3) (25 points) A projectile is launched from a height h above the ground with an initial speed v_0 at an angle θ with the horizontal axis. Another projectile is launched at the same instant on the ground with an initial speed v parallel to the ground. Ignore air resistance and friction.

(a) Find the angle θ for the two projectiles to hit each other on the ground.
(b) Find the expression for the horizontal displacement, d, where the two projectiles hit each other.
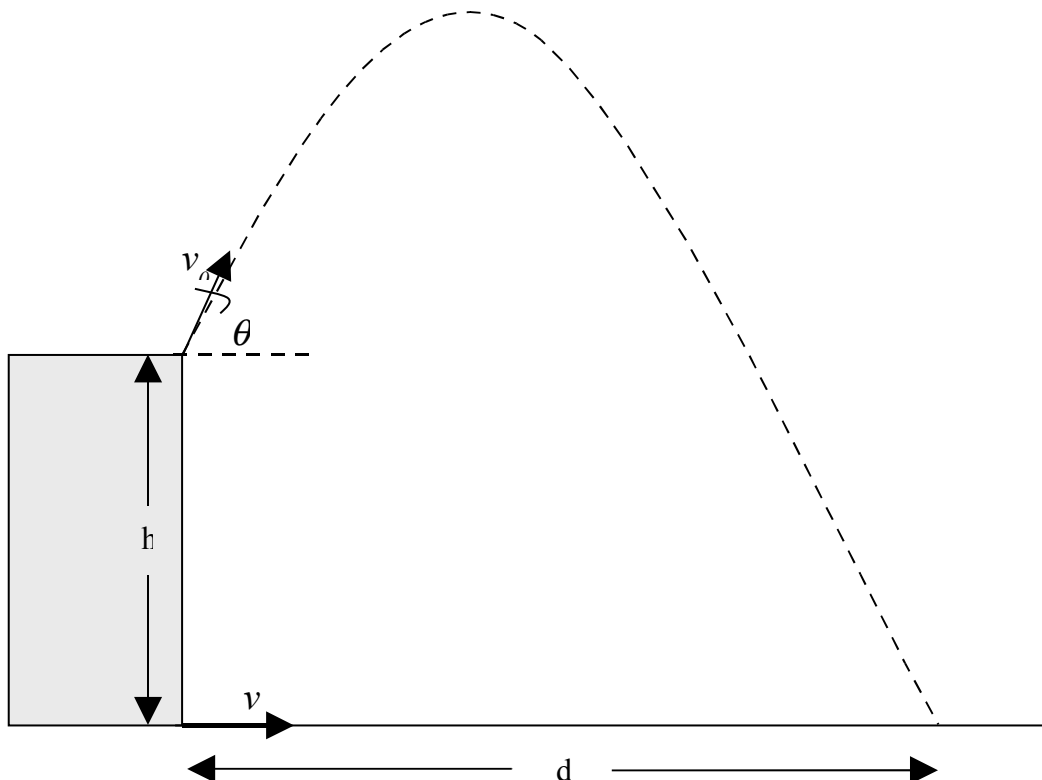
Q4. (25 points) Two blocks withe masses of 7 kg are connected by a heavy uniform rope with a mass of 6 kg. An upward force of 250 N is applied to the system.

    a) Draw three free-body diagrams for the two blocks and the rope.
    b) What is the acceleration of the system?
    c) What are the tensions at the top and bottom of the rope?
    d) What is the tension at the midpoint of the rope?