Quiz 7 March 27, 2001

1. A spring has stored 30 Joules of potential energy. It transfers 10 Joules to the kinetic energy of a mass. What is the potential energy that remains stored by the spring?

Spring forces conserve energy.

a) 10 Joules
b) 20 Joules
c) 30 Joules
d) 40 Joules
e) 50 Joules

$$KE_0 + PE_0 = KE + PE$$
$$(0) + (30\ \text{J}) = (10\ \text{J}) + PE$$
$$PE = 20\ \text{J}$$

2. A spring stores 50 Joules of potential energy. Initially at rest, a mass fired from that spring is observed to have 50 Joules of kinetic energy. What is the length of the spring?

$$KE_0 + PE_0 = KE + PE$$
$$(0) + (50\ \text{J}) = (50\ \text{J}) + PE$$
$$PE = 0$$

A spring storing no potential energy has its natural length.

a) 1 m
b) 3 m
c) 5 m
d) 10 m
e) the natural length

3. Which choice below is NOT equivalent to 1 Joule of energy.

These quantities have the units of energy.

a) 1 N m
b) 1 (N/m) m^2
c) 1 kg (m/s)
d) 1 kg (m^2/s^2)
e) none of the above

$w = \mathbf{F}\ \mathbf{s}$; units: Nm

$PE_S = \frac{1}{2}kx^2$; units: $\left(\frac{\text{N}}{\text{m}}\right)\text{m}^2$

$KE = \frac{1}{2}mv^2$; units: $\text{kg}\frac{\text{m}^2}{\text{s}^2}$