

**Biomechanics**- the study of force and their effects on living systems

**Kinematics**- the branch of dynamics concerned with the description of motion

**Kinetics**- the branch of dynamics concerned with the forces that cause or tend to cause motion

### **Projectile Motion**

- Vertical velocity is positive and decreasing in magnitude on the way up
- Vertical velocity equal zero at the top of flight
- Vertical velocity is negative and increasing in magnitude on the way down
- Horizontal velocity is assumed to be constant
- The magnitude of the upward velocity of a projectile as it passes any height on the way up is the same as the magnitude of the downward velocity at the same height

### **Release Velocity and Projection Angle**

- To maximise time of flight/height reached
  - Maximise vertical component of release velocity
  - Projection angle > 45 deg
- To minimise time of flight
  - Minimise vertical component of release velocity
  - Projection angle < 45 deg
- To maximise horizontal displacement
  - Maximise release velocity (horizontal component faster than vertical)
  - Higher release height is better
  - Projection angle < 45 deg

### **Newton's Laws of Motion**

1. A body will maintain a state of rest, or constant velocity, unless acted upon by an external force that changes that state
  - Inertial  $\propto$  mass
2. The acceleration of an object varies in direct proportion to the external unbalanced force applied to it and inversely proportional to its mass
3. For every action there is an equal and opposite reaction

**COMPLETE NOTES COVER REMAINING TOPICS AND INCLUDE A FORMULA SHEET**