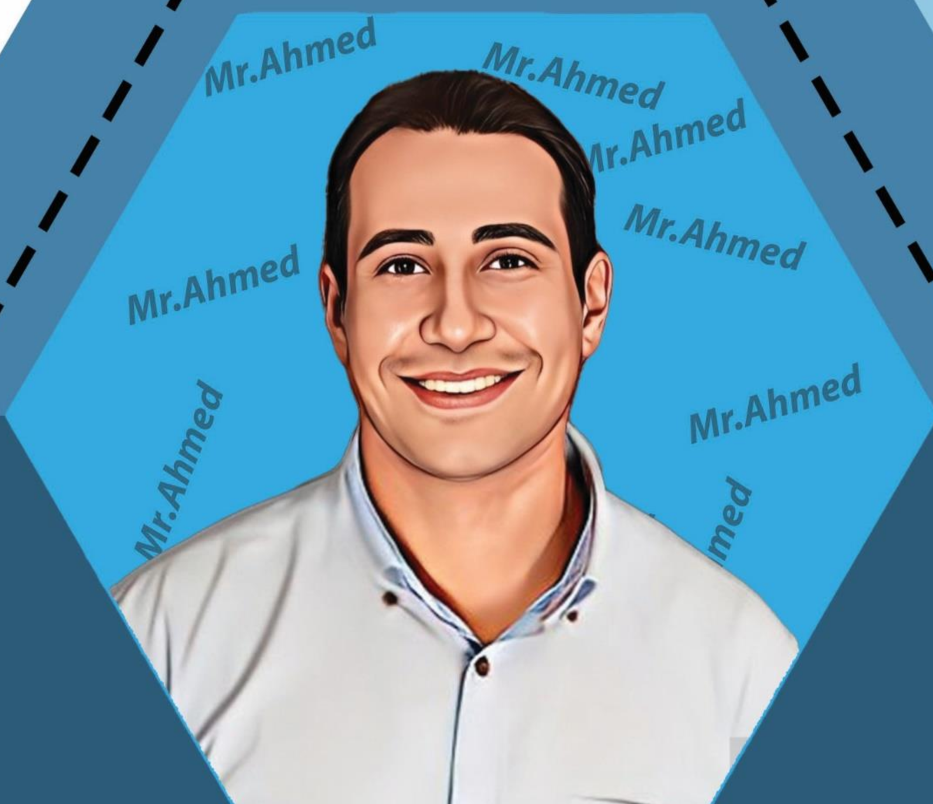
AHMED RAMADAN

Physics school_mr ahmed ramadan

The Golden book in pysics

Revision Book



Secondary.2

Mr.
Ahmed ramadan

CHAPTER ONE

1) υ (frequency) $= \frac{N}{t} = \frac{1}{T} = \frac{V}{\lambda}$, $\upsilon \propto N$

2) T (Periodic time) $= \frac{t}{N} = \frac{1}{\upsilon} = \frac{\lambda}{V}$, $T \propto \frac{1}{N}$

3) **In case of pendulum or string or spring:**

→ distance of 1 cycle = 4 × Amplitude

→ T of 1 cycle = 4 × time of Amplitude

4) $V = \lambda\,\upsilon = \frac{\text{distance}}{\text{time}} = \frac{\lambda}{T}$

5) $\lambda = \frac{\text{distance}}{\text{no.of cycles}} = \frac{V}{\upsilon} = V\,.\,T$

هام

At constant (d):

$\lambda \propto \frac{1}{N}$, $\frac{\lambda_1}{\lambda_2} \propto \frac{N_2}{N_1}$

6) **To know distance between two points:-**

$d_{(2\ points)} = \lambda \times$ no. of waves between 2 points

7) **To know time between two points:-**

$t_{(2\ points)} = T \times$ no. of waves between 2 points

8) **N (no. of waves):**

→ **Crest with crest (trough with trough):**

N = difference between them

→ **Crest with trough:**

N = (crest - (trough + $\frac{1}{2}$))

→ **On drawing:**

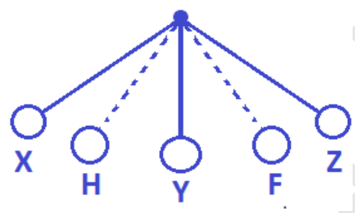
N = no. of quarters (Amplitudes) × $\frac{1}{4}$

9) **Important rule:**

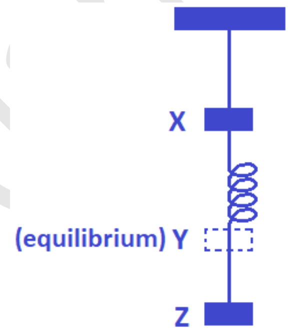
$$\frac{\lambda_1}{\lambda_2} = \frac{T_1}{T_2} = \frac{\upsilon_2}{\upsilon_1} = \frac{N_2}{N_1}$$

(see problems (44) p.47 , (3,4,5) p.50)

10) **In pendulum:**



Spring:



- At we go up from equilibrium , time increases and velocity decreases,

  $t_{YF} < t_{FZ}$, $V_{YF} > V_{FZ}$

- Speed always at equilibrium is maximum. (Y) maximum speed, zero P.E, Maximum K.E
- At ends: (X , Z) velocity is zero, K.E is zero, (P.E) is maximum.
- Mechanical energy (M.E) at any point (X,H,Y,F,Z) is constant and maximum.
- **To make one cycle:**

  a) If points at the end (X or Z) **start** is the **end**.

  b) If point is in the middle (Y), passes by it two successive times:

YZ → ZY	→	YX → XY
1st time		2nd time

متكسلش مهمين

11) See problems 19, 21, 24, (4 , 5) Essay in P.(38 , 39)

12) **Medium**

Same medium

"V" is constant

LAW

$$\frac{\lambda_1}{\lambda_2} = \frac{T_1}{T_2} = \frac{\upsilon_2}{\upsilon_1}$$

different medium

(T "periodic time" , υ "frequency" are constant)

LAW

$$\frac{V_1}{V_2} = \frac{\lambda_1}{\lambda_2}$$

13) **Problems depends on time difference:-**

$$\Delta t = t_{\text{الكبير}} - t_{\text{الصغير}}$$

$$\Delta t = \frac{d}{V_{\text{الصغيرة}}} - \frac{d}{V_{\text{الكبيرة}}}$$

بص فيهم متكسلش

Problems like:

(22 , 5) P.29 , 30

(32 , 36) P.45 , 46

14) **Problems on wireless or reflected waves or echo:-**

$V = \frac{2d}{t}$ or divide time on (2) and use $V = \frac{d}{t}$ (Problems "23" P.25)

15) **Problems on "λ" increases (large) or decreases (small):-**

$$\frac{\upsilon_{Small}}{\upsilon_{large}} = \frac{\lambda_{(decrease)}}{\lambda_{(increase)}}$$

Note:

16) لو عاوز بعد كده تجيب ال velocity ←

اعمل Multiply للرقمين اللي في وش بعض يعني

يا زكي $\upsilon_{small} \times \lambda_{large}$ **or** $\upsilon_{large} \times \lambda_{small}$

$$\frac{\upsilon \; [1]}{\upsilon \; [2]} = \frac{[2] \; \lambda}{[1] \; \lambda}$$

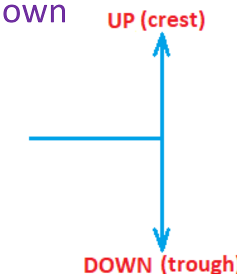
Problem "33" page 29 مهمة يا كسول

Note:

17) Velocity depends on medium only.

18) Frequency depends on **source** → مصدر ال waves

19) **Transverse:** Up and down perpendicular.



20) **Longitudinal:** ⟺ along Left and Right

Chapter two

(Mirrors):

→ $\phi_1 = \phi_2$

incidence = reflection

Solving Mirror problems:

1. Make normal line on mirror surface at the end of light incident ray.
2. Normal must make an angle of 90° with surface.
3. Angle of incidence or reflection must be between light and normal only.
4. If light falls normal on mirror, it reflects on itself, ∴ angle of deviation = 180°

→ **Tricky Mirror problems: (rotating mirror)**

1) If normal on mirror moves away "يبعد" from incident ray or (incident ray moves away "يبعد" from normal) by θ:

a) ϕ_1 (incidence) = ϕ_2 (reflection) increase by θ , $\phi_1 = \phi_{old} + \theta$

b) Angle between incident ray and reflected ray increases by 2θ

$$\theta_{new} = \theta_{old} + 2\theta$$

2) If normal approaches "يقرب" from incident ray (or incident ray approaches "يقرب" from normal) by θ:

a) $\phi_1 = \phi_2$ decrease by θ

$$\phi = \phi_{old} - \theta$$

b) Angle between incident ray and reflected ray decreases by 2θ

$$\theta_{new} = \theta_{old} - 2\theta$$

← الخلاصة: شوف ال (normal) لو قرب من incident بعد rotation اعمل (-) يعني decrease و لو بعد ال (rotation) ال normal بعد عن ال incident اعمل (+) يعني increase

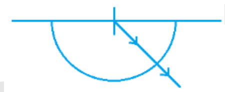
→ $\frac{\sin\varphi}{\sin\theta} = {}_1n_2 = \frac{n_2}{n_1} = \frac{V_1}{V_2} = \frac{\lambda_1}{\lambda_2}$ = constant (ratio always constant)

→ $n = \frac{C}{V}$

→ $\frac{\lambda_1}{\lambda_2} = \frac{n_2}{n_1}$, (υ) constant, see problems (17) , (21) P.68 ⇒ متكسلش

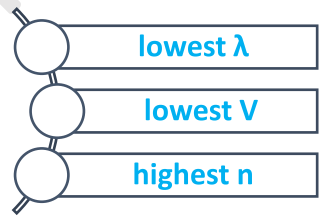
Note: If light falls on half circle glass:

$\phi_1 = \theta_1 = zero$ "always"



→ **Critical angle:**

Always found in denser medium, it's θ = 90°



→ $\sin\phi_c = \frac{\text{small number}}{\text{large number}}$

← في حالة لو عاوزين مكانها في أي (medium):

(from more) $\sin\phi_c$ (to less) $= \frac{n_{\text{less medium}}}{n_{\text{more dense (prism)(here)}}} =$

$\frac{V_{\text{more dense (prism)}}\ \text{(small value)(here)}}{V_{\text{less dense}}\ \text{(large value)}} = \frac{\lambda_{\text{more dense (prism)}}\ \text{(small value)(here)}}{\lambda_{\text{less dense}}\ \text{(large value)}} = \frac{\sin(\phi_c)_1}{\sin(\phi_c)_2}$

Here: معناها مكان ال ϕ_c

- $\sin\phi_c \propto ({}_1n_2)$ relative index
- $\sin\phi_c \propto n_{less}$, $\sin\phi_c \propto \frac{1}{n_{more}}$
- as ϕ_c : big → refraction occurs → n_{less} (outside) بيزيد
- as ϕ_c: small → total internal reflection occurs → n_{less} بيقل
- $\sin\phi_c \propto \frac{1}{(N - n)}$, (N - n) difference between (n_{less} , n_{more})

Special cases: (in case of air)

$$\sin \phi_C = \frac{1}{n} = \frac{V}{C}$$

→ **In optical fiber or reflecting prism:** ($n_{inner} > n_{outer}$)

$$\therefore \sin \phi_C = \frac{n_{outer}}{n_{inner}} \quad , \quad \frac{n_{inner}}{n_{outer}} > 1$$

→ **In problems of knowing (radius or diameter) of disc to prevent light from coming out:** $\tan \phi_C = \frac{radius}{depth}$

→ **Solving prism problems:**

1. Calculate critical angle first.
2. Compare angle of incidence inside prism only with critical, if:
   - $\phi = \phi_C$ ⇒refract tangent $\theta_2 = 90°$
   - $\phi < \phi_C$ ⇒refract by θ_2
   - $\phi > \phi_C$ ⇒total internal reflection

     $\underset{(incidence)}{\phi_1} = \underset{(reflection)}{\phi_2}$
3. Don't forget to make normal at arrow of incident ray, if light reflects.

شوف ال light هيقفل المثلث علي كام و هات ال angle of incidence هي الباقي بتاعها

Laws of prism:

$$\frac{\sin(\text{outer angle } \phi_1 \text{ or } \theta_2)}{\sin(\text{inner angle } \theta_1 \text{ or } \phi_2)} = \frac{n_{prism}}{n_{medium}}$$

→ A: Apex angle / refractive angle / angle of prism $= \theta_1 + \phi_2$

(مجموع اللي جوه)

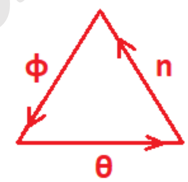
→ α (angle of deviation) $= \phi_1 + \theta_2 - A$

(اللي بره) - (اللي جوه)

→ $\lambda \propto V \propto \theta_1 \propto \phi_C \propto {}_1n_2$ (relative) $\propto \frac{1}{n} \propto \frac{1}{\alpha_0} \propto \frac{1}{\theta_2}$ من الاخر

→ To get one, you must have the other two.

$$\phi_1 \propto \theta_1 \propto \frac{1}{\phi_2} \propto \frac{1}{\theta_2}$$



→ **Young's laws:**

$$\Delta y = \frac{\lambda R}{d} \quad , \quad \Delta y \propto \lambda \propto R \propto \frac{1}{d} \propto \frac{1}{U} \propto T$$

(V is constant as same medium)

ratio $\frac{\Delta y_1}{\Delta y_2} = \frac{\lambda_1}{\lambda_2} \times \frac{R_1}{R_2} \times \frac{d_2}{d_1}$

→ **Knowing Δy by using distance (X) and number (N) of fringes:**

$$\Delta y = \frac{X}{N}$$

a) **Dark with dark or bright with bright:**

$\Delta y = \frac{X}{N}$, N: difference between their number

b) **Dark with bright:**

N = (dark no.) - (bright + 0.5) نمشي بنفس الترتيب

→ **Knowing ratio if distance (X) between fringes constant, $y \propto \frac{1}{N}$ if "X" constant:**

$$\left(\frac{\lambda_1}{\lambda_2} \text{ or } \frac{\Delta y_1}{\Delta y_2}\right) \Leftarrow \frac{\Delta y_1}{\Delta y_2} = \frac{N_2}{N_1}$$

See problems (13 , 14 , 16) P.87

→ Knowing path difference:

a) In case of bright:

$$\text{path difference} = (\text{bright no.} \times \lambda)$$

b) In case of dark:

$$\text{path difference} = (\text{dark no.} - 0.5) \times \lambda$$

c) constructive interference = $m\,\lambda$

d) destructive interference = $(m + \frac{1}{2})\,\lambda$

اعرفهم بس هنحل فقط بالفوق

Note: Central fringe it's number = zero "0" and always bright

→ Thin prism:

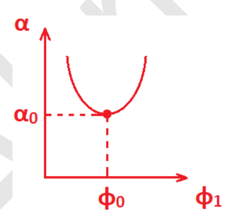
1. $\alpha_0 = A(\frac{n_{prism}}{n_{medium}} - 1)$
2. $\alpha_{0_b} = A(n_b - 1)$, $\alpha_{0_r} = A(n_r - 1)$, $\alpha_{0_y} = A(n_y - 1)$
3. Average

   $\alpha_0 = \alpha_{0_y} = \frac{\alpha_{0_b} + \alpha_{0_r}}{2}$

   $n_y = \frac{n_b + n_r}{2}$
4. $\alpha_{0_b} - \alpha_{0_r}$ (Angular size of dispersion) $= A(n_b - n_r)$
5. Dispersive power:

   $\omega = \frac{n_b - n_r}{n_y - 1}$

Minimum deviation:

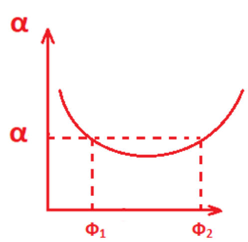
1. $\phi_1 = \theta_2$, $\theta_1 = \phi_2$
2. $\frac{n_P}{n_{medium}} = \frac{\sin(\frac{\alpha_0 + A}{2})}{\sin(\frac{A}{2})}$
3. $\phi_1 = \theta_2 = \phi_0 = \frac{\alpha_0 + A}{2}$
4. $\theta_1 = \phi_2 = \theta_0 = \frac{A}{2}$
5. 

6. If $\phi > \phi_0$ or $\phi < \phi_0$:

   "α" increases

   See problems (29,30,31) P.136
7. Special case:

   If Φ_1 , Φ_2 have same angle of deviation ∴ $\Phi_2 = \theta_2$



→ Colors arrangement:

R O Y G B I V

R side	V side
greatest (λ) lowest (n , υ)	lowest (λ) greatest (n , υ)

"λ" , "ϕ_C" increase ←

→ "υ" , "n" , "α_0" increase

→ Some cases:

Lights falls normal: $\phi_1 = \theta_1 = 0$, $A = \phi_2$

Light emerges normal: $\phi_2 = \theta_2 = 0$, $A = \theta_1$

Light emerges tangent: $\theta_2 = 90°$, $\phi_2 = \phi_{critical}$

CHAPTER THREE

→ Volume flow rate:

$$Q_v = \frac{V_{ol}}{t} = A.v$$

Unit: m^3 / sec , $\frac{m^3}{sec} * 60 = m^3$ / min

Ratio rule: $\frac{v_1}{v_2} = \frac{A_2}{A_1} = \frac{r_2^2}{r_1^2} = \frac{d_2^2}{d_1^2}$

r: radius , d: diameter

→ Mass flow rate :

$$Q_m = \frac{mass}{time} = \rho\, Q_v = \rho\, A\, v$$

Unit: kg/sec , kg/sec * 60 = kg/min .

→ Equation of continuity:

$$A_1 v_1 = A_2 v_2 \,,\; r^2_1 v_1 = r^2_2 v_2 \,,\; Q = A_1 v_1 = A_2 v_2$$

→ **Tube branched into different Areas:**

$$A_1 v_1 = A_2 v_2 + A_3 v_3 + \dots$$

→ **if branched into equal Areas:**

$A_1V_2 = nA_2V_2$, n : no . of branched tubes

→ **Coefficient of viscosity:**

$$v_s = \frac{f.d}{A.V}$$

→ **Volume flow rate Q_V $[m^3/sec]$:**

$$Q_V = \frac{volume}{time} = A.v$$

→ **Mass flow rate Q_m $[kg/sec]$:**

$$Q_m = \frac{mass}{time} = \rho\ A\ v = \rho\ Q_V$$

→ **Continuity equation:-**

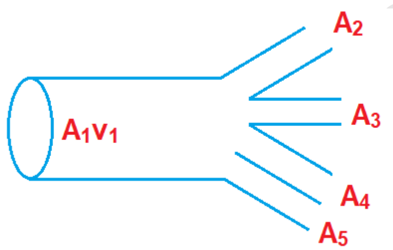
$$A_1 v_1 = A_2 v_2\ ,\ r_1^2 v_1 = r_2^2 v_2\ ,\ d_1^2 v_1 = d_2^2 v_2$$

a) **If tube is branched in to number of branches of different areas:**

$$A_1 v_1 = A_2 v_2 + A_3 v_3 + A_4 v_4 + \dots$$

$$r_1^2 v_1 = r_2^2 v_2 + r_3^2 v_3 + r_4^2 v_4 + \dots$$

$$d_1^2 v_1 = d_2^2 v_2 + d_3^2 v_3 + d_4^2 v_4 + \dots$$

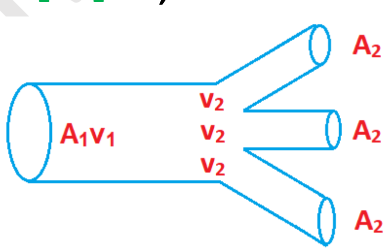


b) **If tube is branched into number of same areas:-**

$A_1V_1 = n\ A_2\ V_2$

$r_1^2\ V_1 = n\ r_2^2\ V_2$

$d_1^2\ V_1 = n\ d_2^2\ V_2$, n: number of branches



→ **Viscosity:**

$$F = \eta_{vs} \frac{A\ v}{d} \quad , \quad \eta_{vs} = \frac{F\ d}{A\ v}$$

Where η_{vs} is viscosity coefficient

Units of η_{vs}: $[\ N.S/m^2\ ,\ Kg/m.s\ ,\ J.S/m^3\ ]$

→ **Notes:**

1. **If there are many taps filing container:**

$$\frac{Vol}{t_{total}} = \frac{Vol}{t_1} + \frac{Vol}{t_2} \quad , \quad Vol_t = Vol_1 = Vol_2$$

$$\frac{1}{t_{total}} = \frac{1}{t_1} + \frac{1}{t_2}$$

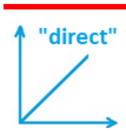
(see problem 3 P.150)

2. **If many tubes connected with different area and ratio of their areas are given then use:**

$$Q_{v_1} : Q_{v_2} : Q_{v_3}$$

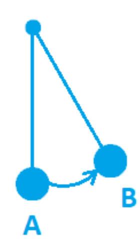
$$1 : 1 : 1$$

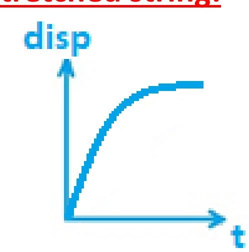
و احسب ال Qv بتاعت أي واحدة و لازم الباقيين يطلعوا نفس الحاجة
see problem (4,5) page.150



GRAPHS

1) **At simple pendulum or stretched string:**





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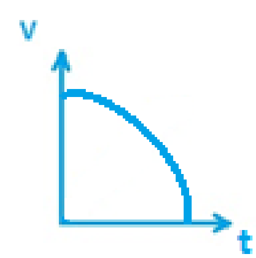

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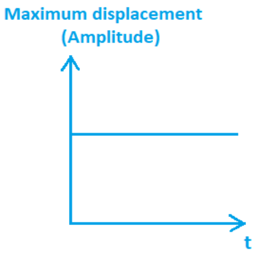
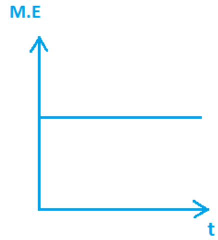
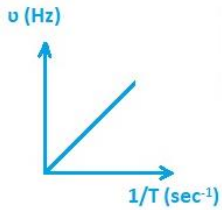


4)



5) $\upsilon = \frac{1}{T}$

Slope = $\frac{\Delta y}{\Delta x} = \frac{\upsilon}{1/T} = 1$

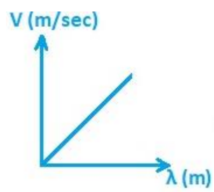


6) In case of same wave:

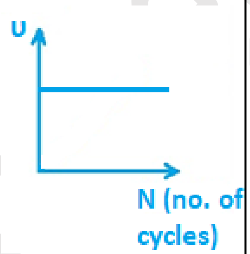
$V = \lambda \upsilon$

Slope = $\frac{\Delta y}{\Delta x} = \frac{V}{\lambda}$

∴ Slope = υ



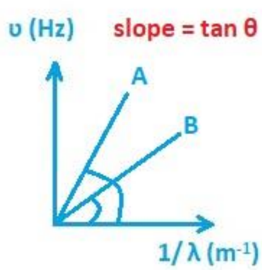
7) In case of tuning fork:



8) Slope = V

$V_A > V_B$

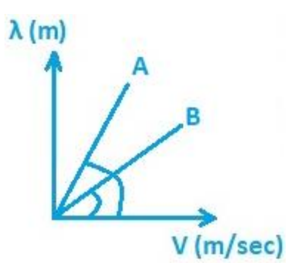
Because $(Slope)_A > (Slope)_B$



9) Slope = T = tan θ

$T_A > T_B$

$(Slope)_A > (Slope)_B$

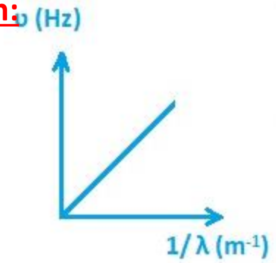


10) In case of same medium:

$V \cong \lambda \upsilon$

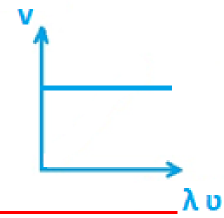
Slope = $\frac{\Delta y}{\Delta x} = \frac{V}{1/\lambda} = \lambda \upsilon$

∴ Slope = V



11) In same medium:

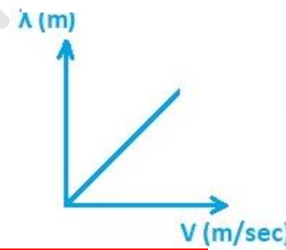
"v" constant depends on type of medium



12) $V = \lambda \upsilon$

Slope = $\frac{\Delta y}{\Delta x} = \frac{\lambda}{V} = \frac{1}{\upsilon}$

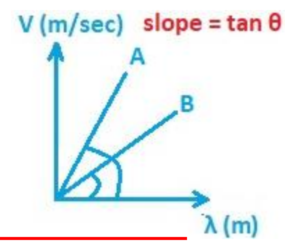
∴ Slope = T



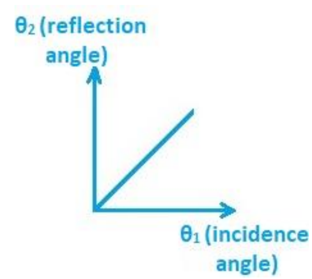
13) Slope = υ

$\upsilon_A > \upsilon_B$

$(Slope)_A > (Slope)_B$



14) Slope = 1

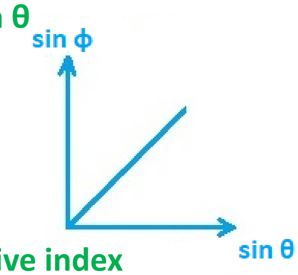


15) $_1n_2 = \frac{\sin \phi}{\sin \theta}$ OR $n = \frac{\sin \phi}{\sin \theta}$

Slope = $\frac{\sin \phi}{\sin \theta}$

∴ Slope = $_1n_2 = n$

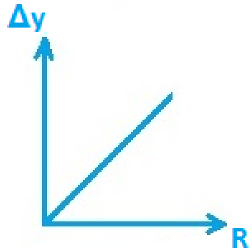
relative OR absolute refractive index



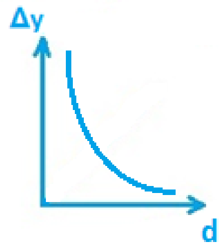
16) $\Delta y = \frac{\lambda R}{d}$

Slope $= \frac{\Delta y}{\Delta x} = \frac{\Delta y}{R} = \frac{\lambda}{d}$

$\therefore$ Slope $= \frac{\lambda}{d}$



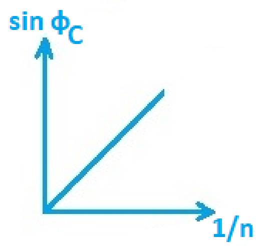
17)



18) $\sin \phi_C = \frac{1}{n}$

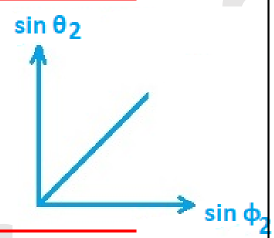
Slope $= \frac{\sin \phi_C}{\frac{1}{n}} = n \times \sin \phi_C$

$\therefore$ Slope = 1



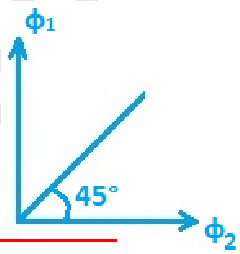
19) $\frac{\sin \theta_2}{\sin \phi_2} = n$

$\therefore$ Slope = n



20) $\phi_1 = \phi_2$

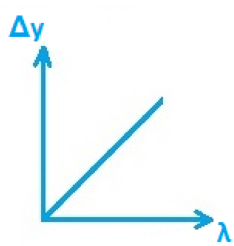
Slope = 1



21) $\Delta y = \frac{\lambda R}{d}$

Slope $= \frac{\Delta y}{\Delta x} = \frac{\Delta y}{\lambda} = \frac{R}{d}$

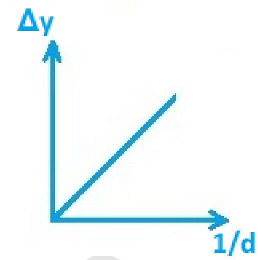
$\therefore$ Slope $= \frac{R}{d}$



22) $\Delta y = \frac{\lambda R}{d}$

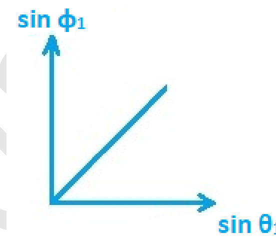
Slope $= \frac{\Delta y}{\Delta x} = \frac{\Delta y}{\frac{1}{d}} = \Delta y\, d$

$\therefore$ Slope = λ R

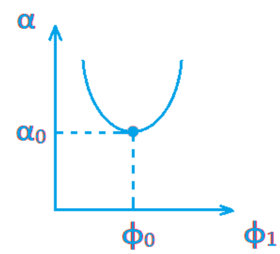


23) $\frac{\sin \phi_1}{\sin \theta_1} = n$

$\therefore$ Slope = n



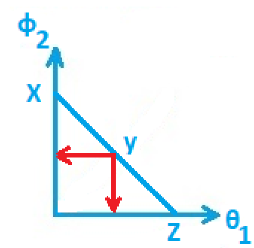
24) α_0: Minium angle of deviation



25) Point (X,Z) = Apex angle (A)

Point (y) represents minimum angle of deviation

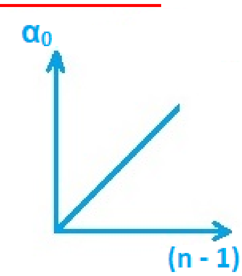
because at (y) $\phi_2 = \theta_1$



26) $\alpha_0 = A\,(n - 1)$

Slope $= \frac{\Delta y}{\Delta x} = \frac{\alpha_0}{n - 1} = A$

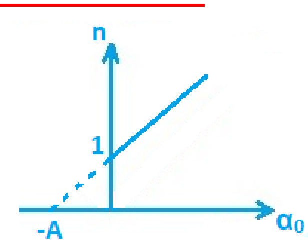
$\therefore$ Slope = A



27) $\alpha_0 = A\,(n - 1)$

Slope $= \frac{\Delta y}{\Delta x} = \frac{\Delta n}{\alpha_0} = \frac{1}{A}$

$\therefore$ Slope $= \frac{1}{A}$

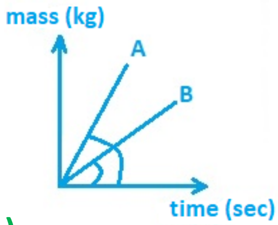


28) Slope = $\frac{mass}{time}$

∴ Slope = Q_m

$Q_{mA} > Q_{mB}$

Because $(Slope)_A > (Slope)_B$



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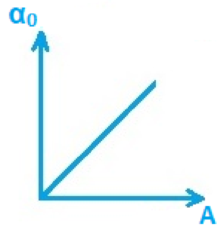
29) $\alpha_0 = A (n - 1)$

Slope = $\frac{\Delta y}{\Delta x} = \frac{\alpha_0}{A}$ = (n - 1)

∴ Slope = (n - 1)



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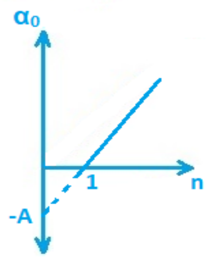
30) $\alpha_0 = A (n - 1)$

Slope = $\frac{\Delta y}{\Delta x} = \frac{\alpha_0}{\Delta n}$ = A

∴ Slope = A



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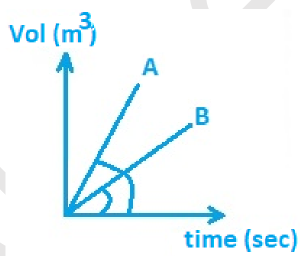
31) Slope = $\frac{vol}{time}$

∴ Slope = Q_v

$(Slope)_A > (Slope)_B$

∴ $Q_{vA} > Q_{vB}$



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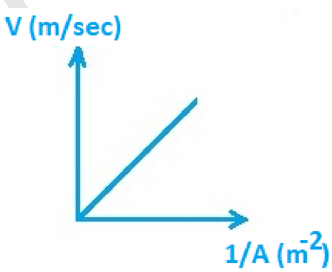
32) Slope = $\frac{V}{\frac{1}{A}}$ = V A

∴ Slope = Q_v

∴ $Q_m = \rho\, Q_v$

∴ $Q_m = \rho \times$ slope



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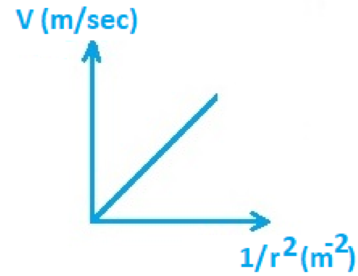
33) Slope = $\frac{V}{\frac{1}{r^2}} = V\, r^2$

$Q_V = V\, \pi\, r^2$

∴ Slope = $\frac{Q_V}{\pi}$

$Q_V = \pi \times$ slope

$Q_m = \rho \times \pi \times$ slope



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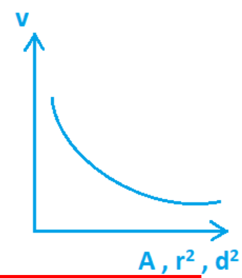
34)



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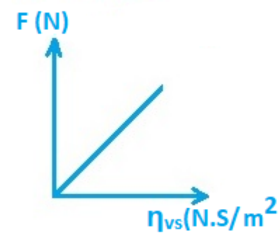
35) Slope = $\frac{F}{\eta_{vs}} = \frac{A\,V}{d}$



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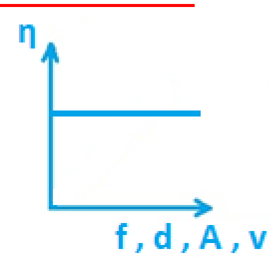
36) Viscosity coefficient depends only on kind of material and temperature



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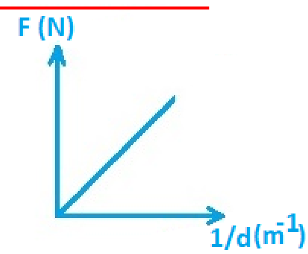
37) Slope = $\frac{F}{\frac{1}{d}}$ = F d

∴ Slope = η_{vs} A V



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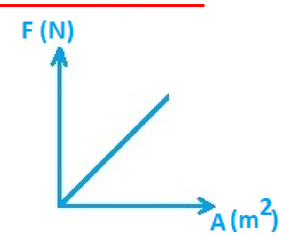
38) Slope = $\frac{F}{A} = \eta_{vs}\, \frac{V}{d}$



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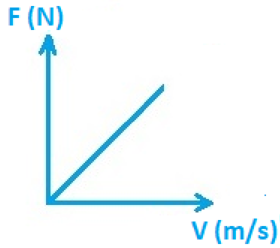
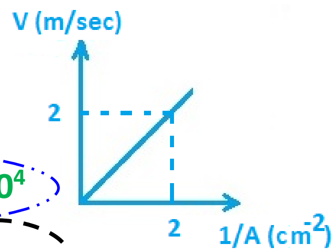
39) Slope = $\frac{F}{V} = \eta_{vs}\frac{A}{d}$



Notes:

لو فيه unit علي ال graph غير ال standard حولها و أنت بتجيب ال slope

Example



Slope = $\frac{2}{2 \times 10^4}$

$cm^{-2} \longrightarrow (10^{-2})^{-2} = 10^4$

عكس التحويلة اللي أنتم عارفينها

- **Frequency:** sec^{-1}, Hertz
- **Q_V (volume flow rate):** $\frac{m^3}{sec}$
- **Q_m (mass flow rate):** $\frac{Kg}{sec}$
- **η_{Vs} (viscosity coefficient):** $\frac{N.s}{m^2}$ OR $\frac{Kg}{m \cdot s}$

  OR Pascal . sec OR $\frac{J \cdot s}{m^3}$

Units and prefixes

Small units: -	Big units: -
m (mille) → unit: $\times 10^{-3}$ unit → m: $\times 10^{3}$	k (kilo) → unit: $\times 10^{3}$ unit → k: $\times 10^{-3}$
μ (micro) → unit: $\times 10^{-6}$ unit → μ: $\times 10^{6}$	M (mega) → unit: $\times 10^{6}$ unit → M: $\times 10^{-6}$
n (nano) → unit: $\times 10^{-9}$ unit → n: $\times 10^{9}$	G (Giga) → unit: $\times 10^{9}$ unit → G: $\times 10^{-9}$
d (deci) → unit: $\times 10^{-1}$ unit → d: $\times 10$	T (terra) → unit: $\times 10^{12}$ unit → T: $\times 10^{-12}$
F (femto) → unit: $\times 10^{-15}$ unit → F: $\times 10^{15}$	direct converstion
P (Pico) → unit: $\times 10^{-12}$ unit → P: $\times 10^{12}$	cm = 10^{-2} m cm^2 = 10^{-4} m^2 cm^3 = 10^{-6} m^3
A° (Angstrom) → m: $\times 10^{-10}$ m → A°: 10^{10}	1 Ton = 1000 kg
Centi → unit: $\times 10^{-2}$ unit → Centi: $\times 10^{2}$	1 liter → 10^{-3} m^3 m^3 → liter: $\times 10^{3}$
hector (h) → unit: $\times 10^{2}$ unit → h: $\times 10^{-2}$	Kg = 1000 gram mm^3 = 10^{-9} m^3 mm^2 = 10^{-6} m^2 m/sec → $\times \frac{18}{5}$ Km/h Km/h → $\times \frac{5}{18}$ m/sec

AHMED RAMADAN

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By.

Ahmed Ramadan

This book was made to revise you with every single point and to make you recover all the Curriculum of this semister

With best luck

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