

EEE349/350 – Power Engineering Electromagnetics

Tutorial Sheet 2

1. Derive an expression for the variation in electric field strength with increasing radius **within** a circular conductor of radius R_c which has a volume charge density q .
2. Derive an expression for the variation in electric field from the surface of a circular conductor of radius R_c which has a volume charge density q .
3. A circular conductor of radius 15mm has a static volume charge density of $2 \times 10^{-3} \text{Cm}^{-3}$
 - i) Calculate the maximum value of electric field and state its direction.
 - ii) Plot a graph of the variation in electric field strength with increasing distance from the centre of the conductor in a radial direction up to a distance of 45mm from the surface of the conductor.
4. A circular conductor of radius 20mm is located in air at sea level and is at an electric potential of 100kV relative to a distant ground plane. The conductor is slowly moved towards the ground plane. Calculate the clearance between the conductor and ground plane at which there is a danger of localised breakdown.