

Department of Electrical Engineering
 201A
 ESC 201A: Introduction to Electronics

Assignment -3

1. The switch has been in position 1 for a long time.
 - a. What is the voltage across L? The current through R? The current through L?
 - b. At $t=0$ s, the switch is moved to position 2. Determine $i_R(t)$ and $v(t)$ for $t > 0$ s.

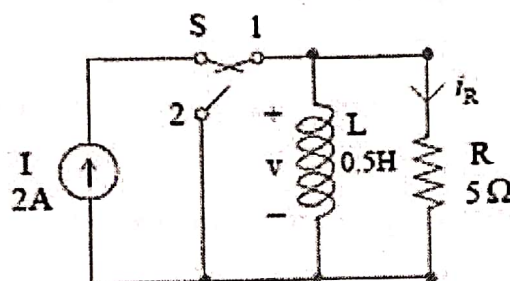


Fig. 1

2. The initial voltage on the capacitor in Fig 2 is zero. The switch S is connected to position 'A' at $t=0$.
 - a. Find the expression for the current through the capacitor as a function of time.
 - b. If the switch is moved to the position 'B' at $t = 1.5$ m sec, calculate the current through $2\text{ K}\Omega$ resistor as a function of time.

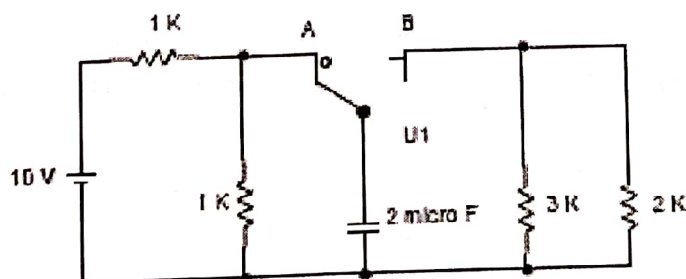


Fig. 2

3. The switch has been open for a long time. It is closed at $t=0$ s. Determine the inductor current and voltage for $t > 0$ s. Also determine the power supplied by the battery, as $t \rightarrow \infty$.

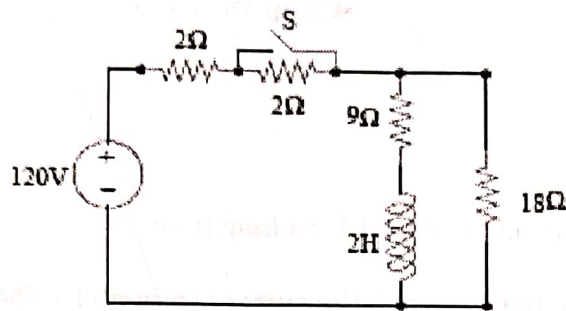


Fig. 3

4. A single rectangular pulse of 5 V magnitude and 30 μ s width is applied to RL circuit of figure 4.

- Determine the current through inductor after 20 μ s from the instant the pulse was applied.
- What is the voltage across the inductor after 50 μ s from the instant the pulse was applied.
- Plot inductor voltage as a function of time.

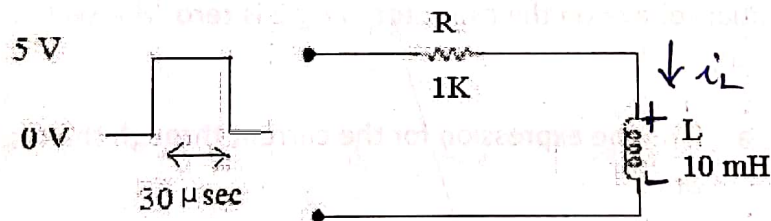


Fig. 4

5. The switch is moved to position 1 at $t=0$ s. Initial voltage across the capacitor is zero. The switch is subsequently moved to position 2 at $t=3T$, where T is the time constant of the circuit when the switch is in position 1. Determine $i(t)$ for (a) $0 < t < 3T$ (b) $t > 3T$.

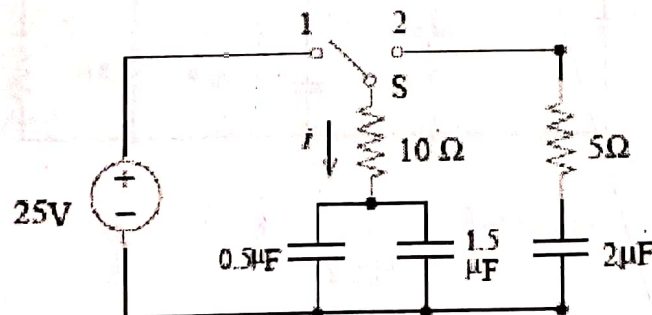


Fig. 5