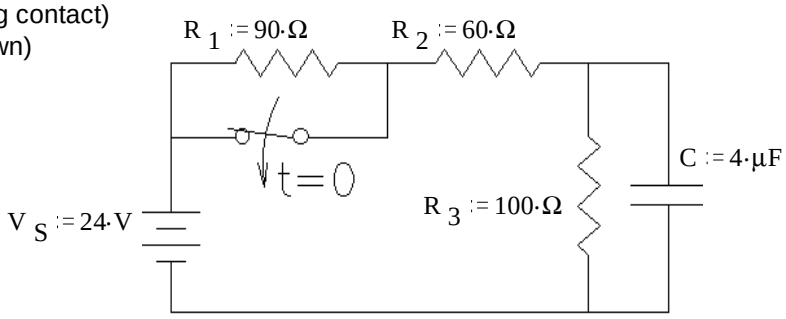
ECE 2210/00 Exam 2 given: Spring 21 (Some space has been removed)

1. (30 pts) The switch has been open (not making contact) for a long time and is switched closed (as shown) at time $t = 0$.



a) Find the complete expression for $v_C(t)$.

b) What is $v_C(t)$ when $t = \tau$? $v_C(\tau) = ?$

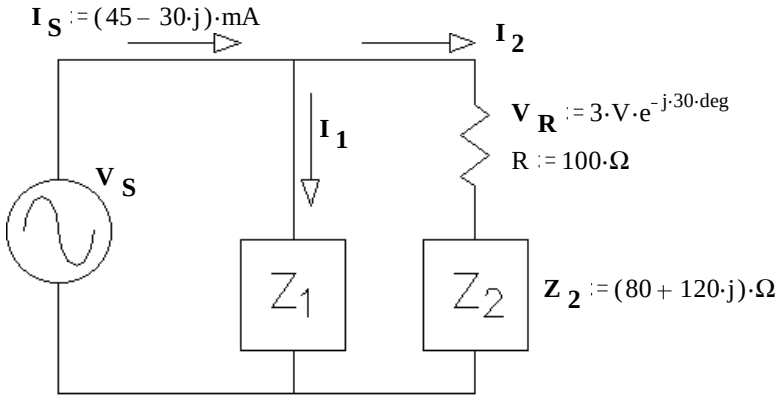
c) At time $t = \tau$ the switch is opened again. Find the complete expression for $v_C(t')$, where t' starts at $t = \tau$. Be sure to clearly show the time constant.

ECE 2210/00 Exam 2 Spring 21 p2

Problems are out-of-order

3. (30 pts) For partial credit, you must show work and/or intermediate results.

a) Find $\mathbf{I_2}$



b) Find $\mathbf{V_S}$

c) Find $\mathbf{I_1}$ in polar form.

Remember to put $\mathbf{I_1}$ in polar form

d) Find $\mathbf{Z_1}$ in any form.

Answers 1. a) $15\cdot V - 5.4\cdot V\cdot e^{-\frac{t}{0.15\cdot ms}}$ b) $13.0\cdot V$ c) $9.6\cdot V + 3.4\cdot V\cdot e^{-\frac{t'}{0.24\cdot ms}}$

2. $211\Omega\ \underline{/-31.43^o}$

3. a) $25.98 - 15\cdot j$ mA b) $6.48 + 0.418\cdot j$ V $= 6.49\cdot V\cdot e^{j\cdot 3.69\cdot deg}$

c) $24.2\cdot mA\cdot e^{-j\cdot 38.3\cdot deg}$ d) $199.3 + 179.1\cdot j\ \Omega = 268\cdot\Omega\cdot e^{j\cdot 41.95\cdot deg}$

4. i_C