Ch. 10

اهم .... مادة الفايزل بسم الله

Scale	Freezing point	Boiling point	Division
Celsius C°	0 C°	100 C°	100
Fahrenheit F°	32 F°	212 F°	180
Kelvin	273,15 K°	373,15 K°	100

- $T_F = \frac{9}{5} T_C + 32$
- $T_K = T_C + 273,15$

- pressure:

$$\overline{P} = \frac{F}{A}$$

- P of gas:

$$P = \frac{F}{A}$$

F ← القوة العمودية على السطح

A ← مساحة السطح

- unite of pressure is Pascal (pa) where $1pa = 1 N/m^2$
- other unite: (atm)
- gauge pressure: the difference ... $P_{in} - P_{out}$

$$\sim_{net} = \sim_{in} - \sim_{out}$$

- $1atm = 1,013 \times 10^5 pa$
  $= 1,013$ bars
  $= 760$ torr
  $= 760$ mm Hg ← ملي متر x زئبق

= 760 torr

= 760 (mm Hg) → ملي متر x زئبق

ch.12

□ length expansion

$\Delta L = \alpha L_0 \Delta T$

α ← وحدته K^{-1}

□ Area expansion

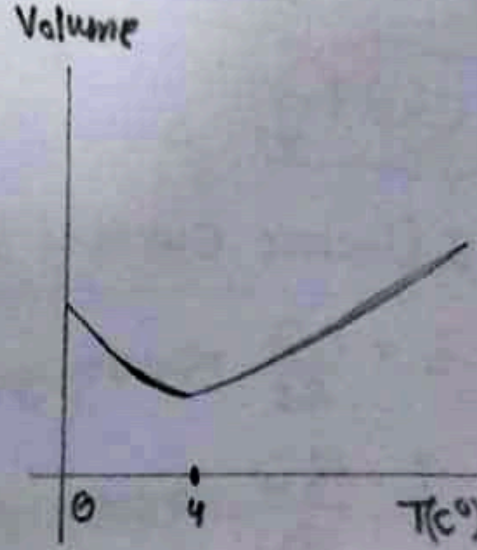
$\Delta A = 2\alpha A_0 \Delta T$

2α ← γ

□ Volume expansion

$\Delta V = 3\alpha V_0 \Delta T$

3α ← β

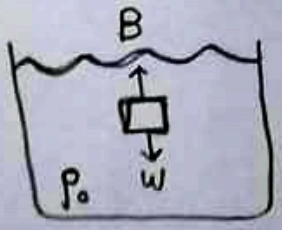


water anormaly characteristic

• Fractional increase $= \dfrac{\Delta A}{A} = \dfrac{2\alpha A_0 \Delta T}{A}$

$= 2\alpha \Delta T \Leftarrow$

Ch.13



Buoyant Force = B

Floating = الأجسام الطافية

Submerged = الأجسام المغمورة

$B = \rho_0 V g$

ρ_0 ← كثافة السائل

V ← حجم الجسم المغمور داخل السائل

$\Rightarrow$ fraction of submerged $= \frac{V_s}{V} = \frac{\rho}{\rho_0}$

$\Rightarrow$ fraction of non-submerged $= 1 - \frac{V_s}{V}$

- Flow rate (Q) → حجم الماء الي يمر بنقطة معينة عند زمن معين

$Q = \frac{\Delta V}{\Delta t}$ ⇒ it's unit m^3/s

- the equation of continuity → بتحني انو Q ثابتة في جميع النقاط في حال تساوي الدفع

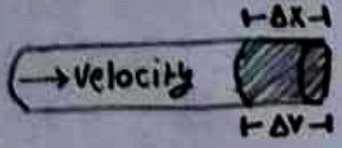
$Q_1 = Q_2 = Q_3 \cdots$

$\Delta V = A \Delta X = A v \Delta t$

$\Delta V = Q \Delta t$

Soll $Q = A v$ ← سرعة الجريان

مساحة المقطع



* للتحويل من لتر لـ m^3 بنضرب في 10^{-3} او $\frac{1}{1000}$

- Bernoulli's equation:

$\frac{}{1000}$ g/l

- Bernoulli's equation:

$$P_a + \rho g y_a + 1/2 \rho v_a^2 = P_b + \rho g y_b + 1/2 \rho v_b^2$$

⇒ Fluid at rest ($v = 0$) in lake

$$P_a + \rho g y_a = P_b + \rho g y_b$$

$$P_b = P_a + \rho g h$$

سرعة البرميل الخزان

$$v_1 = \sqrt{2gh}$$

$P_1 = P_2$

$v_2 = 0$

⇒ venturi tube $y_1 = y_2$ أنبوب فنتوري

$$P_a + 1/2 \rho v_a^2 = P_b + 1/2 \rho v_b^2$$

$$v_2 = A_1 \sqrt{\frac{2(P_a - P_b)}{\rho (A_a^2 - A_b^2)}}$$

the mano meter ((U-Shaped tube))

1. $P = P_{atm} + \rho g h$
2. gauge pressure $= P - P_{atm} = \rho g h$

Ch.14

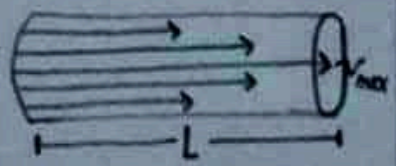
$$F = \eta A \frac{v}{y}$$

η ← وحدته Pa·S

□ laminar Flow in a tube : جريان المائع اللزج في انبوب

$$\bar{v} = 1/2\, v_{max}$$

$$\bar{v} = \frac{\Delta P R^2}{8\eta L}$$



$$Q = A\bar{v}$$

$$Q = \frac{\Delta P R^4 \pi}{8\eta L}$$

□ power dissipation : القدرة المفقودة او الضائعة

$$P = F\bar{v} = \Delta P A \bar{v} = \Delta P Q$$

P ← power ; A ← πR^2 ; ΔP ← pressure

□ Flow Resistance : مقاومة الجريان

⇒ وهي نسبة التغير في الضغط الى معدل الجريان

$$R_f = \frac{\Delta P}{Q} = \frac{8\eta L}{\pi R^4}$$ → its unit is $Pa \cdot S/m^3$

□ conta... قاس...

If θ <...

If θ >...

If θ = ...

$F_{cos...}$

ηL c...

$\eta(2\pi$...

Ch.1...

□ Coul...

$F = (K$...

□ Elec...

$E = \frac{F}{q}$

□ Elec...

$(V) = ...$ فرق الجهد

$V = ...$

□ Flow Resistance : مقاومة الجريان

⇒ وهي نسبة التغير في الضغط الى معدل الجريان

$$R_f = \frac{\Delta P}{Q} = \frac{8\eta L}{\pi R^2}$$ → its unit is $Pa \cdot S/m^3$

ch.15

□ cohesive force in liquids : قوى التماسك

① Surface tension = ظاهرة التوتر السطحي

$\gamma = \frac{F}{L}$ For each surface ⇒ its unite N/m

$\gamma = \frac{F}{2L}$ For surface and it opposite

→ surface tension

② Cohesive and adhesive Force =

adhesive تلاصق

water

it surface has a concave shap (مقعر) becaus water wets the surface

cohesive تماسك

mercury زئبق

it surface has a convex shap (محدب) because mercury does not wet glass

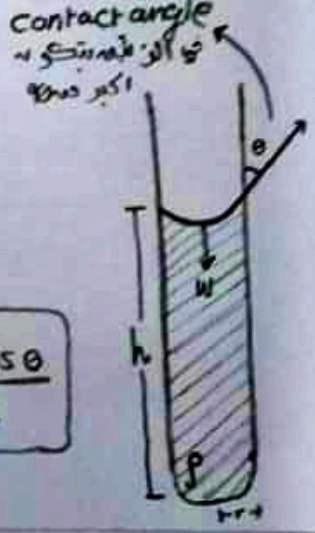
☐ contact angles and capillarity :

زاوية التلامس — الخاصية الشعرية

If $\theta < 90$ water will rise → h+

If $\theta > 90$ " depressed → h-

If $\theta = 90$ " neither rise nor fall → h 0



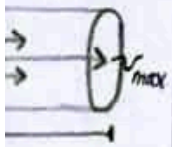
$F\cos\theta = w$

$\gamma L \cos\theta = mg$ ($m = \rho V$, $V = \pi r^2 h$)

$\gamma (2\pi r)\cos\theta = \rho V g$

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

جريان الحا



الق

Ch.16

☐ Coulmb's law :

$$F = \frac{K|q_1||q_2|}{r^2}$$

$K = 9\times10^9\ N.m^2/C^2$

$$K = \frac{1}{4\pi\varepsilon_0}$$ → permittivity of free space

☐ Electric field :

$$E = \frac{F}{q} \Rightarrow E = \frac{KQ}{r^2} \Rightarrow E_{total} = E_1 + E_2 \dots$$

its unite N/C

☐ Electric potential :

$$V = \frac{U}{q}$$ (V: فرق الجهد، U: طاقة الوضع)

$\Rightarrow$ its unite volt (V) = J/C

$$V = \frac{KQ}{r}$$

$V = \frac{U}{q}$ (V: فرق الجهد، U: طاقة الوضع) $\Rightarrow$ it's unite Volt (V) = J/C

$V = \frac{KQ}{r}$

Ch 17

☐ Electric Current :

$I = \frac{\Delta Q}{\Delta t} \Rightarrow$ average

$I = \frac{dQ}{dt} \Rightarrow$ instantaneous

$\Rightarrow$ it's unite (A) Ampere = C/S

☐ Resistance

Ohms law $V = IR$ (V: فرق الجهد)

$R = \frac{\rho L}{A}$ (ρ: يعتمد على نوع المادة) ← قانون ١و٢

$\Rightarrow$ unit of R ohm (Ω) = V/A

$\sigma = \frac{1}{\rho}$

resistance per unit leng =

$\frac{R}{L} = \frac{\rho}{A}$

Ch.23

□ the index of refraction : معامل الانكسار

$n = \frac{c}{v}$ → c: speed of light in vacuum
→ v: " " " " medium

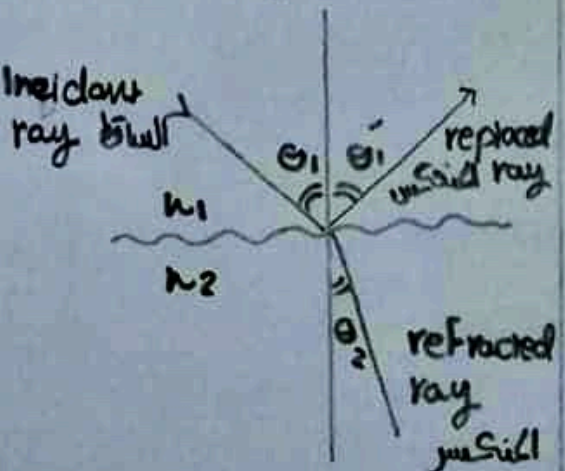
□ frequency and wavelength : التردد و الطول الموجي

$f = \frac{v}{\lambda} \Rightarrow [n_1 v_1 = n_2 v_2] \Rightarrow \frac{n_1}{n_2} = \frac{v_1}{v_2} = \frac{\lambda_2}{\lambda_1}$

□ Snells law

$n_1 \sin\theta_1 = n_2 \sin\theta_2$

$\theta_1 = \theta_1'$



Ch.24

□ lenses
- convex محدب + وبنحوفها (R)
- concave مقعر − وبنحوفها (R)
- plane مستو ∞ وبنحوفها (R)

□ focal length البعد البؤري

Ch.24

- lenses
  - Convex محدب + وبنحوطها (R)
  - Concave مقعره - وبنحوطها (R)
  - plane مسطحه ∞ وبنحوطها (R)

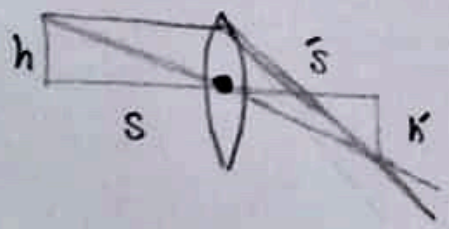
- facal length البعد البؤري

$$\frac{1}{F} = (n-1)\left(\frac{1}{R_1} + \frac{1}{R_2}\right)$$

- thin lens formla معادله العدسات الرقيقه

$$\frac{1}{F} = \frac{1}{S} + \frac{1}{S'}$$

F
- → + conver
- → - concave



Ch.30

(A) → number of protons + neutrons

(Z) → number of protons just

A - Z = number of neutrons

Ch31

- type of Radiation :

1. Alpha(α)
   - they are helium nuclei $^{4}_{2}He$
   - // // positively charged protons
   - low speed $v = 0,05C$ يعني عندها بالنية من سرعة الضوء
   - they have greatest ionization but least penetration

2. Beta (β)
   - negatively charged
   - high speed $v \approx 0,9C$
   - less ionization and greater penentration than alpha

3. Gamma(γ)
   - electromagnetic waves of very short wavelength and high Frequency
   - no electric charge
   - least ionization and greatest penetration
   - high speed $v = C$