

Quiz 19.1B

In a physics experiment documented with a high quality video camera, a 1.80-kg ball is thrown horizontally off a 45.0-meter high cliff with an initial speed of 16.0 m/s. In addition to a uniform gravitational field of 9.80 N/kg pointing down, the ball is also immersed in a uniform electric field of 226,000 N/C pointing up, and the ball carries some charge q . The only forces acting on the ball after it is thrown are gravity and the electric force.

Just before the ball strikes the ground below the cliff, video analysis reveals that its final velocity the instant before it hits the ground is 37.0 m/s in a direction 64.4° below the horizontal.

- a) How much work is done on the ball by the gravity?
- b) What is the change in kinetic energy of the ball, in Joules?
- c) How much work is done on the ball by the electric force?
- d) What is the charge on the ball (be sure to get the sign correct)?
- e) If the Voltage at ground level is 0.00 Volts, what is the Voltage at the top of the cliff where the ball is initially released?