Benha University   **3ʳᵈ year Electrical power**
Faculty of Engineering at Shoubra   **High Voltage Engineering (1)**
Electrical Engineering Department   **Sheet (1A), 2015**

1- **Define** the meaning of the electric field and **discuss** the various types of electric field according to the electrode configuration.

2- **Mention** the various methods for electric field computation and discuss the importance of electric field computation.

3- **Mention** the different applications in which electric field computation is important.

4- Consider two concentric spheres form a capacitor as apart from GIS; the inner and outer radii are r and R respectively, the potential upon the inner sphere is V.
   a) **State** the expression for the electric field and the potential at any radius x and then draw them with radius x.
   b) **Derive** the expressions for the maximum value and minimum value of electric field.
   c) **Derive** the field enhancement factor.
   d) **Derive** the inner radius of the inner sphere at which Emax has a minimum value.
   e) **Derive** the capacitance of the concentric sphere.

5- Consider a pair of coaxial cylindrical electrodes as apart from GIS, the potential upon the inner electrode is V, the inner electrode radius is r where the outer radius of the enclosure is R, the length of the cylinder is L.
   a) **State** the expression for the electric field and the potential at any radius x and then draw them with radius x.
   b) **Derive** the expressions for the maximum value and minimum value of electric field.
   c) **Derive** the field enhancement factor.
   d) **Derive** the optimal radius of the inner electrode at which Emax has a minimum value.
   e) **Derive** the capacitance of the coaxial cylindrical electrodes.