2.2 - Projectile Motion

PJ Gibson - Peace Corps Tanzania

May 2020

- (2000) Mention two motions that add up to make projectile motion.
- (2000) In long jumps does it matter how high you jump? State the factors which determine the span of the jump.
- (2000) Derive an expression that relates the span of the jump and the factors you have mentioned.
- (2000) A bullet is fired from a gun on the top of a cliff 140 m high with a velocity of 150 m/s at an elevation of 30° to the horizontal. Find the horizontal distance from the foot of a cliff to the point where the bullet lands on the ground.
- (2007) What is meant by the term "projectile" as applied to projectile motion?
- (2007) Give two (2) practical applications of projectile motion at your locality.
- (2007) The ceiling of a long hall is 25 m high. Determine the maximum horizontal distance that a ball thrown with a speed of 40 m/s can go without hitting the ceiling of the wall.
- (2010) Mention two examples of projectile motion.
- (2010) Define the trajectory.
- (2010) Mention two uses of projectile motion.
- (2010) Find the velocity and angle of projection of a particle which passes in a horizontal direction Just over the top of a wall which is 12 m high and 32 m away.
- (2013) List down two main assumptions in deriving the equation of projectile motion.
- (2013) Why the horizontal motion of a projectile constant?
- (2013) A ball is thrown horizontally with a speed of 14.0 m/s from a point 6.4 m above the ground, calculate:
  - The horizontal distance traveled in that time.
  - Its velocity when it reaches the ground.
- (2014) Outline the motions that add up to make projectile motion.
- (2014) In the first second of its flight, a rocket ejects 1/60 of its mass with a relative velocity of 2400 m/s.

Find this and other free educational resources at:
https://maktaba.tetea.org

  - Find its acceleration.
  - What is the final velocity if the ratio of initial to final mass of the rocket is 4 at a time of 60 seconds?

- (2014) A ball is thrown upwards with an initial velocity of 33 m/s from a point 65° on the side of a hill which slopes upward uniformly at an angle of 28° .
  - At what distance up the slope does the ball strike?
  - Calculate the time of flight of the ball.

- (2014) A cannon of mass 1300 kg fires a 72 kg ball in a horizontal direction with a nuzzle speed of 55 m/s, If the cannon is mounted so that it can recoil freely calculate the:
  - recoil velocity of the cannon relative to the earth.
  - horizontal velocity of the ball relative to the earth.

- (2015) Define the term trajectory.

- (2015) Briefly explain why the horizontal component of the initial] velocity of a projectile always remains constant.

- (2015) List down two limitations of projectile motion.

- (2015) A body projected from the ground at the angle of 60° is required to pass just above the two vertical walls each of height 7 m. If the velocity of projection is 100 m/s, calculate the distance between the two walls.

- (2015) A fireman standing at a horizontal distance of 34 m from the edge of the burning story building aimed to raise streams of water at an angle of 60° into the first floor through an open window which is at 20 m high from the ground level. If water strikes on this floor 2 m away from the outer edge,
  - Sketch a diagram of the trajectory.
  - What speed will the water leave the nozzle of the fire hose?

- (2016) Mention two characteristics of projectile motion.

- (2016) If the range of the projectile is 120 m and its time of flight is 4 sec , determine the angle of projection and its initial velocity of projection assuming that the acceleration due to gravity $g = 10$ m/s.

- (2017) A jumbo jet traveling horizontally at 50 m/s at a height of 500 m from sea level drops a luggage of food to a disaster area.
  - At what horizontal distance from the target should the luggage be dropped?
  - Find the velocity of the luggage as it hit the ground.

- (2018) How does projectile motion differ from uniform circular motion?

- (2018) A rifle shoots a bullet with a muzzle velocity of 1000 m/s at a small target 200 m away. How high above the target must the rifle be aimed so that the bullet will hit the target?

Find this and other free educational resources at:
https://maktaba.tetea.org

  - Where does the object strike the ground when thrown horizontally with a velocity of 15 m/s from the top of a 40 m high building?
  - Find the speed of travel when a man jumps a maximum horizontal distance of 1 m spending a minimum time on the ground.

- (2019) Justify the statement that projectile motion is two dimensional motion.
- (2019) A rocket was launched with a velocity of 50 m/s from the surface of the moon at an angle of 40° to the horizontal, Calculate the horizontal distance covered after half time of flight.
- (2019) Show that the angle of projection θ° for a projectile launched from the origin is given by $\theta^\circ = tan^{-1}(4h_m/R)$, where R stand for horizontal range and h_m is the maximum vertical height.
- (2019) Determine the angle of projection for which the horizontal range of a projectile is $4\sqrt{3}$ times its maximum height.

Find this and other free educational resources at:
https://maktaba.tetea.org