2.

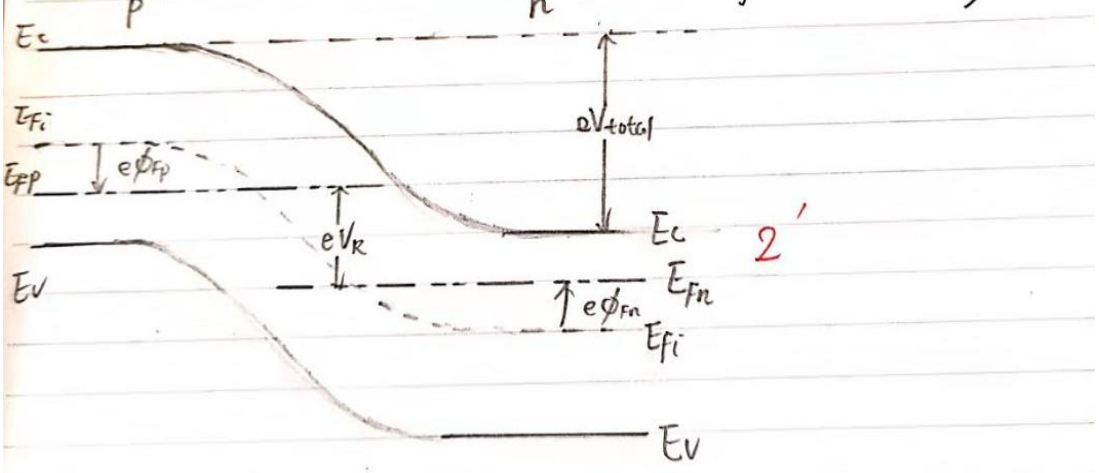
$$V_{bi} = \frac{kT}{e} \ln\left(\frac{N_d N_a}{n_i^2}\right) = 0.718\ V$$

$$W = \left\{\frac{2\varepsilon_s (V_{bi}+V_R)}{e}\left[\frac{N_a+N_d}{N_a N_d}\right]\right\}^{\frac{1}{2}} = 1.576\times10^{-4}\ cm = 1.576\ \mu m \quad 1'$$

$$|E_{max}| = \left|\frac{2(V_{bi}+V_R)}{W}\right| = 1.11\times10^{5}\ V/cm \quad 1'$$

$$x_n = \left\{\frac{2\varepsilon_s (V_{bi}+V_R)}{e}\left[\frac{N_a}{N_d}\right]\left[\frac{1}{N_a+N_d}\right]\right\}^{\frac{1}{2}} = 1.43\times10^{-4}\ cm = 1.43\ \mu m \quad 1'$$

$$x_p = \left\{\frac{2\varepsilon_s (V_{bi}+V_R)}{e}\left[\frac{N_d}{N_a}\right]\left[\frac{1}{N_a+N_d}\right]\right\}^{\frac{1}{2}} = 1.43\times10^{-5}\ cm = 0.143\ \mu m \quad 1'$$



2'

1. ① Large amount of Si on earth, low cost 2'

② Form high quality SiO_2 and good interface 2'

(Any reasonable answer can get credits)