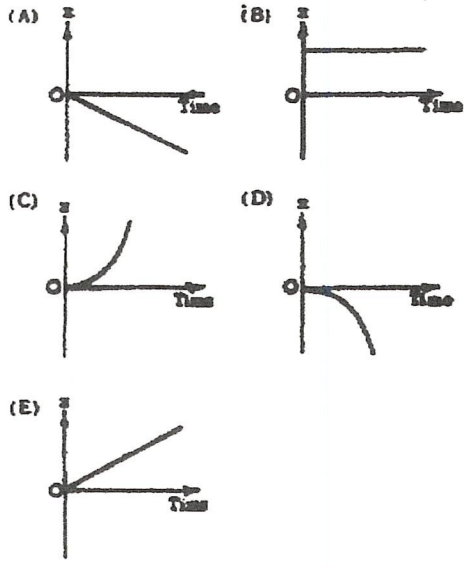
No. 30

Which of the following graphs best represents the x component of the position of the block as a function of time?



No. 31

Suppose the force required to tow a canal barge is directly proportional to the speed. If it takes 3000 watts to tow the barge at a speed of 3.0 km/h, what power is required to move the barge at a speed of 9.0 km/h?

(A) 6,000 watts (B) 14,000 watts
(C) 18,000 watts (D) 24,000 watts
(E) 27,000 watts

No. 32

When a thin stick of mass M and length L is pivoted about one end, its moment of inertia is $I = \frac{ML^2}{3}$

When the stick Is pivoted about its midpoint, its moment of inertia is

(A) $\frac{ML^2}{12}$ (B) $\frac{ML^2}{6}$ (C) $\frac{ML^2}{3}$

(D) $\frac{7ML^2}{12}$ (E) ML^2

No. 33

A projectile has an initial velocity of magnitude v_o which makes an angle θ_o on with the horizontal. Neglecting air friction, all of the following are true at point P, the highest point of its trajectory, EXCEPT:

(A) The time t required to reach P is given by $t = vo \cos\left(\frac{\theta_o}{g}\right)$.

(B) The horizontal displacement has been $v_o t \cos\theta_o$, where t is the time required to reach P.

(C) $h_{max} = \frac{(v_o \sin\theta o)^2}{2g}$

(D) The speed is $v_o \cos\theta_o$.

(E) the acceleration is g

No. 34

An object is suspended from a spring whose mass is negligible compared to that of the object. The object is displaced slightly, and the period of its motion is observed to be T seconds. The spring is then cut in half and the object suspended from one of the halves. The object is displaced slightly, and its period is observed to be T' seconds. The ratio T'/T is

(A) $\frac{1}{2}$ (B) $\frac{1}{\sqrt{2}}$ (C) 1 (D) $\sqrt{2}$ (E) 2

No. 35

A particle is acted upon by a net force $F = F_o e^{-kx}$. If the particle has velocity equal to zero at $x = 0$, then the maximum kinetic energy that the particle can attain is

(A) $\frac{F_o}{k}$ (B) $\frac{F_o}{e^k}$ (C) kF_o

(D) $(kF_o)^2$ (E) $ke^k F_o$