

## Exercise B-6-13

$V_b$ (V)	$C$ (pF)
0.0	408
-0.2	380
-0.4	350
-0.6	334
-0.8	313
-1.0	296
-1.2	283
-1.4	273

here is a GaAs (dielectric constant 13)  $p^+n$  diode grown with molecular beam epitaxy. Doping is abrupt and uniform for both p and n layers. We have cut the grown film to a  $1 \text{ mm}^2$  area and measured the differential capacitance with applying the (negative) bias voltage  $V_b$  and obtained the results summarized in the table on the left.

Obtain the built-in potential in unit of V. The measured  $C$  contains some experimental errors.

Assume that the capacitance is dominated by the doping in the n layer and obtain the donor concentration in the n layer in the unit of  $\text{cm}^{-3}$ .

Submission deadline: 6/27