

• قوت وار بين لا خيزنا •

①

* $s = ut$ → constant velocity

* Average of velocity = $\frac{\text{total Distance}}{\text{Total Time}}$

* $v^2 = v_0^2 + 2as$

* $s = v_0 t + \frac{1}{2} at^2$ → constant acceleration

* $v = v_0 + at$

* $f = m \cdot a$

$a = \frac{f}{m}$

a & f

a & $\frac{1}{m}$

$g = 9.8 \frac{m}{s^2}$

* $w = f \cdot s$

* $w = f \cdot s \cos \theta$

* $PE = mgh$

* $KE = \frac{1}{2} mv^2$

$J = N \cdot m$

$= kg \cdot m^2 / s^2$

watt = J/s

$= N \cdot \frac{m}{s}$

* $E = KE + PE$ * $E_i = E_f$

* $w = \Delta KE = \frac{1}{2} mv^2 - \frac{1}{2} mv_0^2$

* $P = \frac{w}{t} = \frac{f \cdot s}{t} = v \cdot f$ * $KE_i + PE_i = KE_f + PE_f$

* Density $\rho = \frac{\text{mass } (M)}{\text{Volume } (V)}$

$1 \text{ g/cm}^3 = 10^3 \text{ kg/m}^3$

$1 \text{ kg/m}^3 = 10^{-3} \text{ g/cm}^3$

$1 \text{ kg/m}^3 < 1 \text{ g/cm}^3$

Volume of \rightarrow Box L^3 Cylinder $\frac{4}{3}\pi r^3$ Ball $\frac{4}{3}\pi r^3$

Surface area \rightarrow $6L^2$ $2\pi r^2$ $2\pi r h$

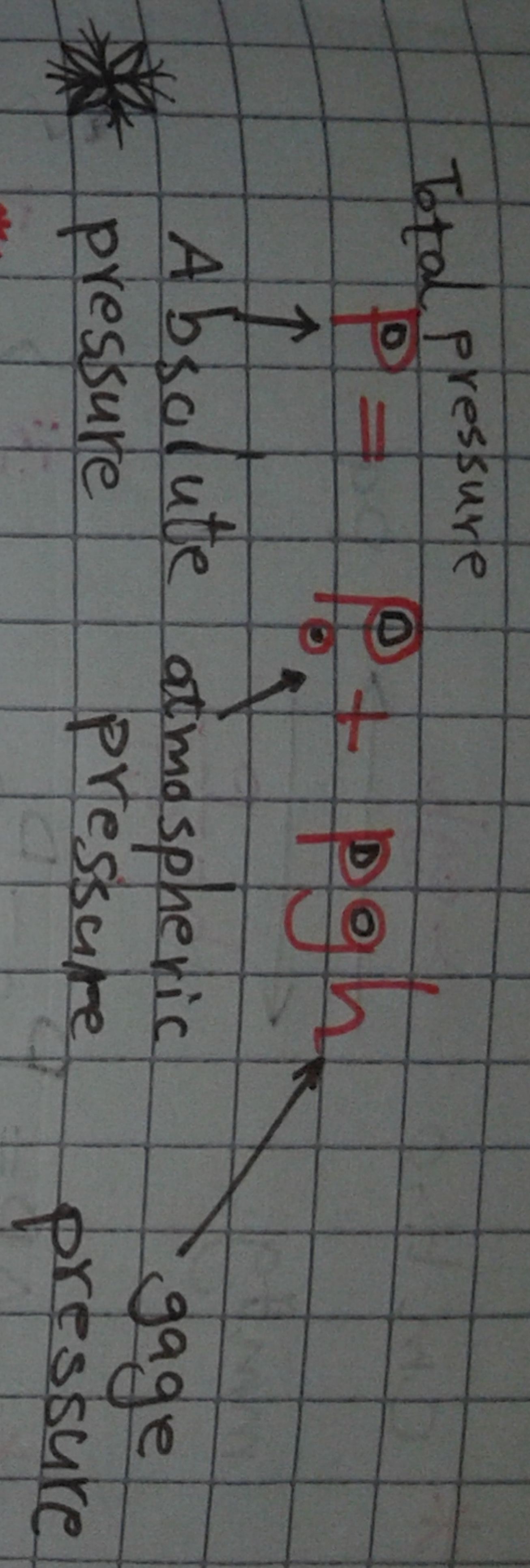
cross section \rightarrow L^2 πr^2 πr^2

* pressure $P = \frac{\text{force } (F)}{\text{Area } (A)}$

calculus

$Pa = \frac{N}{m^2} = \frac{kg}{m \cdot s^2} = \frac{J}{m^3} = \frac{\text{watts} \cdot s}{m^3}$

* $P = \rho g h$ \rightarrow gage pressure



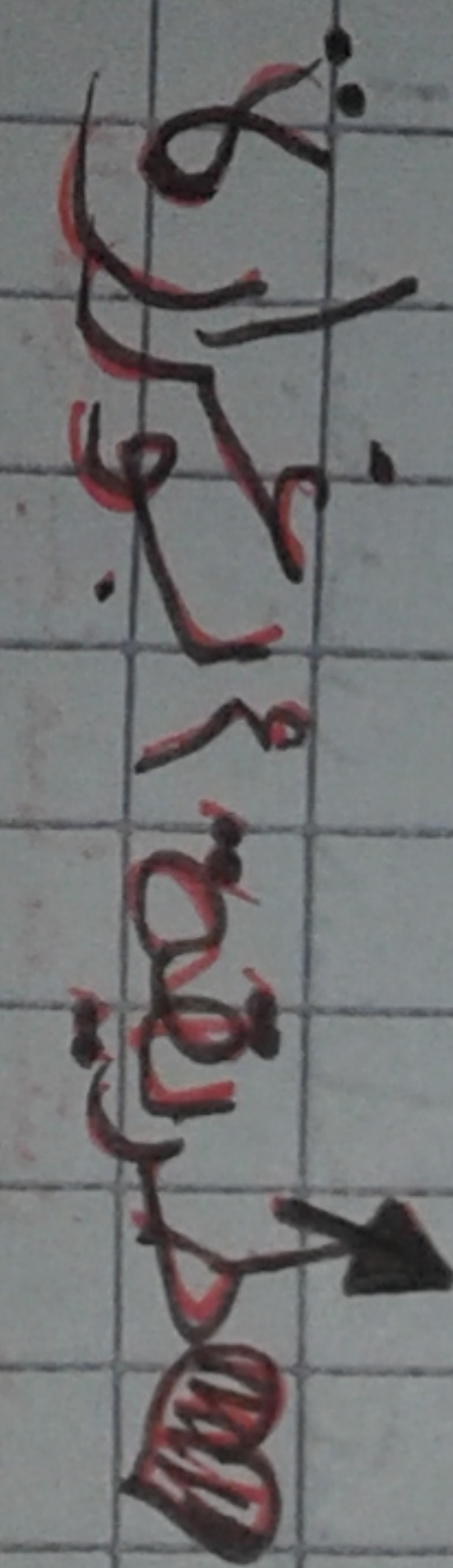
* $P_g = \Delta P = P - P_0$

$P > P_0$ ∴ $P_g > 0$ ∴ positive
 ↳ exhalation

$P < P_0$ ∴ $P_g < 0$ ∴ negative
 ↳ Inhalation

1 Torr = 1 mmHg

1 atm = 1.013×10^5 Pa = 760 mmHg
 760 Torr
 76 cmHg
 $= 1.013 \times 10^3$ cmHg ∴ $= 1.013$ bar

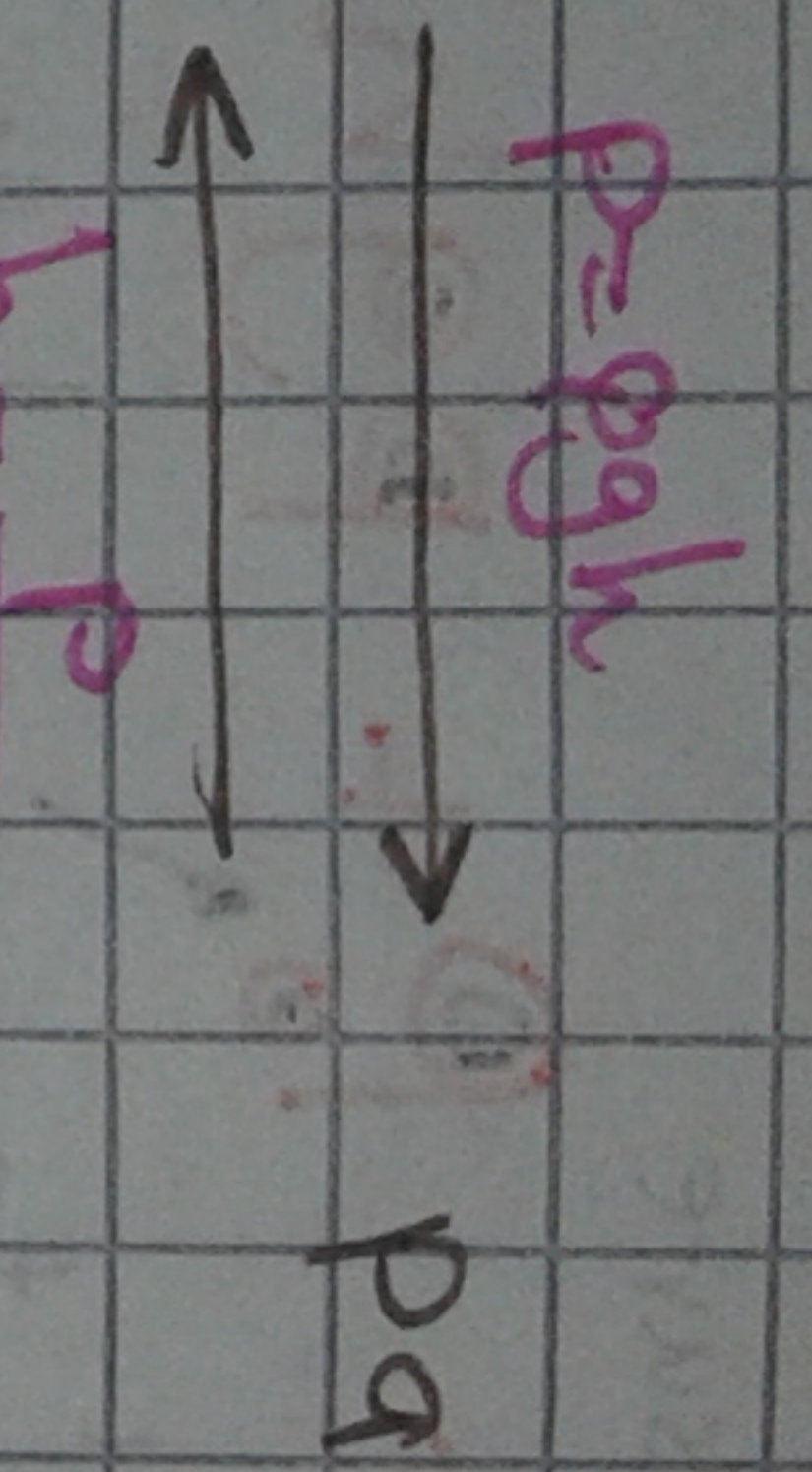


1 bar = 10^5 Pa

1 bar = 10^6 Dyne/cm²

1 Pa = 1 N/m² = 10 Dyne/cm²

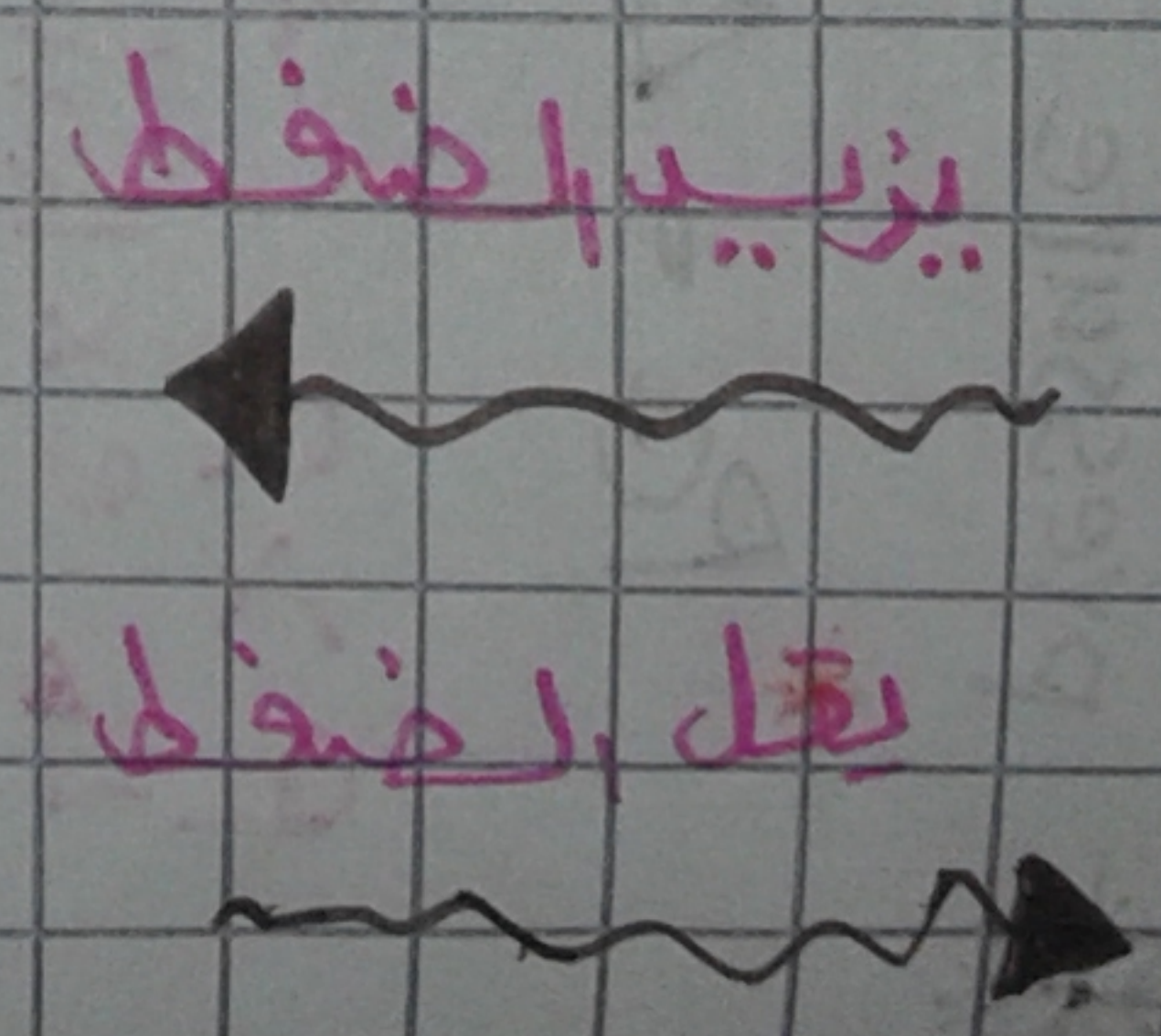
* $C_m H_{2O}$



* $\Delta P = P_c - P_s$

$P_s = P_c - \Delta P$

$P_c = \Delta P + P_s$



* أضعاف المساحة :
وطلب قوة

$F_2 = \frac{F_1}{n}$

* أضعاف الأقطار أو ارتفاع الأقطار :
وطلب قوة

$F_2 = \frac{F_1}{n^2}$

* ال نسبة بين مساحتين :

$\frac{A_1}{A_2} \leftarrow n = \frac{F_1}{F_2} \rightarrow$
النسبة بين مساحتين = النسبة بين قوتيهما

* ال نسبة بين قطرين أو نصف قطريه :

$\frac{r_1}{r_2} \leftarrow n = \sqrt{\frac{F_1}{F_2}}$

* Buoy

* $F_B =$

* $F_B =$

* sp

SP

COP

Alum

* Buoyant Force = weight of displacement fluid

$$* F_B = \rho_f \cdot V \cdot g$$

$$* F_B = w_R - w_A$$

$\hat{V} = V$

* specific density of substance
= Density of substance
Density of water at 4°C

specific Density ρ_f

$$\text{Copper} = 8.96$$

$$\text{Air} = 1.2 \times 10^{-3}$$

$$\text{Aluminium} = 2.7$$

الاجابة

$$\gamma = \frac{F}{L} \rightarrow F = \gamma \cdot L$$

line contact of:

* thin wire (needle)

$$L = 2L$$

* thin ring

$$L = 2(2\pi r)$$

$$L = 4\pi r$$

* thick ring ($r_1 \times r_2$ cc + thick)

$$L = 2\pi r_1 + 2\pi r_2$$

* closed cylinder

$$L = 2\pi r$$

* opened cylinder

$$L = 2\pi r_1 + 2\pi r_2$$

Pressure difference bet inside and outside :-

* liquid drop :-

$$\Delta P = P_{in} - P_{out} = \frac{2\gamma}{r}$$

* air bubble :-

$$\Delta P = P_{in} - P_{out} = \frac{2\gamma}{r}$$

* soap bubble :-

$$\Delta P = P_{in} - P_{out} = \frac{4\gamma}{r}$$

contact Angle :-

water $\rightarrow \theta < 90$

$\cos\theta > 0$ $h > 0$

\therefore positive (water creeps up)

mercury $\rightarrow \theta > 90$

$\cos\theta < 0$ $h < 0$

~~is~~ \therefore negative (mercury creeps down)

Capillarity

توزعة تسمى ρ

① قوة التوتر السطحي \uparrow

② وزعة الضغط \downarrow

$$F = \gamma \cdot l \cdot \cos \theta$$

$$F = \gamma \cdot 2 \pi r \cdot \cos \theta$$

$$w = m \cdot g$$

$$w = \rho \cdot V \cdot g$$

$$V = A \cdot h$$

$$w = \rho \cdot A \cdot h \cdot g$$

$$w = \rho \cdot \pi r^2 \cdot h \cdot g$$

التي Δ في ρ \rightarrow الج

$$F = w$$

$$\gamma \cdot 2 \pi r \cdot \cos \theta = \rho \cdot \gamma \cdot \pi r^2 \cdot h$$

$$\gamma \cdot 2 \cdot \cos \theta = \rho g r h$$

$$h = \frac{2 \gamma \cos \theta}{\rho g r}$$

$$\gamma = \frac{\rho g r h}{2 \cdot \cos \theta}$$

F =

To *

* a

S:

S:

Youn

Y =

Y =

$$B = \frac{1}{B}$$

Elasticity

$$F = \Delta L \cdot k \quad \sim \sim \sim F \propto \Delta L$$

* Total length of wire after extension :-

$$L = \Delta L + L_0$$

* after compression :-

$$L = L_0 - \Delta L$$

Stress
Strain

always
always

$$F/A$$

$$\Delta L/L_0 \quad \text{OR} \quad \Delta V/V_0$$

Elastic Moduli

Young's Modulus

$$Y = \frac{\text{Stress}}{\text{Strain}}$$

$$Y = \frac{F/A}{\Delta L/L_0}$$

Shear Modulus

$$S = \frac{\text{Shear stress}}{\text{Shear strain}}$$

$$S = \frac{F/A}{\Delta x/h}$$

Bulk's Modulus

$$B = \frac{\Delta P}{-\left(\frac{\Delta V}{V_0}\right)}$$

$$B = \frac{\Delta P}{-\left(\frac{\Delta V}{V_0}\right)}$$

reciprocal

of it

compressibility

$$B = \frac{1}{\beta}$$

$$\beta = -\frac{\left(\frac{\Delta V}{V_0}\right)}{\Delta P}$$

conservation of mass

* Continuity Equation :

$$Q = A \cdot v \quad \frac{m^3}{s}$$

↓
Volume Flow rate

$$Q = \frac{V^{\text{volume}}}{t^{\text{time}}} \cdot \frac{m^3}{s}$$

conservation of energy

* Bernoulli's principle :

$$P_1 - P_2 = \frac{1}{2} \cdot \rho (v_2^2 - v_1^2)$$

wijDan Daouh ...