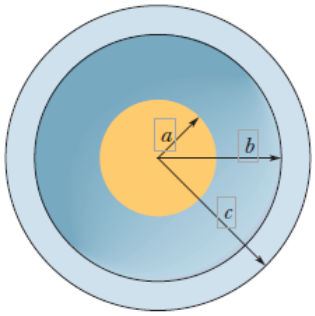
Summer Semester 2023

Assignment 2

PHY 112. Section 4 Submission date: 11 July 2023

1. A 10.0 g block with a charge of +8.00 x 10^{-5} C is placed in an electric field E (3000iˆ - 600jˆ) N/C. What are the (a) magnitude and (b) direction (relative to the positive direction of the x axis) of the electrostatic force on the block? If the block is released from rest at the origin at time t =0, what are its (c) x and (d) y co-ordinates at t = 3.00 s?

2. In Figure, a solid sphere of radius a = 2.00 cm is concentric with a spherical conducting shell of inner radius b = 2.00a and outer radius c = 2.40a. The sphere has a net uniform charge q1 =+5.00 fC; the shell has a net charge q2 =-q1. What is the magnitude of the electric field at radial distances (a) r = 0, (b) r = a/2.00, (c) r = a, (d) r =1.50a, (e) r = 2.30a, and (f) r = 3.50a? What is the net charge on the (g) inner and (h) outer surface of the shell?



3. Identical 50 µC charges are fixed on an x axis at x = ±3.0 m. A particle of charge q =-15 µC is then released from rest at a point on the positive part of the y axis. Due to the symmetry of the situation, the particle moves along the y axis and has kinetic energy 1.2 J as it passes through the point x = 0, y = 4.0 m.(a) What is the kinetic energy of the particle as it passes through the origin? (b) At what negative value of y will the particle momentarily stop?