

$$E = \frac{Q^2}{\epsilon} = \frac{F^2}{A\epsilon}$$

$$\epsilon = \frac{\Delta L}{L_0} = \frac{L_1 - L_0}{L_0} = \frac{L_1}{L_0} - 1$$

$$\gamma = \frac{F}{A} = \mu \frac{dy}{dy}$$

$$\dot{V} = vA = \frac{V}{t} = Q$$

$$\dot{m} = \rho \dot{V} = \rho vA$$

$$A_1 v_1 = A_2 v_2$$

$$\dot{m} \epsilon - \dot{m}_A = \rho \frac{dV}{dt}$$

$$\Delta V = V_{\text{ein}} - V_{\text{aus}}$$

$$V = \pi r^2 L$$

$$V = \int \pi r(x)^2 dx$$

$$\Delta P = \left[P_A - P_a = -P_a = RQ = \frac{128 \mu L}{\pi d^4} Q \right]$$

$$C = \frac{\Delta V}{\Delta P} = \frac{\rho \Delta V}{P_{\text{Blut}} - P_{\text{Gew}}} \rightarrow C = \frac{\pi d^3 l}{4 \eta \epsilon S}$$

$$C_{\text{rel}} = \frac{\Delta V}{V} \cdot \frac{A}{dP} = \frac{\Delta V}{V(P_a - P_0) \Delta P} \rightarrow C_{\text{rel}} = \epsilon S \frac{d}{d}$$

$$C_{\text{TnL}} = \frac{\Delta V}{\Delta P_a}$$

$$V_{\text{tot,KA}} = V_{\text{Kess}} + V_{\text{Kor}} = V_{\text{insp,KA}} + V_{\text{ex,KA}} = V_{\text{Kess}} + V_{\text{Kor}} + V_{\text{ex,KA}} + V_{\text{insp,KA}} = V_{\text{Kess}} + V_{\text{Kor}} + V_{\text{ex,KA}} + V_{\text{insp,KA}}$$

$$\dot{V} \text{ [m}^3/\text{s]}$$

$$v \text{ [m/s]}$$

$$A \text{ [m}^2\text{]}$$

$$\rho \text{ [g/cm}^3\text{]}$$

$$\dot{m} \text{ [g/s]}$$

$$m \text{ [g]}$$

$$h \text{ [m]}$$

$$Q \text{ [ml/min]}$$

$$P \text{ [Pa]} = \frac{F}{A} = \frac{N}{m^2} = \frac{kg \cdot m}{s^2 \cdot m^2}$$

$$R \text{ [mmHg]}$$

$$P \text{ [J/s]} = W = \frac{kg \cdot m^2}{s^3}$$

$$W \text{ [J]} = Ws = Nm = \frac{kg \cdot m^2}{s^2}$$

$$\sigma \text{ [N/m}^2\text{]} = P_a$$

$$\gamma \text{ [m/s}^2\text{]}$$

$$\mu \text{ [kg/ms]}$$

$$C \text{ [m}^4/s^2\text{]}$$

$$\text{m}^3$$

$$\text{L}$$

$$\text{cm}^3$$

$$\text{mm}^3$$

$$\text{m}^2$$

$$\text{dm}^2$$

$$\text{cm}^2$$

$$\text{mm}^2$$

$$\text{m}^2$$

$$\text{dm}^2$$

$$\text{cm}^2$$

$$\text{mm}^2$$

$$\text{m}^2$$

$$\text{dm}^2$$

$$\text{cm}^2$$

$$\text{mm}^2$$

$$P + \rho g h + \frac{1}{2} \rho v^2 = \text{const.}$$

$$P_1 + \rho g h_1 + \frac{1}{2} \rho v_1^2 = P_2 + \rho g h_2 + \frac{1}{2} \rho v_2^2$$

$$P_{\text{stat}} = P_{\text{aorta}} - \rho g h$$

$$\Delta P = P_A - P_S = \frac{1}{2} \rho (v_2^2 - v_1^2)$$

$$Re = \frac{\rho h v}{\mu} \quad Re_L < 2300$$

$$F_x = \gamma A$$

$$\frac{dQ}{dt} = \int_{\text{Grenz}} -j_{G, \text{aus}} + \tilde{Q}_G$$

$$j_{G, \text{aus}} = \rho \left(\frac{\partial v}{\partial t} + \vec{v} \cdot \nabla \right) \vec{v} \cdot d\vec{A} \cdot d\vec{t}$$

$$\frac{\partial \rho}{\partial t} = \frac{\partial (\rho v_x)}{\partial x} + \frac{\partial (\rho v_y)}{\partial y} + \frac{\partial (\rho v_z)}{\partial z} \quad \frac{\partial}{\partial t} \int_V \rho v_x dV = - \int_V \rho v_x \nabla \cdot \vec{v} dV = - \int_V \rho v_x \nabla \cdot \vec{v} dV$$

$$\frac{d}{dt} \int_V \rho v_x dV = \int_V \rho v_x \nabla \cdot \vec{v} dV$$

$$\mu \nabla^2 \vec{v} + \rho \vec{g} - \nabla P = \rho \left(\frac{\partial \vec{v}}{\partial t} + (\vec{v} \cdot \nabla) \vec{v} \right)$$

$$\vec{F} = m \frac{d\vec{v}}{dt} = m \vec{a}$$

$$M \nabla^2 \vec{v} = 0$$

$$\Delta P = RQ = \frac{8 \mu L}{\pi r^4} Q = \frac{128 \mu L}{\pi d^4} Q$$

$$Q_K = \left(\frac{1}{2} \right)^n Q_{\text{ges}}$$

$$\Delta P = P_{\text{aus}} - P_{\text{ein}} = - (R_A + R_K + R_V) Q$$

$$R_{A, \text{st}} = \frac{1}{\left(\frac{2}{3} \right)^4 R_A}$$

$$Q_{A, \text{st}} = \frac{\Delta P_{\text{ges}}}{R_{A, \text{st}} + R_K + R_V}$$

$$\Delta P = (R_{A, \text{st}} + \frac{1}{2} (R_A + R_2) + R_V) Q$$

$$\Leftrightarrow x = \frac{R_A + \frac{1}{2} R_A - R_{A, \text{st}}}{\frac{1}{2} R_A}$$

$$R_A = \frac{\Delta P_A}{Q_A} \Rightarrow R_{A, \text{neu}} = x R_A = \frac{-128 \mu L}{\pi (2/3 d)^4} \Rightarrow \frac{1}{4} R_A =$$

$$R_A = \frac{\Delta P_A}{Q_A} \Rightarrow R_{A, \text{neu}} = x R_A = \frac{-128 \mu L}{\pi (2/3 d)^4} \Rightarrow \frac{1}{4} R_A =$$

$$R = \frac{1}{2} (R_1 + R_2)$$

$$\mu \nabla^2 \vec{v} + \rho \vec{g} - \nabla P = \rho \left(\frac{\partial \vec{v}}{\partial t} + (\vec{v} \cdot \nabla) \vec{v} \right)$$

$$\rho \vec{g} - \nabla P = \rho ((\vec{v} \cdot \nabla) \vec{v})$$

$$\rho \vec{g} - \nabla P = 0$$

$$\epsilon = \frac{\rho g d}{2 \epsilon S}$$

$$P_{\text{bd}} = 2 \epsilon g \epsilon g d + 2 \epsilon g \epsilon g d = 2 S (Q_0 + \epsilon g \epsilon d)$$

$$P_A - P_P = \frac{2 \sigma S}{r} = \frac{2 \epsilon \epsilon S}{r}$$

$$P_{\text{gem}} = \frac{2 P_{\text{O}_2} + P_{\text{N}_2}}{3}$$

$$P_{\text{atm}} P_{\text{ges}} \Delta P = - \frac{1}{2} \rho g v_2^2$$

$$\Delta P = P_A - P_2 = \frac{2 \epsilon S (d_2 - d_1)}{a_2 d_1} \Leftrightarrow a_2 = \frac{2 \epsilon S d_1}{2 \epsilon S (P_2 - P_1) d_1}$$

$$\gamma_R = \frac{\mu}{\pi \rho} Q \quad \gamma(r) = - \frac{r}{2} \frac{dP}{dx}$$

$$\Delta V = \frac{\pi (d_1 s_1^2 - d_2 s_2^2) \cdot L}{4}$$

$$Q_{\text{vent, dia}} = \text{Event} \cdot \epsilon_{\text{vent}}$$

$$Q_{\text{vent, sys}} = \text{Event} \cdot \epsilon_{\text{vent}} + \sigma_{\text{myok}}$$

$$W_{\text{insp}} = P_P \Delta V = P_a \pi r^2 s = -5 P_2 - 2 S (P_2 - P_3) + S V \sqrt{\frac{1}{2} (P_2 - P_1) \rho}$$

$$W_{\text{insp}} = - (P_a - P_P) \Delta V$$

$$P_{\text{ges}} = \frac{dW}{dt} = P_a \frac{dV_a}{dt} = P_a g d$$

$$dV_B = \pi r^2 dx$$