

AE 262 DYNAMICS
2013-2014 SPRING SEMESTER
HOMEWORK #2

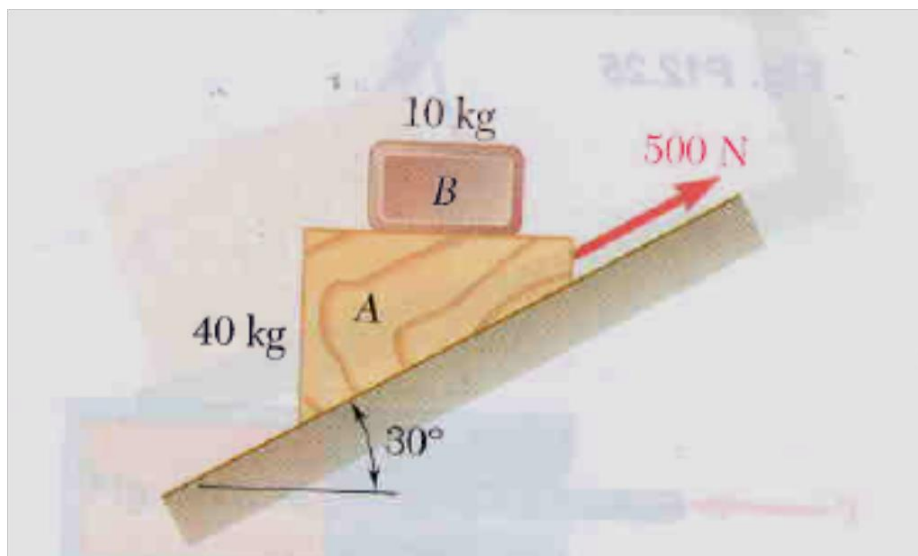
Given: 13.03.2014

Due: 24.03.2014 at 17.00

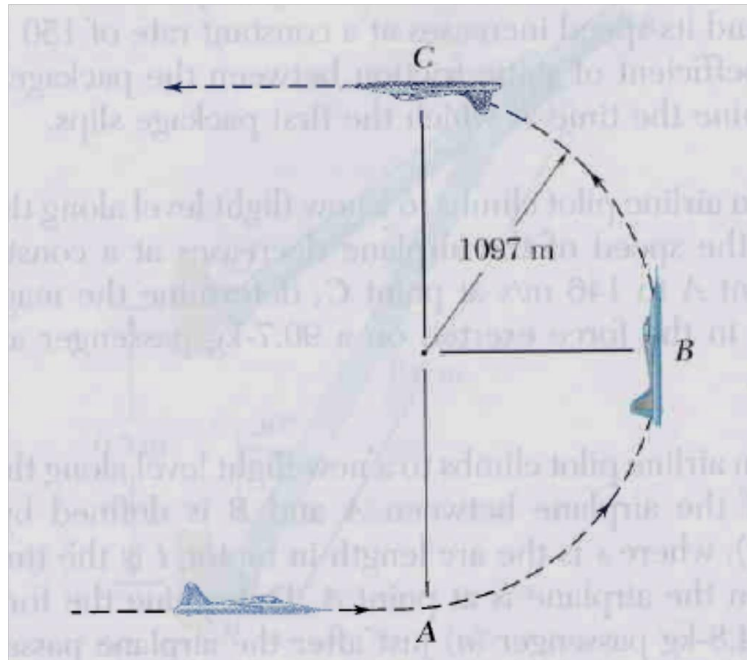
Submit to: Oğuz K. Onay

Room: 003

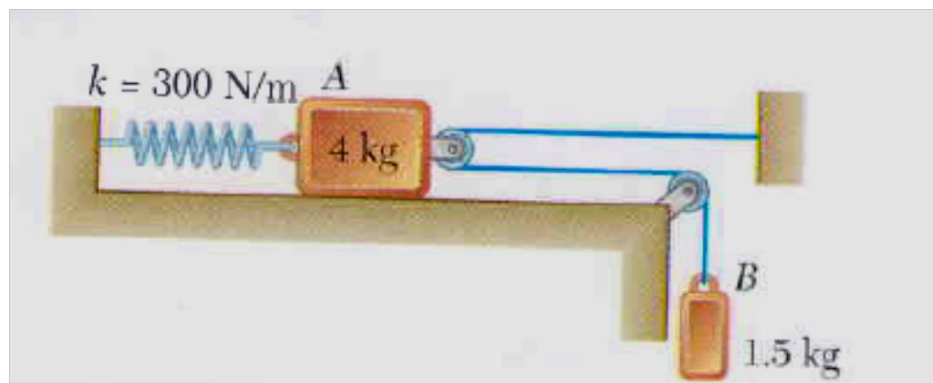
Q-1) The 10-kg block B is supported by the 40-kg block A which is pulled up an incline by a constant 500 N force. Neglecting the friction between the block and the incline and knowing that block B does not slip on block A, determine the smallest allowable value of the coefficient of static friction between the blocks.



Q-2) A 54.4-kg pilot flies a jet trainer in a half vertical loop of 1097 m radius so that the speed of the trainer decreases at a constant rate. Knowing that the pilot's apparent weights at points A and C are 1690 N and 355 N respectively, determine the force exerted on her by the seat of the trainer when the trainer is at point B.



Q-3) Blocks A and B have masses of 4 kg and 1.5 kg respectively, and are connected by a cord-and-pulley system and released from rest in the position shown with the spring undeformed. Knowing that the constant of the spring is 300 N/m determine **(a)** the velocity of block B after it has moved 150 mm, **(b)** the maximum velocity of block B, **(c)** the maximum displacement of block B. Ignore friction and the masses of the pulleys and spring.



Q-4) Collar B has a mass of 4 kg and is attached to a spring of constant 1500 N/m and of undeformed length 0.4 m. The system is set in motion with $r=0.2$ m, $v_\theta=6$ m/s and $v_r=0$. Neglecting the mass of the rod and the effect of friction, determine the radial and transverse components of the velocity of the collar when $r=0.5$ m.

