

1. (4 points) Solve for the charge on the capacitor at time t , $q(t)$, for the LRC circuit with inductance $L = 2$ henry, $R = 7$ ohm, $C = 0.2$ farad, and an electromotive force $E(t) = 8$ volts if $q(0) = 5$ and $q'(0) = 0$. Hint: use $Lq''(t) + Rq'(t) + \frac{1}{C}q(t) = E(t)$. Show work.

2. (2 points) A spring on a frictionless track has a spring constant of 9N/m . What is the mass attached to the spring if it is set in motion and it has a frequency of 3 cycles/second? Defend your answer.

3. (4 points) Find the general solution for $y'' - 4y' + 5y = \cos(x)$. Show work.