

* Ch2 :- elasticity :- (المرنة)

- ① $F = -K \times \Delta L$. (Hook's law).
- ② Stress = Force $\div$ Area.
- ③ Strain = distortion $\div$ origin.
- ④ Modulus of elasticity = $\frac{\text{Stress}}{\text{Strain}}$.
- ⑤ Young mod. = $\frac{\text{Tensile stress}}{\text{Tensile strain}}$.
- $Y = \frac{F \cdot L}{\Delta L \cdot A}$.
- ⑥ Shear mod. = $\frac{\text{Shear stress}}{\text{Shear strain}}$.
- $S = \frac{F \div A}{\Delta L / L}$.
- ⑦ Bulk mod. = $\frac{F \cdot \text{Vol}}{\Delta \text{Vol} \cdot A} = \frac{\text{Pressure}}{\Delta \text{Vol} \div \text{Vol}}$.
- ⑧ Poisson ratio = $\frac{\text{الانفعال العرضي}}{\text{الانفعال الطولي}} = \frac{-\Delta r / r}{-\Delta L / L}$.

* Ch3 :- (S.H.M) :- (التردد توافقية بسيطة)

- ① $F = M \cdot a = -K \cdot \Delta L$.
- ② $\omega = \sqrt{\frac{g}{L}} = \sqrt{\frac{K}{m}} = 2\pi f = \frac{2\pi}{T}$.
- ③ $x = A \cos(\omega t + \phi)$.
- ④ $v = -A\omega \sin(\omega t + \phi) = \omega \sqrt{A^2 - x^2}$.
- ⑤ $a = -A\omega^2 \cos(\omega t + \phi) = -\omega^2 x$.
- ⑥ $E_{\text{total}} = P \cdot E + K \cdot E \rightarrow E_t \Rightarrow \text{const.}$
- ⑦ $\theta = \Theta \cos(\omega t + \phi)$.
- ⑧ $\theta'' = -\Theta \omega \sin(\omega t + \phi)$.
- ⑨ $\theta''' = -\Theta \omega^2 \cos(\omega t + \phi)$.
- ⑩ $g = 4\pi^2 \times \frac{L}{T^2} \rightarrow$ (Simple Pendulum).
- ⑪ $\frac{r^3}{T^2} = \text{const.} \rightarrow$ (Kepler's law).

* Ch4 :- Hydrostatics :- (الهوائ)

- ① Press. = $\rho g h = F \div A$. (Pascal).
- ② $P = P_0 + \rho g h$. $\rightarrow$ (النقطة من نقطة).
- ③ $P - P_0 = \rho g h$. $\rightarrow$ (Gauge Press).
- ④ $F_b = -\rho L \cdot \text{Vol} \cdot g$. $\rightarrow$ (Archimids).
- ⑤ $\frac{F_1}{F_2} = \frac{A_1}{A_2} = \frac{\Delta x_2}{\Delta x_1} \rightarrow (F \propto A \propto \frac{1}{\Delta x})$.

* Ch5 :- surface tension :- (التوتر السطحي)

- ① $\gamma = \frac{\text{work}}{\text{Area}} = \frac{F}{L} = \frac{F}{2L}$.
- $\gamma \rightarrow$ (معامل التوتر السطحي).
- ② $\gamma = \frac{\rho g h r}{2 \cos \theta}$. $\rightarrow$ (في الأنبوب بغيره).
- ③ $P - P_0 = \frac{2\gamma}{R}$. $\rightarrow$ (liquid drop).
- (قطرة الماء) $\rightarrow$ يرتفع التوتر السطحي وهو عامله فقط.
- ④ $P - P_0 = \frac{4\gamma}{R}$. $\rightarrow$ (bubble).
- (الفقاعة) $\rightarrow$ يرتفع التوتر السطحي مرتين من قبله.
- ومنه الخارج أصغر يكون له (تحت).
- ⑤ $P - P_0 = \text{diff. pressure}$. (فرق ضغط).

* Ch6 :- viscosity :- (اللزوجة)

- ① $Q = A v$. $\rightarrow$ (معدل جريان).
- ② $F = \mu \times \frac{A \cdot v}{y}$. $\rightarrow$ (أرطقي).
- (معامل اللزوجة).
- ③ $\mu = \frac{F \cdot y}{A \cdot v}$. (Poise, Pascal-sec) unit.
- ④ dim. equation (μ) $\Rightarrow M \cdot L^{-1} \cdot T^{-1}$.
- ⑤ $Q = \frac{\pi}{8} \times \frac{R^4 (P_1 - P_2)}{L \cdot \mu}$. ***
- ⑥ $\mu = \frac{2 r^2 g (s - s_0)}{9 v}$.