# Physics Mechanics Formula Sheet

## Physics Equations (Mechanics)

1. **Kinematic Equations (Constant Acceleration)**
   - $s = ut + \frac{1}{2}at^2$
   - $s = vt - \frac{1}{2}at^2$
   - $s = \frac{u+v}{2} \cdot t$
   - $v = u + at$
   - $v^2 = u^2 + 2as$

2. **Forces and Motion**
   - Newton's Second Law: $F = ma$
   - Newton's Third Law: $F_{\text{A on B}} = -F_{\text{B on A}}$
   - Weight: $W = mg$
   - Hooke's Law: $F = kx$

3. **Work and Energy**
   - Work: $W = Fd$
   - Work (with angle): $W = F\cos\theta \cdot d$
   - Work (Elastic): $W = \frac{1}{2}Fx$
   - Work (Spring): $W = \frac{1}{2}kx^2$
   - Kinetic Energy: $E_k = \frac{1}{2}mv^2$
   - Gravitational Potential Energy: $E_g = mgh$
   - Elastic Potential Energy: $E = \frac{1}{2}kx^2$

4. **Stress and Strain (Elasticity)**
   - Stress: $\sigma = \frac{F}{A}$
   - Strain: $\epsilon = \frac{L-L_0}{L_0}$
   - Young's Modulus: $E = \frac{\sigma}{\epsilon}$

5. **Power**
   - Power: $P = \frac{W}{t}$