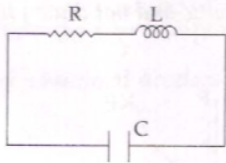
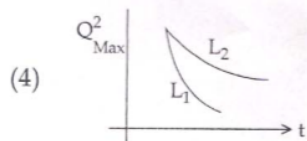
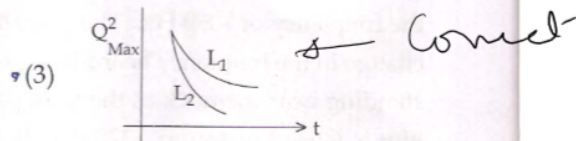
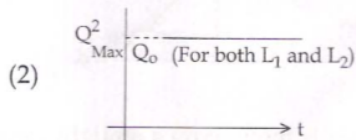
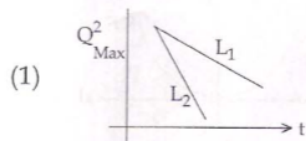


11. An LCR circuit is equivalent to a damped pendulum. In an LCR circuit the capacitor is charged to Q_0 and then connected to the L and R as shown below :



If a student plots graphs of the square of maximum charge (Q_{Max}^2) on the capacitor with time (t) for two different values L_1 and L_2 ($L_1 > L_2$) of L then which of the following represents this graph correctly ? (plots are schematic and not drawn to scale)



The charge on the capacitor is given by: $q = Q_0 e^{-Rt/2L} \cos(\omega t + \phi)$

$$\therefore Q_{max} = Q_0 e^{-Rt/2L}$$

Since L is in the denominator of the exponent, \therefore increasing L will slow the decrease in Q_{max} .

Also, the decay is exponential

Hence (3) is correct