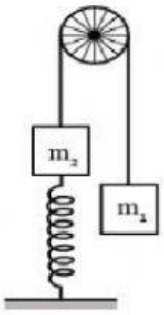
Spring & PE



In the ideal pulley-particle system shown, the mass m_2 is connected with a vertical spring of spring constant K. ($m_2 > m_1$). If the mass m_2 is released from rest when the spring is undeformed, find the maximum compression of the spring.

A. $\frac{(m_2 - m_1)g}{K}$

B. $\frac{(m_2 + m_1)g}{K}$

C. $\frac{m_1 g}{K}$

D. $\frac{2(m_2 - m_1)g}{K}$

A spring of force constant 800 Nm^{-1} has an extension of 5 cm . the work done in extending it from 5 cm to 15 cm is _____

24 J 16 J 8 J

56/3 560/3 3/560

A force F is related to the position of a particle by the relation F= $(10 x^2)$ N . the work done by the force when the particle moves from x =2 m to x = 4 m is _____ J

A block of mass 2 kg is kept at origin at t=0 and is having velocity $4\sqrt{5}$ m/s in positive x direction. The only force acting on it is a conservative and its potential energy is defined as $U = x^3 + 6x^2 + 15$ J . its velocity when its acceleration is min after t=0 is _____ m/s

4 20 8

$-3/4\ k x_0^2$ $3/8\ k x_0^2$ $-3/8\ k x_0^2$

Assuming that the potential energy of spring is zero when it is stretched by x_0, then its potential energy when it is compressed by $x_0/2$.

5 A 0.5kg block slides from point A on a horizontal track with a initial speed of 3m/s towards a weightless spring of length l m and having a force constant 2 N/m. The part AB of the track is frictionless and the part BC has coefficent of static and kinetic friction as 0.22 and 0.20 respectively. If the distacnces AB and BD are 2m and 2.14m respectively, find the total distance through which the block moves before it comes to rest completely. $\left(g = 10 m/s^2\right)$