

NAME: ALI ALNAQBI

08

LAB 3: Oscillatory Motion: The Mass-on-a-Spring System

mass (g)	Force (N)	Position (m)
50 gram	0.4840	-0.002494
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100 gram	0.9460	-0.006580
150 gram	1.470	-0.01675
200 gram	1.971	-0.03199
250 gram	2.464	-0.04836
300 gram	2.958	-0.06613
350 gram	3.455	-0.08131
400 gram	3.942	-0.09791
450 gram	4.437	-0.1146
500 gram	4.932	-0.1313

The long Spring = 31.035 g

Mass holder = 32.36 g

$f(x)_{\max}$	mass	period (xt)	F	Phase shift of $x(t)$ vs $v(t)$
0.9522	200 gram	0.56	0.56	1.7951

$$\# \Delta t = 1.54 - 1.38$$

$$\# \Delta t = 0.16$$

$$\# \frac{\Delta t}{T} = \frac{\phi}{2\pi}$$

$$\# \frac{0.16}{0.56} = \frac{\phi}{2\pi} \rightarrow 1.7951$$

(position)

$$\max = 0.02680$$

$$\min = -0.02616$$

velocity

$$\max = 0.2595$$

$$\min = -0.2603$$

$f(x)_{\max}$	mass	$x(t) T$	$x(t)_{\max}$	$v(t)_{\max}$	Δt	Phase shift
0.9185	250	0.64	0.0299	0.02	0.16	1.570
1.231	300	0.68	0.04093	0.3685	0.16	1.4783
1.108	350	0.72	0.03726	0.288	0.16	1.396
1.494	400	0.76	0.066	0.3741	0.2	1.653

$$\# \text{ Fast } T = 0.53$$

$$\# \text{ Slow } T = 5.06$$

$$\left| \frac{T}{2\pi} = \omega \right|$$