



Print Name: _____

Last Name

First Name

ID Number: M _____

On my honor, I hereby affirm that I have completed this examination independently, within the allotted time, and within the rules set forth by the Instructor. Further, I pledge that I have upheld the U.C. Student Code of Conduct rules on Academic Integrity while completing this examination. I have not cheated, I have not plagiarized, and I have not given unauthorized assistance to another student during the examination.

Signature

Date



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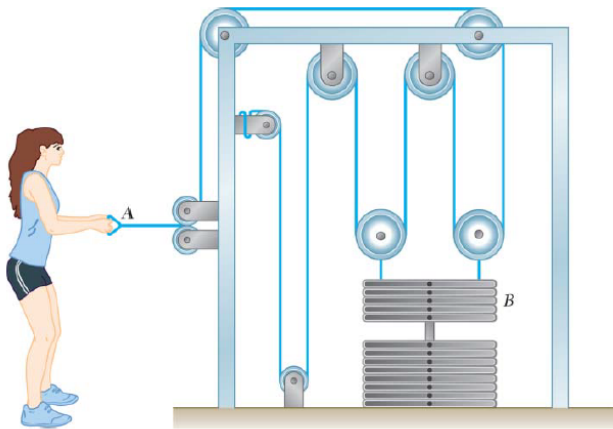


MECH2020 Test#2

1. [15 pts]

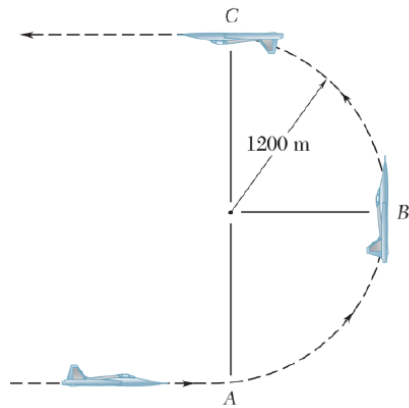
The acceleration of a particle is defined by the relation $a = -k\sqrt{v}$, where k is a constant. Knowing that $x = 0$ and $v = 81$ m/s at $t = 0$ and that $v = 36$ m/s when $x = 18$ m, determine (a) the velocity of the particle when $x = 20$ m, (b) the time required for the particle to come to rest.

2. [15 pts]



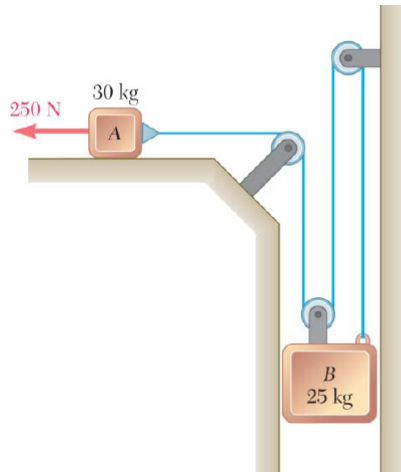
An athlete pulls handle A to the left with a constant force of $P = 100 \text{ N}$. Knowing that after the handle A has been pulled 30 cm its velocity is 3 m/s , determine the mass of the weight stack B .

3. [15 pts]



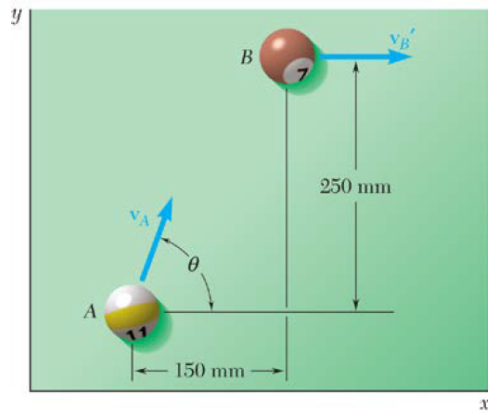
A 54-kg pilot flies a jet trainer in a half vertical loop of 1200-m radius so that the speed of the trainer decreases at a constant rate. Knowing that the pilot's apparent weights at Points *A* and *C* are 1680 N and 350 N, respectively, determine the force exerted on her by the seat of the trainer when the trainer is at Point *B*.

4. [15 pts]



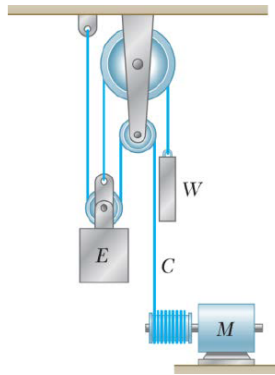
The system shown is at rest when a constant 250-N force is applied to block *A*. Neglecting the masses of the pulleys and the effect of friction in the pulleys and between block *A* and the horizontal surface, determine (a) the velocity of block *B* after block *A* has moved 2 m, (b) the tension in the cable.

5. [20 pts]



The coefficient of restitution is 0.9 between the two 60-mm-diameter billiard balls A and B . Ball A is moving in the direction shown with a velocity of 1 m/s when it strikes ball B , which is at rest. Knowing that after impact B is moving in the x direction, determine (a) the angle θ , (b) the velocity of B after impact.

6. [20 pts]



The elevator E has a weight of 6600 lbs when fully loaded and is connected as shown to a counterweight W of weight of 2200 lb. Determine the power in hp delivered by the motor (a) when the elevator is moving down at a constant speed of 1 ft/s, (b) when it has an upward velocity of 1 ft/s and a deceleration of 0.18 ft/s^2 .