1. $u_0 = 130$ km/h = 36.11 m/s $A = 2.5\ m^2$ $\nu = 1.5 * 10^{-5}\ m^2/s$ $\rho_0 = 1.58\ m^3$

$$Re = \frac{u_0 l_0}{\nu} = 3.8 * 10^6$$

2. $D = 30\ cm = .3\ m$ $u = 5\ m/s$ $\nu = 10^{-6}\ m^2/s$

$$Re = \frac{.3 * 5}{10^{-6}} = 15 * 10^5 = 1.5\ 10^6$$

3. $l_1 = 100\ m$ $u_1 = 20\ m/s$ $\nu = 10^{-6}\ m^2/s$

$l_2 = 1\ m$ u_2 ?

$$\frac{l_1}{l_2} = \alpha = 10^2$$

ho due numeri Re Fr

$$Re = \frac{u_0 l_0}{\nu} \qquad Fr = \frac{u_0^2}{g l_0}$$

$Re_1 = Re_2$ $Fr_1 = Fr_2$

$$\frac{u_1 l_1}{\nu} = \frac{u_2 l_2}{\nu} \qquad \frac{u_1^2}{g l_1} = \frac{u_2^2}{g l_2}$$

$$u_2 = \frac{l_1}{l_2} u_1 = 10^2\ 20 = 2\ 10^3\ m/s$$

$$u_2 = \sqrt{\frac{l_2}{l_1}}\ u_1 = \frac{1}{10}\ 20 = 2\ m/s$$

non è possibile soddisfarle.

4. $D = 50\ m$ $\Omega = 1$ giro/min = $.104$ rad/s $\nu = 10^{-5}\ m^2/s$

$u = 10\ m/s$

$$St = \frac{\Omega L}{u} = .628$$

5. $d = 60\ cm = .6\ m$ $\quad w$ e u?

$$\frac{D}{d} = \alpha = 10^2$$

$$Re = \frac{u\ell}{\nu} \qquad St = \frac{w\ell}{u}$$

$$\Omega D = ud$$

$$u = \frac{D}{d}\Omega = 10^2 \Omega = 10^3\ m/s \qquad \frac{\Omega D}{\Omega} = \frac{\omega d}{u}$$

$$\Downarrow$$

$$\omega = \Omega\left(\frac{u}{\Omega}\right)\left(\frac{D}{d}\right) = 10^2\ 10^2 \Omega = 10^4\ \text{giri/min}$$

5.A. si

5.B no

5.C $\quad u = 10\ m/s \Rightarrow \frac{u}{\Omega} = 1$

$\omega = 1000$ giri al minuto

5.D $\quad Re = \frac{ud}{\nu} = \frac{10 \cdot .6}{10^{-5}\ m/s} = 6\ 10^5$

6.

$u_0 = 70\ m/s \qquad \ell_0 = 10^3\ km$

$$\omega_0 = \frac{2\pi}{24 * 3600} \sim 7 * 10^{-5}\ s$$

$$Ro = \frac{u_0}{\omega_0 \ell_0} = \frac{70}{7 * 10^{-5}\ 10^6} = 1$$

6.A NO

7. $u_0 = 7\ m/s \qquad l_0 = 2000\ km$

$$Ro = \frac{7}{7\cdot10^{-5}\ 2\cdot10^{6}} = .05 \qquad Re = 1.4 \cong 12$$

$$\frac{\partial u^*}{\partial t} + u^* \cdot \nabla^* u^* = -\frac{1}{Ma^2}\frac{\nabla^* p^*}{\rho^*} + \frac{1}{Re}\nabla^{*2} u^* + \frac{1}{Ro}\Omega^* \times u^*$$

piccolo piccolo

$$-\frac{\nabla p}{\rho^*} + \Omega^* \times u^* = 0$$

prodotto scalare con u

$$+ u \cdot \frac{\nabla p}{\rho} = + u \cdot (\Omega \times u) = 0$$

venti paralleli alle isobare atmosferiche.