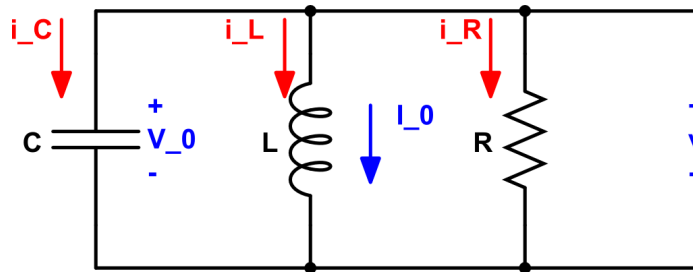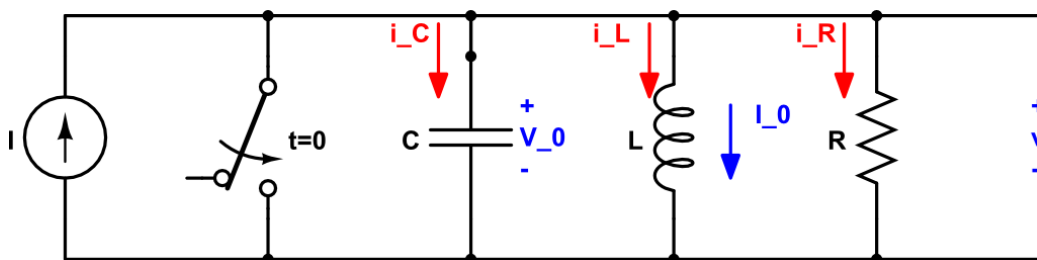**Question 1** [10]

For the circuit below, $R = 200\Omega$, $L = 50mH$, $C = 0.2\mu F$. The initial inductor current is $-45mA$ and the initial capacitor voltage is $15V$.

(a) Calculate the initial current for each branch of the circuit.

(b) Find $v(t)$ for $t \geq 0$.

(c) Find $i_L(t)$ for ≥ 0.

Question 2 [10]

For the circuit below, $R = 12.5\Omega$, $L = 25mH$, $C = 62.5\mu F$. The initial inductor current is $1mA$ and the initial capacitor voltage is $50V$.
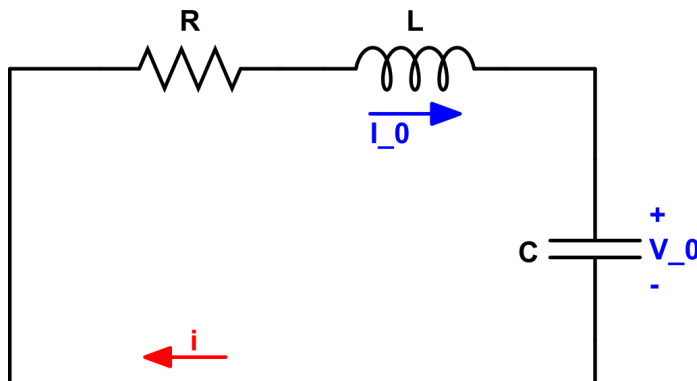

(a) If $I = 2A$, find the $i_L(t)$ for $t \geq 0$.

Question 3 [10]

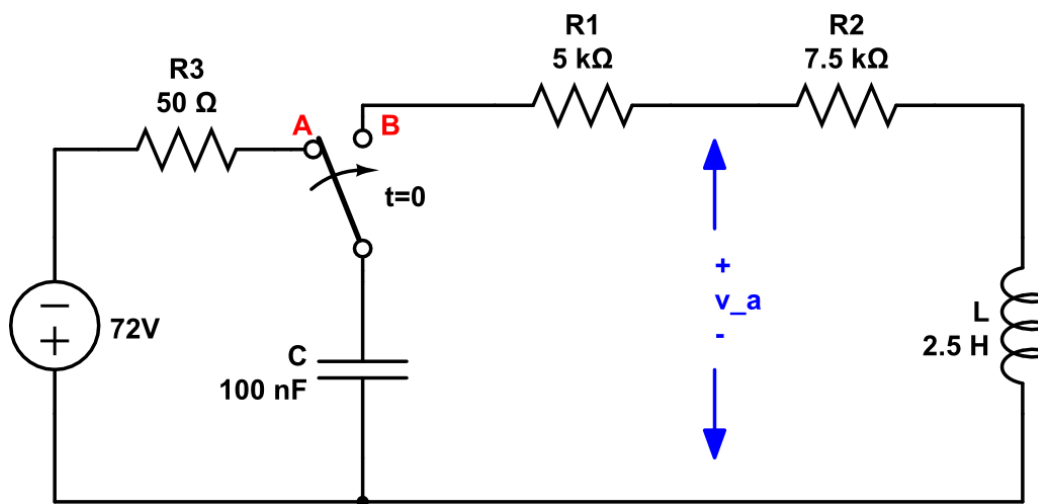The current in the circuit below is known to be

$$i(t) = B_1 e^{-2000t} \cos(1500t) + B_2 e^{-2000t} \sin(1500t), t \geq 0 \tag{1}$$

The capacitor has a value of $80nF$, the initial current is $7.5mA$, and the initial voltage across the capacitor is $-30V$. Find R, L, B_1, B_2.

Question 4 [20]

The switch in the circuit below has been at Position A for a long time. At $t = 0$, the switch is moved instantaneously to Position B.

(a) What is the initial value for v_a?

(b) What is the initial value for $\frac{dv_a}{dt}$?

(c) What is the numerical expression for $v_a(t)$ for $t \geq 0$.