a) $$C_D = c_d + \underbrace{\left(\frac{C_L^2}{\pi AR}\right)}_{\equiv C_{D_i}} \quad , \quad \frac{C_L}{C_D} = \frac{C_L}{c_d + C_L^2/\pi AR}$$

Maximize $\frac{C_L}{C_D}$ $\rightarrow$ set $\frac{d}{dC_L}\left(\frac{C_L}{C_D}\right) = 0$

$$\frac{d}{dC_L}\left(\frac{C_L}{c_d + C_L^2/\pi AR}\right) = \frac{(c_d + C_L^2/\pi AR) - C_L(2C_L/\pi AR)}{(c_d + C_L^2/\pi AR)^2} = \frac{c_d - C_L^2/\pi AR}{(\quad)^2} = 0$$

$$\Rightarrow c_d = \frac{C_L^2}{\pi AR} \quad \text{or} \quad \boxed{C_L = \sqrt{c_d \pi AR}} \quad \text{at max } \frac{C_L}{C_D}$$

At this point, $\boxed{C_D = c_d + \frac{(\sqrt{c_d \pi AR})^2}{\pi AR} = 2c_d}$ $\quad C_{D_i} = c_d$

b) Set $\frac{d}{dC_L}\left(\frac{C_L^{3/2}}{C_D}\right) = 0$

$$\frac{d}{dC_L}\left(\frac{C_L^{3/2}}{c_d + C_L^2/\pi AR}\right) = \frac{\frac{3}{2}C_L^{1/2}(c_d + C_L^2/\pi AR) - C_L^{3/2}(2C_L/\pi AR)}{(c_d + C_L^2/\pi AR)^2} = C_L^{1/2}\,\frac{\frac{3}{2}c_d - \frac{1}{2}\frac{C_L^2}{\pi AR}}{(\quad)^2} = 0$$

$$\Rightarrow 3c_d = \frac{C_L^2}{\pi AR} \quad \text{or} \quad \boxed{C_L = \sqrt{3c_d \pi AR}} \quad \text{at max } \frac{C_L}{C_D}$$

At this point, $\boxed{C_D = c_d + \frac{(\sqrt{3c_d \pi AR})^2}{\pi AR} = 4c_d}$ $\quad C_{d_i} = 3c_d$