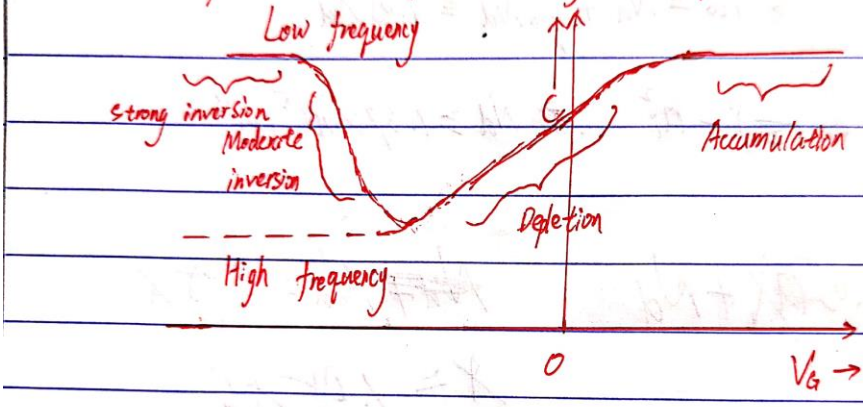
1. In the limit of a very high frequency, the inversion layer charge will not respond to a differential change in capacitor voltage.



2. $\phi_{fp} = V_t \ln\left(\frac{N_a}{n_i}\right) = (0.0259)\ln\left(\frac{3\times10^{16}}{1.5\times10^{10}}\right) = 0.376\ V$

$$x_{dT} = \left\{\frac{4\varepsilon_s \phi_{fp}}{eN_a}\right\}^{\frac{1}{2}} = \left\{\frac{4\times11.7\times8.85\times10^{-14}\times0.376}{1.6\times10^{-19}\times3\times10^{16}}\right\}^{\frac{1}{2}} = 1.8\times10^{-5}\ cm$$

$$|Q'_{sD(max)}| = eN_a x_{dT} = 1.6\times10^{-19}\times3\times10^{16}\times1.8\times10^{-5} = 8.646\times10^{-8}\ C/cm^2$$

We have $V_{TN} = (|Q'_{sd(max)}| - Q'_{ss})\left(\frac{t_{ox}}{\varepsilon_{ox}}\right) + \phi_{ms} + 2\phi_{FD}$ $\Rightarrow t_{ox} = 4.5\times10^{-6}\ cm$