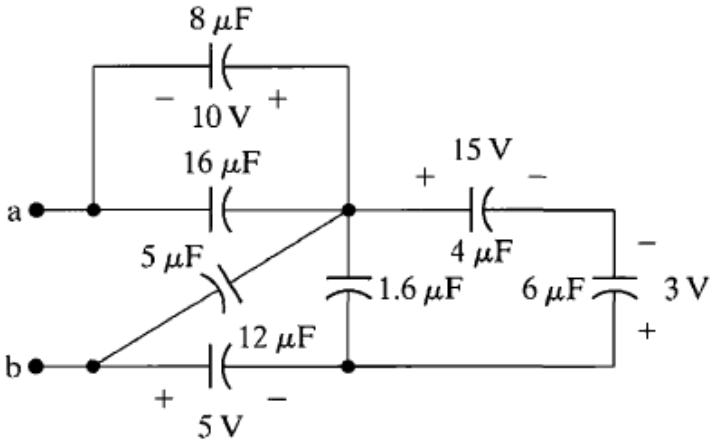
$\dfrac{1}{C_5} = \dfrac{1}{5} + \dfrac{1}{20} + \dfrac{1}{4} = \dfrac{1}{2}; \qquad C_5 = 2\,\mu\text{F}$



Equivalent capacitance is $2\,\mu$F with an initial voltage drop of +25 V.

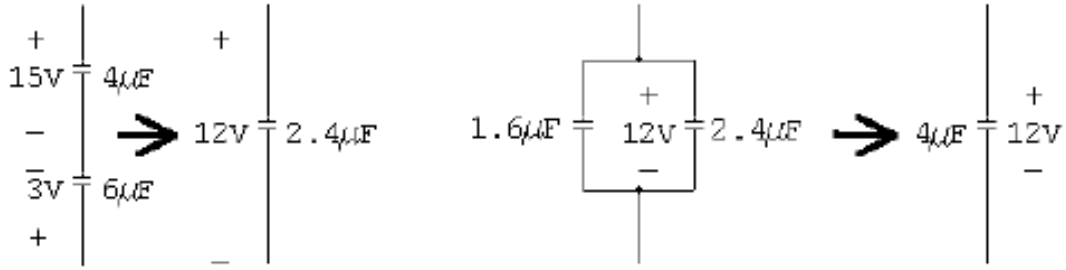
6.27 Find the equivalent capacitance with respect to the terminals a,b for the circuit shown in Fig. P6.27.

Figure P6.27



Solution:

P 6.27 $\dfrac{1}{4}+\dfrac{1}{6}=\dfrac{5}{12} \quad \therefore \quad C_{eq}=2.4\,\mu\text{F}$



$\dfrac{1}{4}+\dfrac{1}{12}=\dfrac{4}{12} \quad \therefore \quad C_{eq}=3\,\mu\text{F}$