1) I have a MOSCAP with an N-substrate. I apply a gate voltage \( V_G \) to bend the bands to the onset of strong inversion.

   a) Is \( V_G \) positive or negative?

   b) If the substrate doping is changed from \( 1 \times 10^{15} \text{ cm}^{-3} \) to \( 1 \times 10^{16} \text{ cm}^{-3} \), does \( V_G \) change in order to keep the bands at the onset of strong inversion?

2) I have two MOSCAPS

   1) \( \text{Fox} = 500 \text{ A} \), \( \text{Na} = 5 \times 10^{15} \text{ cm}^{-3} \)

   2) \( \text{Fox} = 100 \text{ A} \), \( \text{Nd} = 1 \times 10^{15} \text{ cm}^{-3} \)

   a) Would one of these have a higher threshold voltage \((V_{TH})\)?

   b) Which has a larger drop across the oxide \((V_{OX})\)?
3). I require a certain $V_{G}$ to bend the bands to intrinsic condition. Do I "simply" double the $V_{G}$ to bring the bands to the onset of strong inversion?

4). Why is the oxide an insulator?

5). For the MOSCAP, I have a $V_{G}$. One side is connected to the gate and the other to ground. Do we have a complete circuit? Did I forget to state something else?

6). Sometimes it can be an advantage to lower the threshold voltage ($V_{th}$). We can decrease the oxide thickness ($t_{ox}$). To do this, can you name one trade-off?