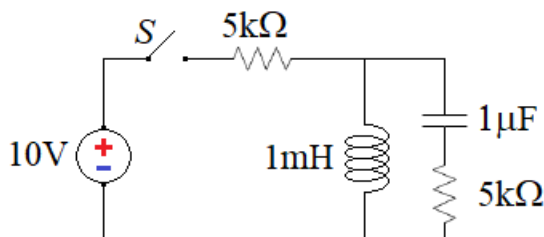


Physics II

RLC circuits

Problem 1.- In the circuit shown below, the capacitor is initially uncharged and there is no current through the inductance. Calculate the current in the resistor that is in series with the source immediately after closing the switch S at $t = 0$ and a long time after that.



- (A) $I(0) = 1\text{mA}$; $I(\infty) = 2\text{mA}$ (B) $I(0) = 2\text{mA}$; $I(\infty) = 1\text{mA}$
 (C) $I(0) = 1\text{mA}$; $I(\infty) = 0\text{mA}$ (D) $I(0) = 0\text{mA}$; $I(\infty) = 1\text{mA}$
 (E) $I(0) = 0\text{mA}$; $I(\infty) = 2\text{mA}$

Problem 2.- An RLC circuit is used to tune a radio to the frequency 103.7 MHz. The resistance of the circuit is $10\ \Omega$ and the inductance $2.0\ \mu\text{H}$. What is the best value of capacitor to be used?

- (A) 200 pF (B) 50 pF (C) 1.2 pF (D) 0.2 pF (E) 0.02 pF

Problem 2a.- In an RLC circuit in series, the resistance is 330 ohm and the inductance 25 mH. The circuit is fed by a 20V amplitude generator with angular frequency 1,000 radians per second. What value of capacitor will give maximum current?

- (A) 4nF (B) 40nF (C) 4μF (D) 40μF (E) 400μF

Problem 3.- A circuit has a capacitor C and an inductor L . Initially the capacitor is charged and at time $t = 0$ the switch S is closed. Indicate which of the graphs better represents the energy stored in the inductor as a function of time. Assume they are ideal devices.

