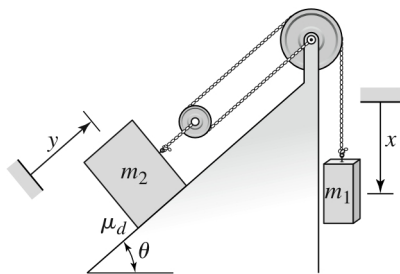


The FE reference book and 1 formula sheet may be used during this exam. 10 points each.

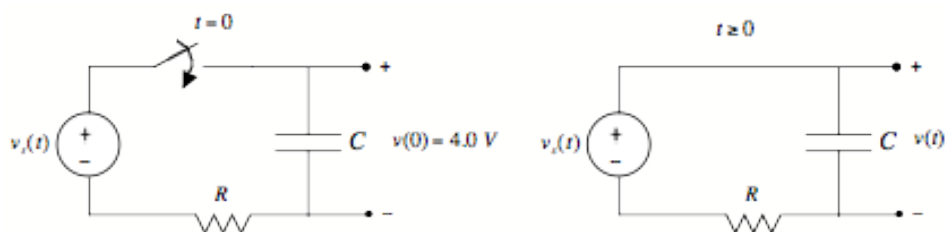
1. The voltage applied to a resistor results in currents as measured below. Determine the resistance by linear regression presuming a model of  $v = iR$ . Show all work.

Voltage (V)	Current (Ohm)
1.00	0.0105
2.00	0.0192
3.00	0.0297
4.00	0.0401

2. For the figure below, presume the pulleys are massless. Find  $\ddot{y}$  presuming  $\ddot{y}$  will be positive.



3. At time  $t = 0$  an RC circuit has an initial voltage of 0 V across the capacitor. The switch is closed, and a constant voltage source of  $v_s$  is applied to the circuit.



The governing differential equation is given by

$$RC \frac{dv(t)}{dt} + v(t) = v_s$$

Determine  $v(t)$ .