1. It is known that the value of $\alpha$ for the discharge current to be critically damped is 0.8. Consider a linear xenon ($X = 450$) flashlamp with $l = 76.2$ mm, $d = 4$ mm and $P = 450$ torr. This flashlamp is discharged using a capacitor $C = 102 \mu$F at discharge voltage $V_o = 1.4$ kV. Obtain the circuit inductance that is required for the above flashlamp discharge circuit to be critically damped.

2. The current signal of a pulsed plasma discharge powered by capacitor discharge as shown in the diagram below has been obtained experimentally. The capacitor used has capacitance $C = 80$ nF and the discharge voltage is $V_o = 15$ kV.

![Diagram of current signal](image_url)

The following measurements are obtained: $T = 580$ ns, $V_1 = 12.17$ V, $V_2 = 6.68$ V, $V_3 = 3.67$ V dan $V_4 = 2.01$ V.

(i) Determine the inductance ($L$) of the discharge circuit.
(ii) Obtain the damping factor ($\alpha$) of the circuit.
(iii) Obtain the resistance ($R$) of the circuit.