EXAM III Physics 206 FALL 2020

Last Name..... First..... Section Number.....

USEFUL EQUATIONS

If $f(x) = a\,x^n$, then

$$\frac{df}{dx} = n\,a\,x^{n-1}$$

$$\int f(x)\,dx = \frac{a}{n+1}\,x^{n+1} + C$$

Work – Kinetic Energy Theorem:

$$\int_{\vec{r}_1}^{\vec{r}_2} \vec{F}_{tot} \cdot d\vec{r} = \frac{1}{2}mv^2(\vec{r}_2) - \frac{1}{2}mv^2(\vec{r}_1).$$

If $\vec{F}$ is conservative, then there exists a potential energy function U such that

$$U(\vec{r}_2) - U(\vec{r}_1) = -\int_{\vec{r}_1}^{\vec{r}_2} \vec{F} \cdot d\vec{r}$$

and

$$F_x = -\frac{\partial U}{\partial x}, \quad F_y = -\frac{\partial U}{\partial y}.$$

$$\vec{L} = \vec{r} \times \vec{p}, \quad \vec{\tau} = \vec{r} \times \vec{F}$$

Moment of inertia:

$$I = L/\omega, \quad I = mr^2 \text{ (point particle)}$$

Note: The symbol g stands for the **magnitude** of the acceleration due to gravity, and therefore it is always a positive quantity.

Free-body force diagrams are very important!

Do not spend too much time on algebra!