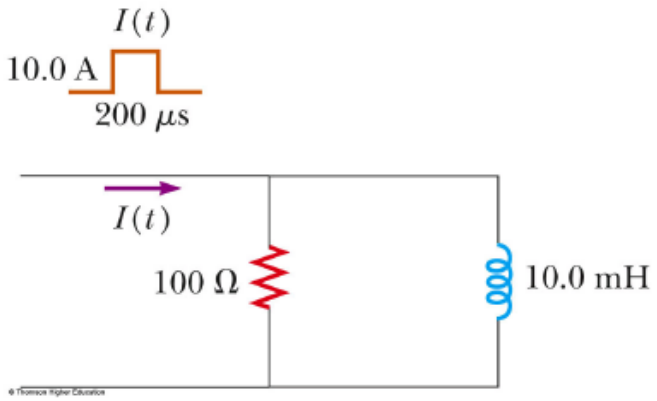
1. A current pulse is fed to the partial circuit shown in the figure. The current pulse is 10.0 A and its duration is from t =0 to t = 200 μs. Determine the current in the inductor and the resistor as a function of time.



First, 0 < t < 200 μs , we have two deferential equations: (I1 is the current go through the inductor and I2 is the current go through resistor.

$$L\frac{dI_1}{dt} = I_2 R$$

$$I_1 + I_2 = 10$$

Solve these equations(with initial condition: I1=0 when t = 0), we will get:

$$I_1 = 10 - 10e^{-\frac{R}{L}t} = \boxed{10 - 10e^{-1\times10^4 t}}$$

$$I_2 = 10e^{-\frac{R}{L}t} = \boxed{10e^{-1\times10^4 t}}$$

Second, t > 200 μs ($200\mu s = 2\times10^{-4}\, s$)

$$I_1 = I_2 = I_{1@(200\mu s)} \times e^{-\frac{R}{L}t} = \left(10 - 10e^{-1\times10^4\times2\times10^{-4}}\right)\times e^{-1\times10^4 t}$$

$$= \boxed{9e^{-1\times10^4 t}}$$

2. A 1.00 μF capacitor is fully charged with a 40.0 V power supply. The capacitor is then connected in parallel to a 10.0 mH inductor. Find the maximum current in the circuit.

Energy conserve

$$\frac{1}{2}CV^2 = \frac{1}{2}LI^2 \Rightarrow I = \sqrt{\frac{CV^2}{L}} = \sqrt{\frac{1\times10^{-6}\times40^2}{10\times10^{-3}}} = \boxed{0.4(A)}$$