Device Simulation Laboratory

(EE5195)

Problem Sheet-IV

Q.1:- Assume two metal plates A and B are kept at a separation of 100mm in free space. Plate A is grounded (at x=0) and while plate B is held at a potential of 1V (at x=100 mm). Find the potential profile from Plate A to Plate B. Obtain the results using the analytical methods as well as numerical methods. Compare the results obtained using both the methods.

Q.2:- For the same configuration as above, assume both plates are grounded, and a charge sheet of zero thickness but with charge of $10^{-6}C/cm^2$ is placed at a distance of 30mm from plate A towards plate B. Find the potential profile from Plate A to Plate B. Obtain the results using the analytical methods as well as numerical methods. Compare the results obtained using both the methods.

Q.3:- For the problem (1), assume that the dielectric constant varies as a function of spatial co-ordinates as follows:

ε_r=1,0<x<30mm

ε_r=3,30<x<100mm

Find the potential profile from Plate A to Plate B and compare it with that of case (1). Obtain the results using the analytical methods as well as numerical methods. Compare the results obtained using both the methods.

Q.4:- Assuming the conditions in case (1), assume that the region between A and B has a charge density of $q\times10^{16}$ cm^{-3}, where q is the electronic charge. Find the potential profile between the plates A and B. Obtain the results using the analytical methods as well as numerical methods. Compare the results obtained using both the methods.