1. A positive point charge $q$ is located at the center of a spherical perfectly conducting shell of an inner radius $R_i$ and an outer radius $R_o$. The shell is filled with and surrounded by air. Determine and sketch a plot of electric field intensity $E$ (vertical axis) as a function of the radial distance $R$ (horizontal axis) ranging from $R=0$ (position of the point charge inside the shell) to $R>R_o$ (in air outside the shell).
2. Three impedances of value $4 + j3$ ohms are connected in Y. For balanced line-to-line voltages of 208 V, find the line current, the power factor, real power, reactive power, and apparent power.