1) $KE_{Top} = \frac{1}{2} m v_{Top}^2$

★ let start position height = 0m

$PE_{Start} + KE_{Start} + W_{NC} = PE_{Top} + KE_{Top}$

$\frac{1}{2} k_1 x^2 + 0 + F_{fr} d = mgh + KE_{Top}$

$\frac{1}{2}(1120\ N/m)(5m)^2 + (-90N)(30m) = 70kg(9.8\ m/s^2)(5m) + KE_{Top}$

$14{,}000\ J - 2700\ J = 3430\ J + KE_{Top}$

$KE_{Top} = 7{,}870\ J$

$7{,}870\ J = \frac{1}{2}(70kg) v^2$

$v = 15.0\ m/s$

2) $PE_{end} = \frac{1}{2} k_2 x$

★ Let Final position height = 0m

$PE_{Start} + KE_{Start} + W_{NC} = PE_{End} + KE_{end}$

Two kinds of PE

$\frac{1}{2} k_1 x^2 + mgh + 0 + F_f d = \frac{1}{2} k_2 x^2 + 0$

$14{,}000\ J + 3430\ J + (-90N)(70m) = \frac{1}{2} k_2 (6m)^2$

$11{,}130 = 18m^2 (k_2)$

$k_2 = 618\ N/m$