Phys 222 SI Session #4

**Topics:** Electric fields

Intro Discussion: What is the proper way to orient a toilet paper roll on its holder?

1. Which diagram below best represents the electric field lines between the positive and negative charges shown?

   ![Diagram A](image1.png)  
   ![Diagram B](image2.png)  
   ![Diagram C](image3.png)  
   ![Diagram D](image4.png)  
   ![Diagram E](image5.png)

2. Two charges result in the electric field lines shown in the figure at right. Compare the sign and magnitude of the two charges.

3. A solid conductor is placed in an electric field. Describe the electric field within and near the surface of the conductor. What does this say about the distribution of charges in the conductor?

4. A horizontal infinite plane that has uniform area charge density of +3.0 nC/m² is parallel to and above a second horizontal infinite plane that has uniform area charge density of −1.5 nC/m². If the second plane is 1.0 cm below the first plane, what is the electric field 1.0 cm below the second plane, in N/C?

5. A pair of charged conducting plates produces a uniform field of 12,000 N/C, directed to the right, between the plates. The separation of the plates is 40 mm. An electron is projected from plate A, directly toward plate B, with an initial velocity of \( v_0 = 1.0 \times 10^7 \) m/s, as shown in the figure. What is the distance of closest approach of the electron to plate B?