_____
name

1. Short answer questions; no explanations required.

5% (a) State the terminal law of a capacitor with capacitance 2 F.

5% (b) Is an inductor an open or short circuit at dc steady-state?

5% (c) When the input to an RLC circuit is $v_i(t) = \cos \omega t$ the output is

$$v_o(t) = \frac{2\omega}{\sqrt{1+4\omega^2}} \cos\left(\omega t + \tan^{-1}\left(-\frac{1}{2\omega} - 90^o\right)\right).$$

Is this circuit a lowpass filter, highpass filter, bandpass filter or none of the above?

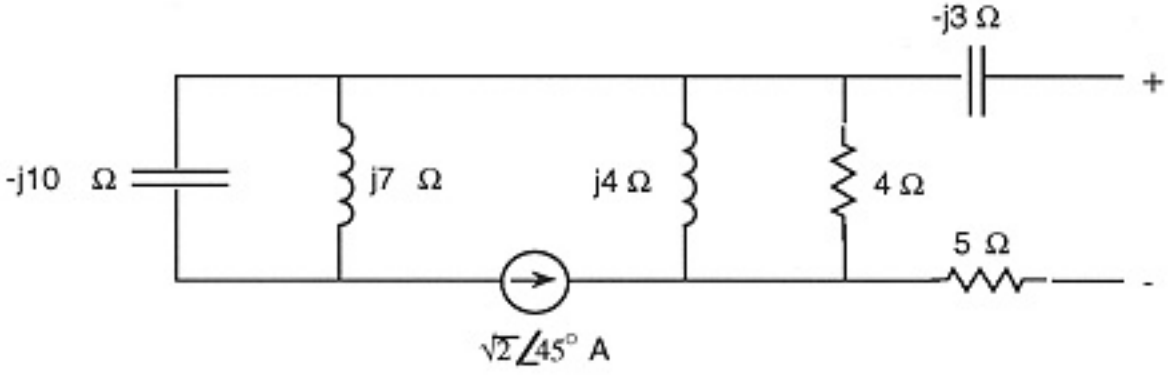
5% (d) Give the formula for the current i(t) whose phasor representation is $17 \angle -37^o$ with frequency 3 Hz.

2. Show how to interconnect several 1 F capacitors to obtain 2.5 F.

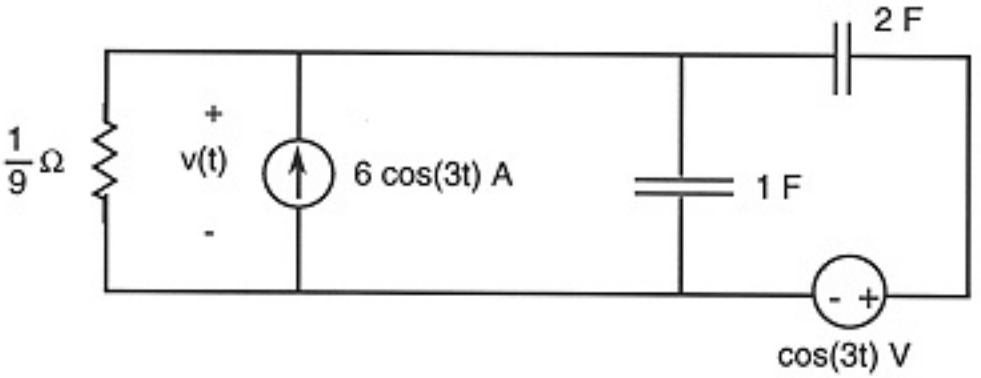
10%

3. Find the Thevenin equivalent phasor circuit for the following:

20%



4.

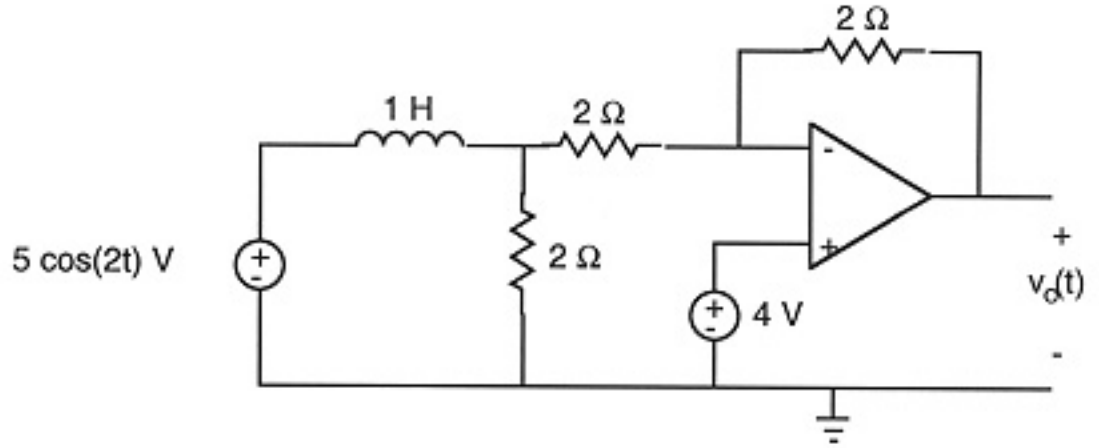


10% (a) Write a differential equation for v(t) in the circuit shown above. Simplify your equation but do not solve.

15% (b) Find the steady-state voltage v(t). You may use any method.

5. Find the steady-state voltage $v_0(t)$ in the circuit shown below.

25%



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_____
name

1. Short answer questions; no explanations required.

5% (a) State the terminal law of an inductor with inductance 3 H.

5% (b) Is a capacitor an open or short circuit at dc steady state?

5% (c) When the input to a certain RLC circuit is $v_i(t) = \cos \omega t$ the output is

$$v_o(t) = \sqrt{\frac{1}{1+9\omega^2}} \cos\left(\omega t + \tan^{-1}\left(-\frac{1}{3\omega}\right)\right).$$

Is this circuit a lowpass filter, highpass filter, bandpass filter or none of the above?

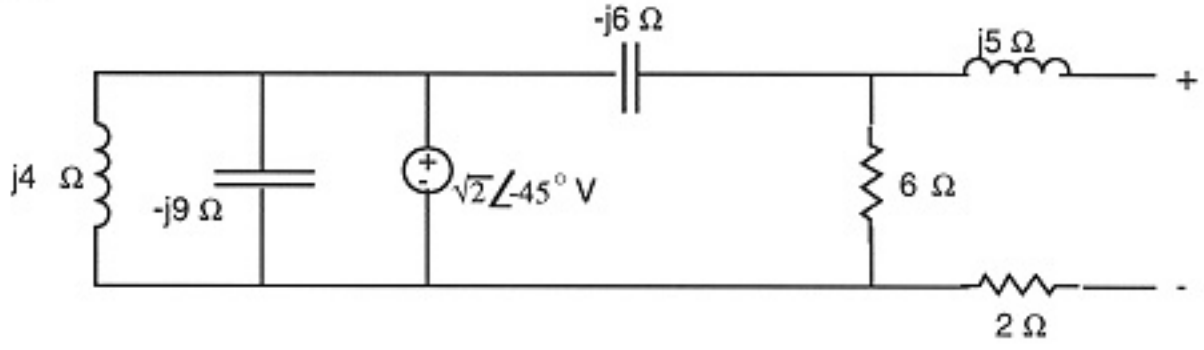
5% (d) Give the formula for the voltage v(t) whose phasor representation is $13 \angle -24^\circ$ with frequency 5 Hz.

2. Show how to interconnect several 1 H inductors to obtain $3\frac{1}{3}$ H.

10%

3 Find the Thevenin equivalent phasor circuit for the following.

20%



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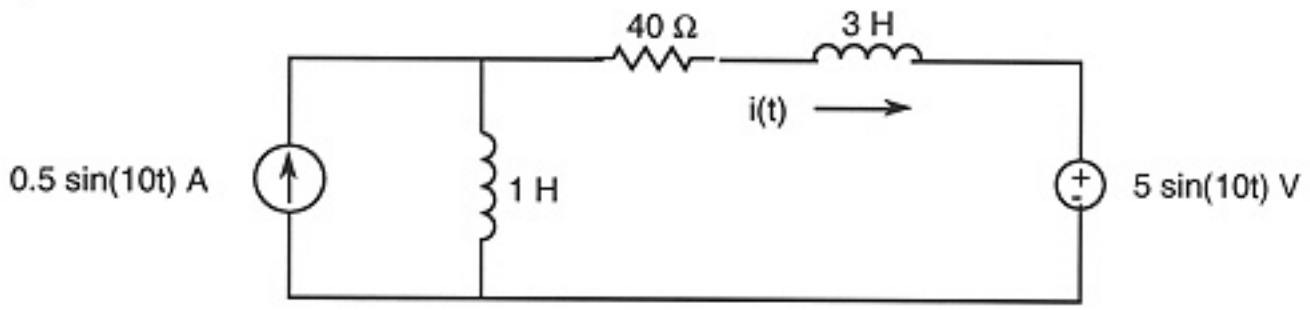
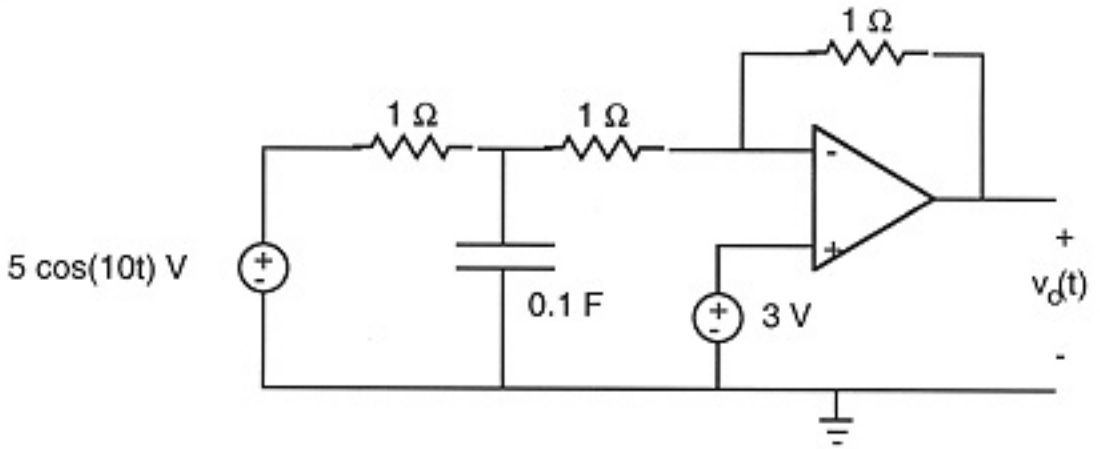


10% (a) Write a differential equation for i(t) in the circuit shown above. Simplify your equation but do not solve.

15% (b) Find the steady-state current i(t). You may use any method.

5. Find the steady-state voltage $v_0(t)$ in the circuit shown below.

25%



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