Name: _____ (Key) _____ ID # _____
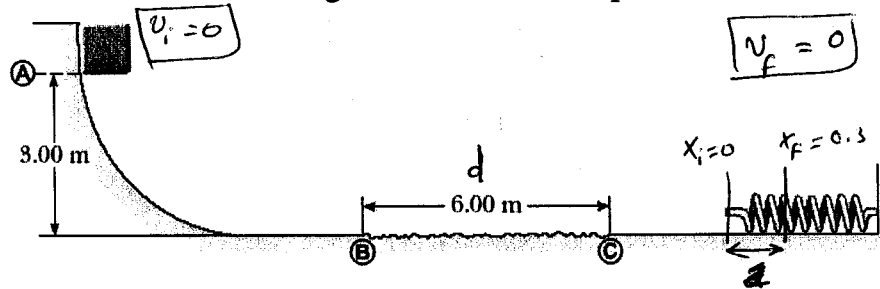
A 10-kg block is released from rest from point **A** in the figure. The track is frictionless except for the region between points **B** and **C**, which has a length of 6 m. The block travels down the track, hits a spring of force constant 2250 N/m, and compresses the spring 0.3 m from its equilibrium position before coming to rest momentarily. Determine the coefficient of kinetic friction μ_k between the block and the rough surface between points **B** and **C**.

$$\cancel{\Delta K}^{0} + \Delta U_g + \Delta U_s + \Delta E_{th} = 0$$

$$mg\,(\cancel{y_f}^{0} - y_i) + \tfrac{1}{2}k(x_f^2 - \cancel{x_i^2}^{0}) + \mu_k F_N\,d = 0$$

$$-mg\,y_i + \tfrac{1}{2}k\,x_f^2 + \mu_k\,mg\,d = 0$$

$$-10(9.8)(3) + \tfrac{1}{2}(2250)(6.3)^2 + \mu_k(10)(9.8)(6) = 0$$

$\text{solve} \quad \text{for} \quad \boxed{\mu_k = 0.328}$