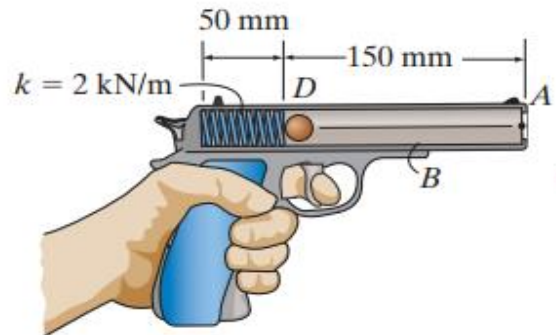


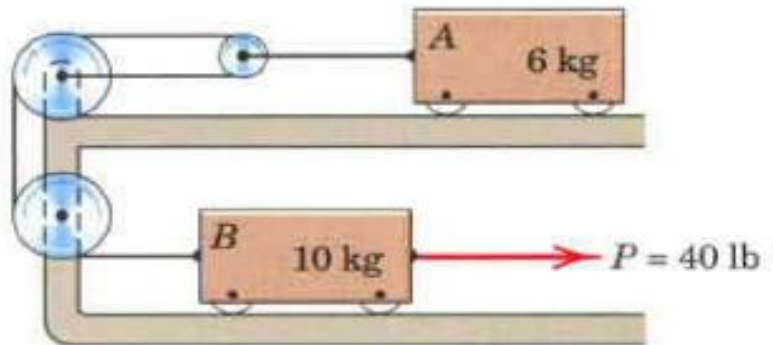
Addis Ababa Science and Technology University
College of Electrical and Mechanical Engineering
Department of Mechanical Engineering

Worksheet - III (Engineering Mechanics II: Dynamics)

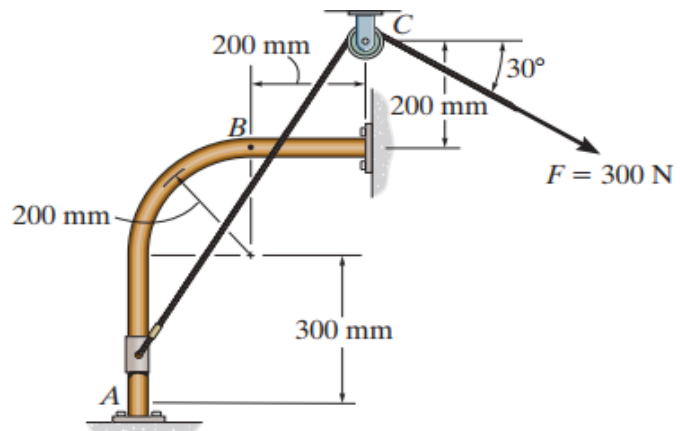
1. The spring in the toy gun has an unstretched length of **100 mm**. It is compressed and locked in the position shown. When the trigger is pulled, the spring unstretches **12.5 mm**, and the **20-g** ball moves along the barrel. Determine the speed of the ball when it leaves the gun. Neglect friction.



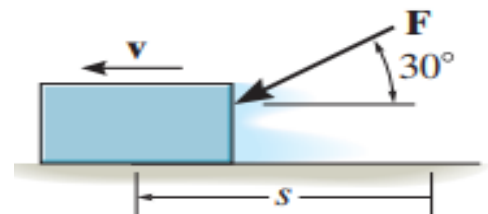
2. The force $P = 40 \text{ N}$ is applied to the system, which is initially at rest. Determine the speeds of A and B after A has moved **0.4 m**.



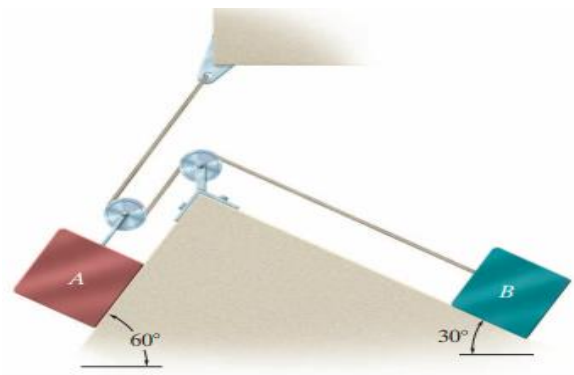
3. If the cord is subjected to a constant force of $F = 300 \text{ N}$ and the **15-kg** smooth collar starts from rest at A, determine the velocity of the collar when it reaches point B. Neglect the size of the pulley



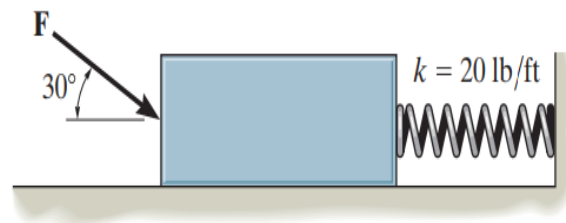
4. The **2-kg** block is subjected to a force having a constant direction and a magnitude, $F = (300/(1 + s)) \text{ N}$, where s is in meters. When $S = 4 \text{ m}$, the block is moving to the left with a speed of **8 m/s**. Determine its speed when $S = 12 \text{ m}$. The coefficient of kinetic friction between the block and the ground is $\mu_k = 0.25$.



5. Determine the velocity of the **60-lb** block **A** if the two blocks are released from rest and the **40-lb** block **B** moves **2 ft** up the incline. The coefficient of kinetic friction between both blocks and the inclined planes is $\mu_k = 0.10$.



6. The **50-lb** block rests on the rough surface for which the coefficient of kinetic friction is $\mu_k = 0.2$. A force, $F = (40 + s^2)\text{lb}$, where s is in ft, acts on the block in the direction shown. If the spring is originally unstretched ($s = 0$) and the block is at rest, determine the power developed by the force the instant the block has moved $s = 1.5\text{ ft}$



7. The **2-kg** ball of negligible size is fired from point **A** with an initial velocity of **10 m/s** up the smooth inclined plane. Determine the distance from point **C** to where it hits the horizontal surface at **D**. Also, what is its velocity when it strikes the surface?

