

Reinforcement Quiz – DYN_013

1. An object experiences rectilinear acceleration $a(t) = 10 - 2t$. How far does it travel in 6 seconds if its initial velocity is 10 m/s?

(A) 182 m
 (B) 168 m
 (C) 142 m
 (D) 126 m

2. A wheel is rotating at 4000 rpm. If it experiences a deceleration of 20 rad/s^2 , through how many revolutions will it rotate before it stops?

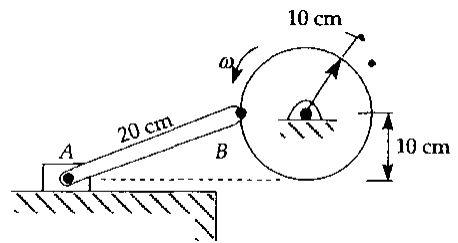
(A) 4400
 (B) 3200
 (C) 2100
 (D) 700

3. An 80-cm-diameter wheel is accelerating at 10 m/s^2 without slipping on a flat surface. What is the magnitude of the acceleration of the very top of the wheel when the velocity of the wheel is 4 m/s?

(A) 20 m/s^2
 (B) 25 m/s^2
 (C) 40 m/s^2
 (D) 45 m/s^2

4. If $\omega = 10 \text{ rad/s}$, find the velocity of slider A.

(A) 0.5 m/s
 (B) 0.557 m/s
 (C) 0.6 m/s
 (D) 0.866 m/s

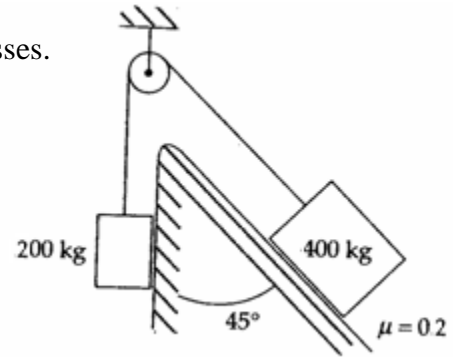


5. If the angular acceleration of the driver wheel in Problem 4 is zero, find the acceleration of slider A.

(A) 12.6 m/s^2
 (B) 15.1 m/s^2
 (C) 17.7 m/s^2
 (D) 20.3 m/s^2

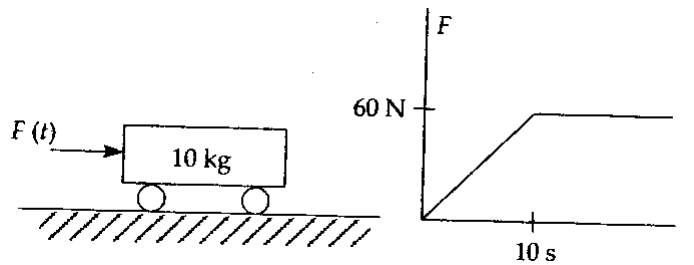
6. Find the tension in the string connecting the two masses. The pulley is massless and frictionless.

- (A) 240 N
 (B) 560 N
 (C) 1260 N
 (D) 2050 N



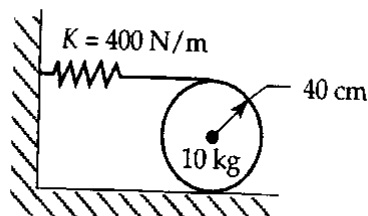
7. The force $F(t)$ acts on the mass shown. What is its velocity after 20 s if it starts from rest?

- (A) 60 m/s
 (B) 70 m/s
 (C) 80 m/s
 (D) 90 m/s



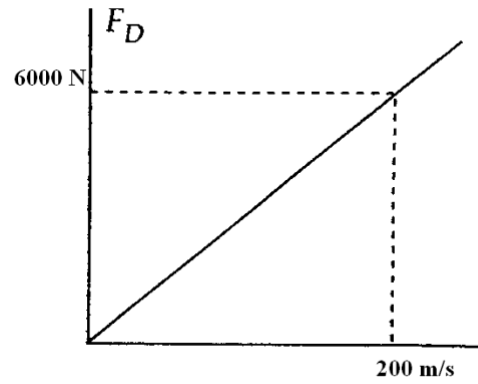
8. The spring is stretched until the force it exerts on the cylinder is 400 N. It is attached to a rope wrapped around the stationary cylinder. What is the cylinder's speed when the spring force is zero? (No slipping occurs.)

- (A) 5.16 m/s
 (B) 5.98 m/s
 (C) 6.32 m/s
 (D) 7.48 m/s



9. A constant thrust of 20,000 N launches on a 1500-kg rocket vertically upward. If the drag force F_D is related to the velocity, as shown, find the velocity of the rocket after 20 seconds.

- (A) 38 m/s
- (B) 42 m/s
- (C) 58 m/s
- (D) 70 m/s



10. The two identical balls collide as shown. What is v_2' if the coefficient of restitution is 0.8?

- (A) 5.4 m/s
- (B) 5.2 m/s
- (C) 5.0 m/s
- (D) 4.8 m/s

