

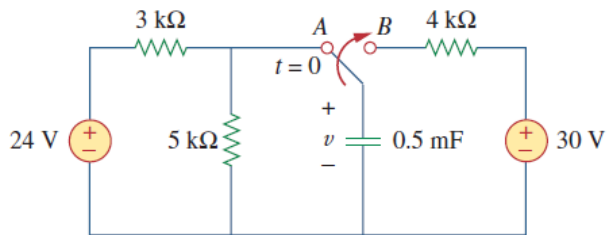
Midterm May 5, 2016

Instructions: This exam is closed book, closed notes. You may have a single sheet of formulas (front and back) with no worked problems that you must turn in with your exam.

Question 1:

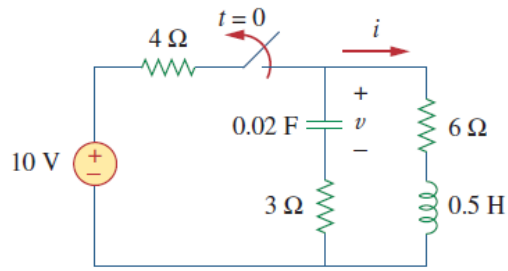
The switch in the circuit shown below has been in position A for a long time. At $t = 0$, the switch moves to B.

- Find $v(t)$, $t \geq 0$
- Calculate $v(t)$, at $t = 4$ s.



Question 2:

The switch in the circuit below has been closed for a long time before opening at $t = 0$. Find $i(t)$, $t \geq 0$.



Question 3:

Use phasors to find the (steady state solution for) current $i(t)$ in a circuit described by the following integro-differential equation:

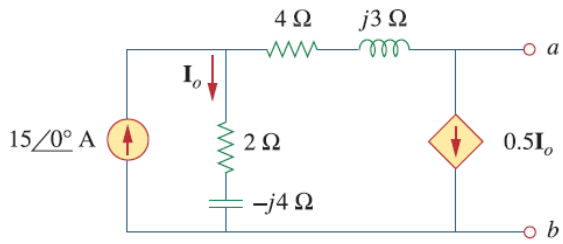
$$4i(t) + 8 \int_{-\infty}^t i(\tau) d\tau - 3 \frac{di(t)}{dt} = 50 \cos(2t + 75^\circ)$$

Hint: Replace each term in the above equation with its phasor representation and then solve for the current phasor. The time domain solution should follow directly.

(Use of another method will result in a maximum score of 50%).

Question 4:

Determine the Thevenin equivalent circuit of the circuit shown below as seen from terminals a - b .



Question 5:

Find the input impedance of the circuit shown below. Assume that the circuit operates at $\omega = 50$ rads/s.

