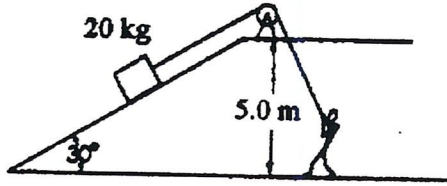


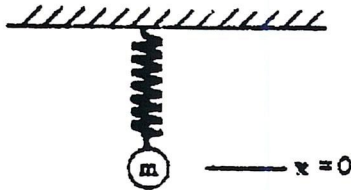
No. 22



A man pulls a 20 kg crate up a frictionless 30° slope 5.0 m high. If the crate is moved from rest at the bottom to rest at the top of the slope, the work done by the man is

- (A) +1000 joules
- (B) +500 joules
- (B) zero
- (B) -500 joules
- (B) -1000 joules

No. 23



A spring which does not obey Hooke's law supplies a force of magnitude αx^2 , where x is measured downward from the equilibrium position of the unloaded spring and α is a constant. A mass m is attached to the end of the spring and is released from rest at $x = 0$. What is its maximum downward displacement?

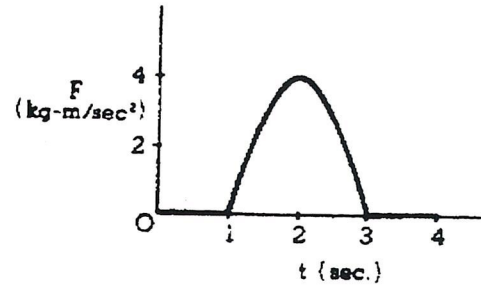
- (A) $\sqrt{\frac{mg}{\alpha}}$
- (B) $\sqrt{\frac{mg}{\alpha}}$
- (C) $\frac{mg}{\alpha}$
- (D) $\frac{2mg}{\alpha}$
- (E) $\frac{3mg}{\alpha}$

No. 24

A ball of mass m at one end of a string of length R rotates in a vertical circle just fast enough to keep the string from going slack when the ball is at the top of the circle. The ball's speed when it is at the bottom of the circle is

- (A) $\sqrt{2gR}$
- (B) $\sqrt{3gR}$
- (C) $\sqrt{4gR}$
- (D) $\sqrt{5gR}$
- (E) $\sqrt{7gR}$

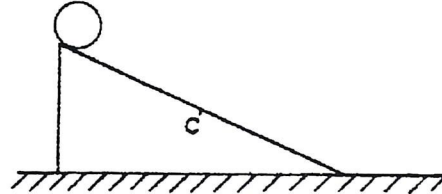
No. 25



A force acting in a straight line on an object of mass 5.0 kilograms is plotted as a function of time in the graph above. The change in the velocity of the object is

- (A) 0.8 m/s
- (B) 1.1 m/s
- (C) 1.6 m/s
- (D) 2.3 m/s
- (E) 4.0 m/s

No. 26



A ball starts from rest at the top of an inclined plane and rolls without slipping down the plane. The ratio of the angular velocity of the ball at the end of the plane to its angular velocity as it passes the center point C of the plane equals

- (A) 4
- (B) 2
- (C) $\sqrt{3}$
- (D) $\sqrt{2}$
- (E) $\sqrt{\frac{5}{2}}$