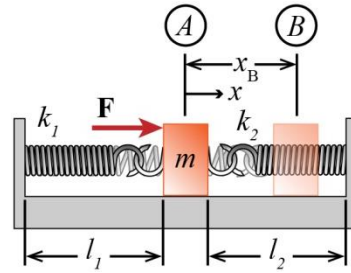


**P7.3-8)** A mass ( $m = 2 \text{ kg}$ ) is attached to two springs as shown in the figure. Initially, at state  $A$ , the springs are un-stretched. Force  $\mathbf{F}$  pushes the mass from state  $A$  to state  $B$ , compressing/extending the springs by  $x_B = 5 \text{ cm}$ . The mass is released from rest at state  $B$ . What is the speed of the mass as it passes its initial position at state  $A$ ? The spring constants are  $k_1 = 200 \text{ N/m}$  and  $k_2 = 300 \text{ N/m}$ . The coefficient of kinetic friction is  $0.3$  and the springs do not support vertical weight.



Given:

Find:

Solution:

### Free-body diagram

Draw a free-body diagram of the mass.

Which force(s) do non-conservative work?

Which force(s) do conservative work?

Which force(s) do no work?

### Newton's laws

Determine the value of the friction force.

### Work-energy balance

Apply the work-energy balance equation between states  $B$  and  $A$  to determine the speed of the mass as it passes state  $A$ .

$v_A =$  \_\_\_\_\_