Physics 221&: Engineering Physics I Equtaion Sheet

Below are some equations that may be helpful during your exam. Remember to carefully analyze each problem to determine which equation(s) to use. This equation sheet does not include all the equations you may need, so be sure to rely on your understanding of the concepts as well!

Kinematics

1) $v = v_0 + at$
2) $x = x_0 + v_0 t + \frac{1}{2}at^2$
3) $v^2 = v_0^2 + 2a(x - x_0)$

Forces and Newton's Laws

1) $\sum F = ma$
2) $F_f = \mu F_n$

Impulse and Momentum

1) $p = mv$
2) $F\Delta t = \Delta p$

Work and Energy

1) $W = Fd\cos\theta$
2) $\text{KE} = \frac{1}{2}mv^2$
3) $\text{PE}_g = mgh$
4) $\text{PE}_s = \frac{1}{2}kx^2$

Conservation of Energy

1) $\text{KE}_i + \text{PE}_i = \text{KE}_f + \text{PE}_f$

Uniform Circular Motion

1) $a_c = \frac{v^2}{r}$
2) $F_c = m\frac{v^2}{r}$

Projectile Motion

1) Horizontal motion: $x = v_{0x}t$
2) Vertical motion: $y = v_{0y}t - \frac{1}{2}gt^2$
3) Initial velocity components: $v_{0x} = v_0\cos(\theta)$, $v_{0y} = v_0\sin(\theta)$