Assignment 13

ELG2138 A

November 28, 2019

General instructions

1. **Your equations and solutions may be handwritten, scanned into a PDF format.**
2. **A typed solution can be given a bonus mark of up to 10% the full mark.**
3. **Once you have a PDF file for your entire assignment you can upload it to your account on the Blackboard Learn.**

Consider the circuit shown in Figure 1, where $v(t)$ is given by the shifted unit step function, with amplitude A, i.e., $v(t) = Au(t - T_1)$, as shown in the figure. Assume that the circuit has been left in steady-state for a long time for $t < 0$.

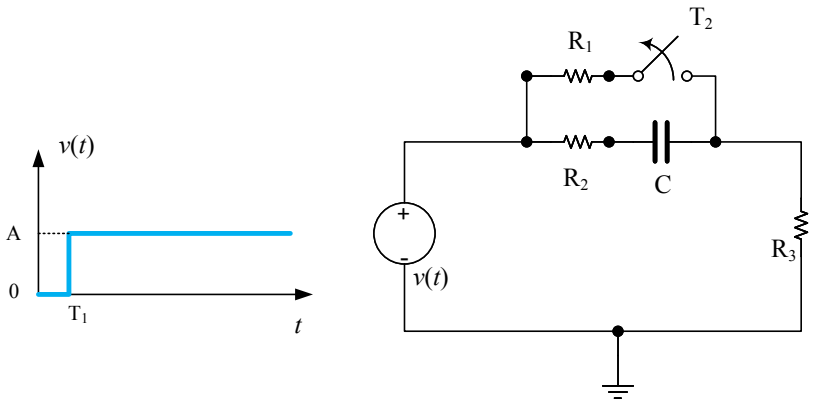

Figure 1: RLC circuit

Let

$$\begin{aligned} R_1 &= R_3 = 2\Omega, \quad R_2 = 1\Omega \\ C &= 1\frac{1}{6}\text{F} \\ T_1 &= 1 \text{ Seconds}, \quad T_2 = 2 \text{ Seconds} \\ A &= 5\text{V} \end{aligned}$$

Derive an expression for the voltage accross the capacitor for $t \geqslant 0$.