Formula Sheet – Power Plants – Final Term – Fall 2021

Specific heat of air 1.004 kJ/kgK, (k = 1.4)

Desnsity of air = 1.225 kg/m³

Planck constant (h = 6.626 ×10^{-34} Js)

light speed c = 2.998 × 108m/s

Power in the Wind =½ρAV³

$$\eta_{GT} = \frac{\dot{W}_{GT}}{\dot{Q}_{GT,\,in}}$$

$$\eta_{St} = \frac{\dot{W}_{St}}{\dot{Q}_{St,\,in}}$$

$$\frac{y - y_0}{y_1 - y_0} = \frac{x - x_0}{x_1 - x_0}.$$

$$\eta_{Carnot} = 1 - \frac{T_L}{T_H}$$

$$F(V;k,\lambda) = 1 - e^{-\left(\frac{V}{\lambda}\right)^k}$$

$$\eta_{CCPP} = \frac{\dot{W}_{CCPP}}{\dot{Q}_{GT,\,in}} = \frac{\dot{W}_{GT} + \dot{W}_{St}}{\dot{Q}_{GT,in}}$$

$$C_D = \frac{F_D}{\frac{1}{2}\rho A V_{rel}^2}$$

$$\eta_{Solar\ unit} = \frac{\text{Generated electricity}}{\text{Incoming solar energy}} = \frac{I_{MPP} \times V_{MPP}}{P_{in}}$$

$$C_L = \frac{F_L}{\frac{1}{2}\rho A V_{rel}^2}$$

$$E = h\upsilon = hc/\lambda$$

$$I_s = I\cos\theta$$

$$\frac{V_2}{V_1} = \left(\frac{h_2}{h_1}\right)^{\gamma}$$

$$f(V;k,\lambda) = \left(\frac{k}{\lambda}\right)\left(\frac{V}{\lambda}\right)^{k-1} e^{-\left(\frac{V}{\lambda}\right)^k} \text{ for } V > 0$$

MC = HR × F