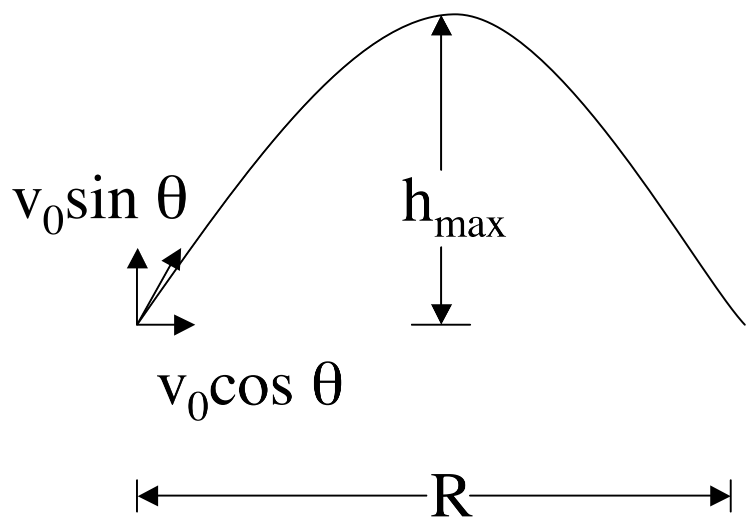
Maximum Horizontal Range

<u>Solution:</u>

The correct answer is b.)

From Question #3, we know that if the initial launch height is the same as the height at which the projectile lands, the horizontal range is given by the expression:

$$R = \left(\frac{v_0^2 \sin(2\theta)}{g} \right)$$



Maximum Horizontal Range

Clearly, for a given value of initial velocity v_0, g is a constant, so that R is maximum when $\sin(2\theta)$ is maximum, i.e., $\theta = 45°$.

Under this condition (launch height = final height), the expression for maximum horizontal range simplifies to:

$$R_{\max} = \left(\frac{v_0^2}{g}\right)$$

Again, the above expression is correct only if the final height of the ball equals its launch height.