

PHY 181: Summer 2023

Midterm test

Name: _____ Date: _____

Policies and Advice

- As stated in the syllabus addendum, this test is closed book and closed notes.
- Cell phone usage during the test is strictly prohibited. There is likely nothing going on in the world that needs your intervention during this test. If there is such an issue, such as an ongoing family emergency, let the proctor or instructor know before beginning the test.
- A calculator is strongly encouraged.

Almost any test should be run through in at least three passes.

1. Complete any problems that you know the answer to immediately or that can be completed quickly.
2. Work on problems that you are confident that you can complete in a reasonable amount of time.
3. Ponder and solve all the remaining questions.

Throughout all of the above, remain calm, deep breaths if necessary (I've been there). Keep track of the time; if you have stalled on a problem, move on! If you run out of space, scratch paper is available with the instructor/proctor.

Each point should take about a minute. For example, a five point problem should take around 5 minutes to complete. Of course, some will be faster than that.

And remember this, if your answer is wrong, "No work recorded, no points awarded"!

Useful facts

Prefix	Symbol	Multiple
terra-	T	10^{12}
giga-	G	10^9
mega-	M	10^6
kilo-	k	10^3
hecto-	h	10^2
deca-	da	10^1
—	—	$10^0 = 1$
deci-	d	10^{-1}
centi-	c	10^{-2}
milli-	m	10^{-3}
micro-	μ	10^{-6}
nano-	n	10^{-9}
pico-	p	10^{-12}

$$g = 9.8 \text{ m/s}^2$$

$$1 \text{ kg} = 2.205 \text{ lbm}$$

$$1 \text{ m} = 1.094 \text{ yd}$$

$$g_{\text{moon}} = 1.625 \text{ m/s}^2$$

$$1 \text{ lbf} = 4.45 \text{ N}$$

$$1 \text{ inch} = 2.54 \text{ cm}$$

$$s = \frac{\Delta d}{\Delta t} \quad \Delta d = s\Delta t \quad \Delta t = \frac{\Delta d}{s}$$

$$\vec{v} = \frac{\Delta \vec{d}}{\Delta t} \quad \Delta \vec{d} = \vec{v}\Delta t \quad \Delta t = \frac{\Delta \vec{d}}{\vec{v}}$$

$$\vec{a} = \frac{\Delta \vec{v}}{\Delta t} \quad \Delta \vec{v} = \vec{a}\Delta t \quad \Delta t = \frac{\Delta \vec{v}}{\vec{a}}$$

$$\vec{F} = m\vec{a} \quad m = \frac{\vec{F}}{\vec{a}} \quad \vec{a} = \frac{\vec{F}}{m}$$

$$\vec{W} = m\vec{g} \quad \vec{g} = \frac{\vec{W}}{m} \quad m = \frac{\vec{W}}{\vec{g}}$$

$$\vec{v}_{\text{rel}} = \vec{v}_{\text{obj}} - \vec{v}_{\text{ref}} \quad \vec{v}_{\text{obj}} = \vec{v}_{\text{rel}} + \vec{v}_{\text{ref}}$$

$$\vec{v}_{\text{ref}} = \vec{v}_{\text{obj}} - \vec{v}_{\text{rel}}$$