

Quiz 2 - Solution

2.1) False, We assume temp. is constant

2.2) False, α is small for smooth surfaces.

$$3.1) p_{w@10m} = \frac{1}{2} \rho V^3 = \frac{1}{2} (1.225) (8)^3 = 314 \text{ W/m}^2$$

$$= 0.314 \text{ kW/m}^2 \quad \text{Ans.}$$

$$3.2) \rho_a = \frac{353.1}{T} \exp\left(\frac{-0.0342 \times Z}{T}\right)$$

$$= \frac{353.1}{300.15} \exp\left(\frac{-0.0342 \times 10}{300.15}\right) =$$

$$\approx 1.176 \text{ kg/m}^3 \Rightarrow \rho_a < 1.225 \text{ kg/m}^3 \quad \text{Ans.}$$

$$3.3) \frac{V}{V_0} = \left(\frac{H}{H_0}\right)^{\alpha} \Rightarrow V = V_0 \left(\frac{H}{H_0}\right)^{\alpha}$$

$$V = 8 \left(\frac{76}{10}\right)^{0.2} = 12 \text{ m/s} \quad \text{Ans.}$$

$$3.4) \rho_{@76m} = \frac{353.1}{300.15} \exp\left(\frac{-0.0342 \times 76}{300.15}\right)$$

$$= 1.166 \text{ kg/m}^3 \quad \text{Ans}$$