

# University Physics 1A

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## Final Exam Review

Test:

1. 30 multiple choice questions at 2.5 points each.
2. 6 problems at 6 to 9 points each.

## Review

Constant Acceleration:

$$\begin{aligned}v_x &= v_{ox} + a_x t \\x &= x_o + v_{ox} t + \frac{1}{2} a_x t^2 \\(v_x)^2 &= (v_{ox})^2 + 2a_x(x - x_o) \\x &= x_o + \frac{1}{2}(v_{ox} + v_x)t\end{aligned}$$

Acceleration (towards the center):

$$a_{centripetal} = \frac{v^2}{r}$$

Friction:

$$\begin{aligned}f_k &= \mu_k |\bar{n}| \\f_x &\leq \mu_x |\bar{n}|\end{aligned}$$

Spring Force:

$$F_{spring} = -k\Delta x$$

Work:

$$W = \int \vec{F} \cdot d\vec{r} = \int F dr \cos \theta = \int F_x dx + \int F_y dy + \int F_z dz$$

Energy:

$$K = \frac{1}{2}mv^2$$

$$F_x = -\frac{dU}{dx}$$

$$U_{spring} = \frac{1}{2}kx^2$$

$$U_{grav} = mgh$$

$$W_{net} = K_f - k_i$$

Work:

$$P = \frac{dW}{dt} = \vec{F} \cdot \vec{v}$$

Conservation of Mechanical Energy:

$$E_{mech f} = E_{mech i} + W_{non\ conservative}$$

Momentum:

$$\vec{p} = m\vec{v}$$

Impulse:

$$\vec{J} = \int \vec{F} dt = \vec{F}_a v \delta t = \Delta\vec{p}$$

You can find all my notes at <http://omgimanerd.tech/notes>. If you have any questions, comments, or concerns, please contact me at [alvin@omgimanerd.tech](mailto:alvin@omgimanerd.tech)