5.12 A velocity of 100 ft/sec is low speed. Hence, the desired pressure coefficient is a low speed value, C_{p_o}.

$$C_p = \frac{C_{p_o}}{\sqrt{1 - M_\infty^{\ 2}}}$$

From problem 5.11,

C_p = -0.183 and M_∞ = 0.708. Thus, $0.183 = \dfrac{C_{p_o}}{\sqrt{1-(0.708)^2}}$

$$C_{p_o} = (-0.183)(0.706) = \boxed{-0.129}$$

5.13 Recall that the airfoil data in Appendix D is for low speeds. Hence, at $\alpha = 4^\circ$, c_{ℓ_o} = 0.58.

Thus, from the Prandtl-Glauert rule,

$$c_\ell = \frac{c_{\ell_o}}{\sqrt{1 - M_\infty^{\ 2}}} = \frac{0.58}{\sqrt{1-(0.8)^2}} = \boxed{0.97}$$

5.14 The lift coefficient measured is the high speed value, c_ℓ. Its low speed counterpart is c_{ℓ_o}, where

$$c_\ell = \frac{c_{\ell_o}}{\sqrt{1 - M_\infty^{\ 2}}}$$

Hence,

$$c_{\ell_o} = (0.85)\sqrt{1-(0.7)^2} = 0.607$$

For this value, the low speed data in Appendix D yield

$$\boxed{\alpha = 2^\circ}$$