ECE-255 Fall 2019
Equations you should know

$n_0 p_0 = n_i^2 \propto e^{-E_G/k_B T}$ (subscript 0 denotes equilibrium)

$J_n = qn\mu_n \mathcal{E} + qD_n \, dn/dx$ $\qquad$ $J_p = qp\mu_p \mathcal{E} - qD_p \dfrac{dp}{dx}$

$D_n/\mu_n = D_p/\mu_p = k_B T/q = V_T$ $\qquad$ $V_T = k_B T/q = 0.026$ V (at T = 300 K)

$\sigma = pq\mu_p + nq\mu_n$

$I_D = I_S\left(e^{V/V_T} - 1\right)$ $\qquad$ $r_d = \left\{dI_D/dV_{BE}\right)_Q\}^{-1} = V_T/I_D$

$I_C = I_S e^{V_{BE}/V_T}$ $\qquad$ $I_S \propto n_i^2$

$I_B = \dfrac{I_C}{\beta}$ $\qquad$ $I_C = \alpha I_E$ $\qquad$ $I_C = \beta I_B$