

The following equations for motion of an object in *one direction* are provided for your information and use; where "**V**" represents velocity, "**a**" represents a constant acceleration, "**delta d**" represents the total displacement, "**delta t**" represents the change in time, subscript "**f**" represents the associated final parameter and subscript "**i**" represents the associated initial parameter – all in that *one direction*.

$$V_f = V_i + (a)(\Delta t)$$

$$\Delta d = V_i(\Delta t) + (1/2)(a)(\Delta t)^2$$

$$[V_f]^2 = [V_i]^2 + (2)(a)(\Delta d)$$

Jason hits a volleyball such that it moves with an initial velocity of sixteen meters per second (*16.00 m/s*) **straight upward** from an initial contact point at two meters above the floor. Assume that Jason is the last player to touch the ball before it returns to his hands. Air resistance may be neglected. Determine:

- The acceleration of the ball in the "Y" direction. \*\***
- The maximum height of the ball from its initial contact point of two meters above the floor.
- The time it takes to reach this maximum height.
- The velocity of the ball in the "Y" direction when the ball reaches its maximum height. \*\***
- The velocity of the ball on its way back down, at the level (*i.e. two meters above the floor*) from where it was originally hit. \*\***
- The time for the ball to fall from its maximum height back to the horizontal elevation from which it was hit.
- The total time of the ball in the air.

**\*\* SECTIONS A & B NOTE:** Please answer questions a., d. and e. as a minimum. Extra credit to be provided for remaining parts should you desire to answer these as well.