Friday 2
Name:_____

The simple harmonic oscillator

The spring constant is the slope of the force vs position line. What is the spring constant in the experiment?

The slope is 0.2 (N) divided by 0.1 (m). Thus k= 2 (N/m).

What is the period of the oscillation?

From the graphs we can see that the period is very close to 2 (s).

What is the frequency in Hz?

***f=1/T* , so the frequency is ½ (Hz) or you can write 0.5 (Hz)**

When the position is at its maximum, what is the velocity?

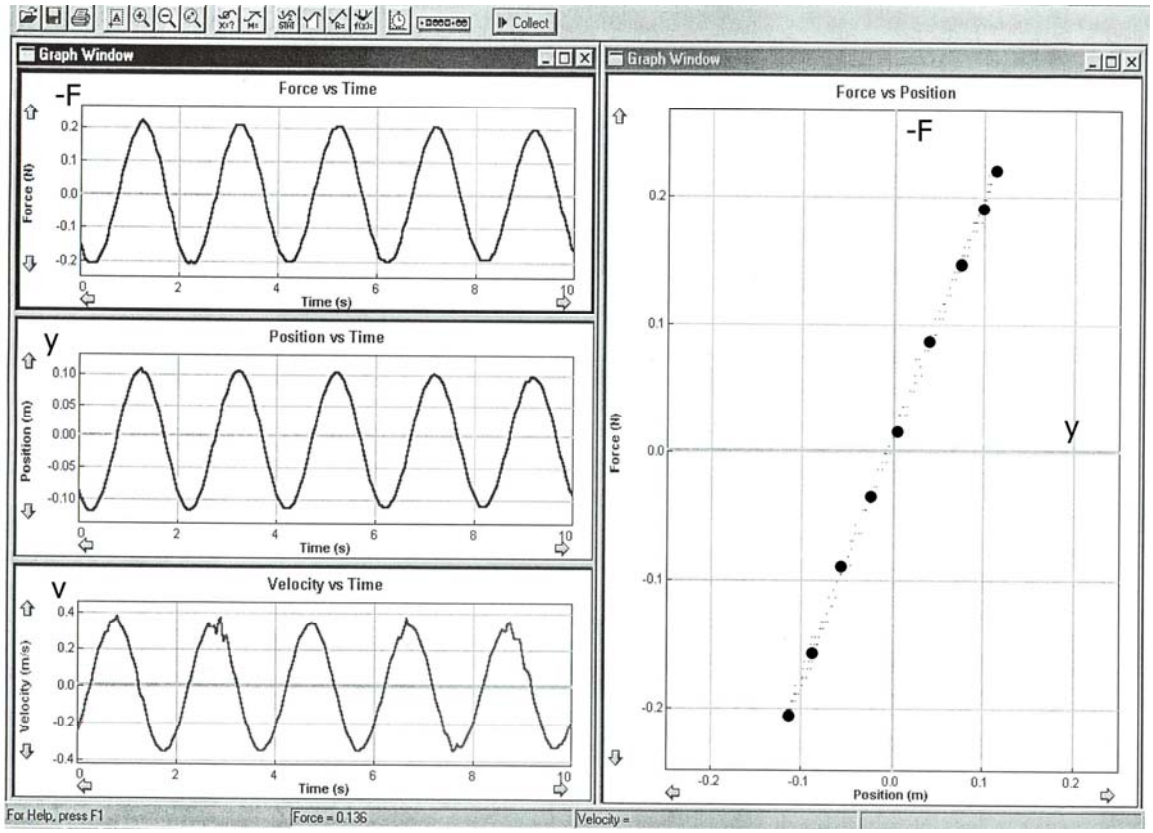
At that point the velocity is zero. This means that all of the energy is stored in the flexing of the spring.

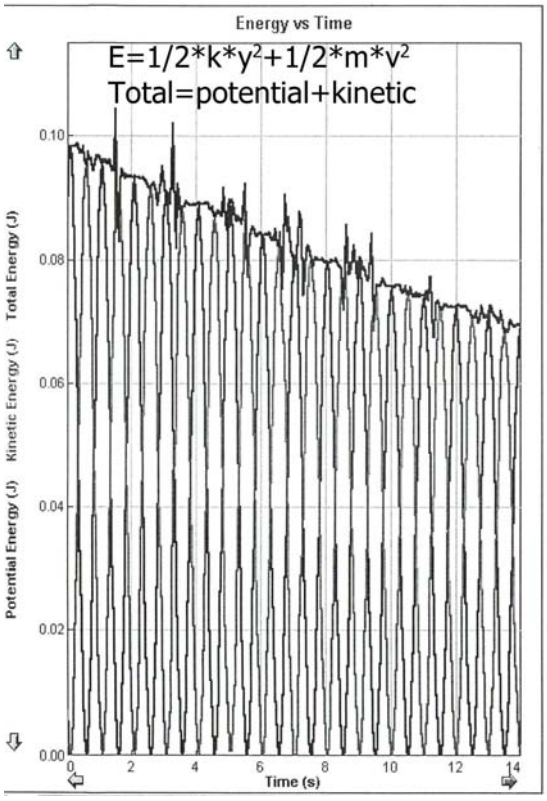
When the velocity is at a maximum, what is the position?

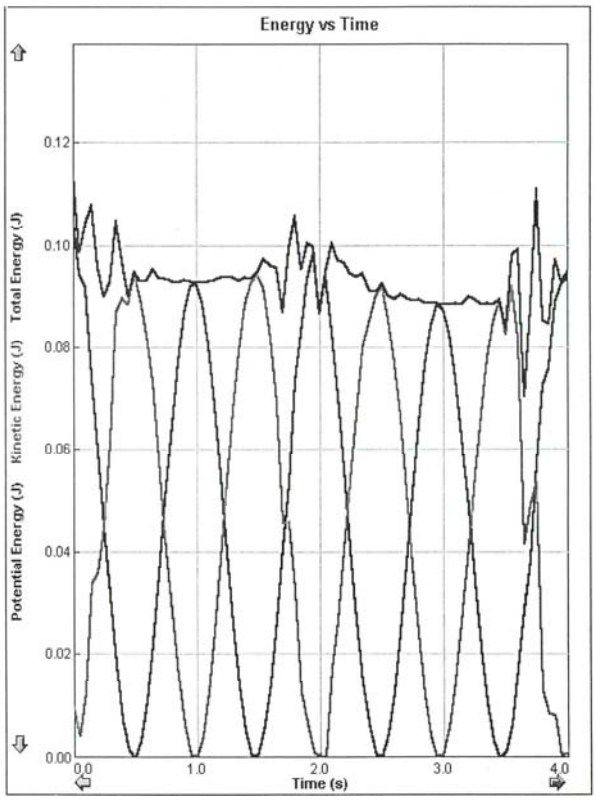
The position is zero at that point. Thus all of the energy is in the motion of the mass.

What is the mass of the oscillator?

$m=k/(2*\pi*f)^2 = 2/(2*\pi*0.5)^2$ (Newtons/meter)*(seconds)^2=0.2 (Kg)


Collect
Graph Window
-F
Force vs Time
Force (N)
Time (s)
y
Position vs Time
Position (m)
Time (s)
v
Velocity vs Time
Velocity (m/s)
Time (s)
Graph Window
Force vs Position
-F
y
Force (N)
Position (m)
For Help, press F1
Force = 0.136
Velocity =


Energy vs Time
E=1/2*k*y²+1/2*m*v²
Total=potential+kinetic
Total Energy (J)
Kinetic Energy (J)
Potential Energy (J)
Time (s)


Energy vs Time
Total Energy (J)
Kinetic Energy (J)
Potential Energy (J)
Time (s)

2012