مدونة المناهج السعودية

https://eduschool40.blog

الموقع التعليمي لجميع المراحل الدراسية

في المملكة العربية السعودية

قوانين شابتر ١ :-

- coordinates system (rectangular)

① $x = r \cos \theta$

② $y = r \sin \theta$

- Polar

③ $\theta = \tan^{-1}\left(\frac{y}{x}\right)$

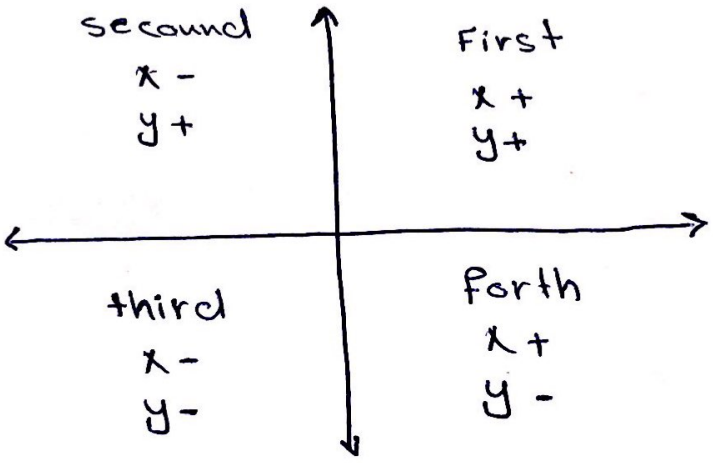
④ $r = \sqrt{x^2 + y^2}$

- unit vector:

x ← i

y ← j

z ← k



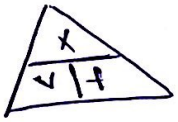
قوانين شابتر 2 :

① displacment Δx :

$$\Delta x = x_f - x_i$$

② averge velocity : unit : m/s

1- $V_x = \frac{\Delta x}{\Delta t}$ 2- $v = \frac{v_i + v_f}{2}$



③ acceleration :

$$a = \frac{\Delta v}{\Delta t}$$ unit m/s^2

$$a = \frac{v_f - v_i}{t_f - t_i}$$

④ Kinematic Equation :-

1- $v_f = v_i + at$

2- $x_f = x_i + \frac{1}{2}(v_i + v_f)t$

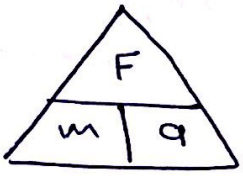
3- $x_f = x_i + v_i t + \frac{1}{2} a t^2$

4- $v_f^2 = v_i^2 + 2a(x_f - x_i)$

قوانين نيوتن 3 :-

① Newton second law:

$F = ma$



unit:

① Newton (N)

$1N = 1kg \cdot m/s^2$

② pound (lb)

$1lb = 1slug \cdot ft/s^2$

② Gravitational force:

$F = mg$

③ static friction:

$f_s \leq \mu_s n$

$\downarrow$

$=$ impending motion

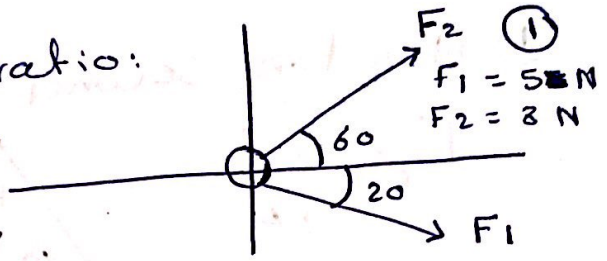
④ kinetic friction:

$f_k = \mu_k n$ (v, x)

$\boxed{f_k = F - ma}$

Static friction force depends on normal force and coefficient

Find accleratio:
$m = 0.3\,kg$



لو المسأله رسمه لازم تحليل بعد التحليل نطلع سهمين.

① F_x =

$F_1 \cos\theta = 5 \cos 20 = 4.6$

$F_2 \cos\theta = 8 \cos 60 = 4$

$4.6 + 4 = \boxed{8.6}$

F_y

$F_1 \sin\theta = 5 \sin 20 = 1.7$

$F_2 \sin\theta = 8 \sin 60 = 6.9$

$1.7 + 6.9 = \boxed{5.2}$

② $a = \frac{f}{m}$

$= \frac{8.6}{0.3} = 28.6$

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

$= \frac{5.2}{0.3} = 17.3$

③ $a = \sqrt{(28.6)^2 + (17.3)^2} = 33.4$

④ $\theta = \tan\left(\frac{17.3}{28.6}\right) = 31.1^\circ$

قوانين شابتر 4 :-

tension اذا طلب

$T = mg$

$T = mg\cos\theta$

① work :

unit : $kg \cdot m^2/s^2$

joule (J) ≡ (N.m)

1- $W = F \Delta r$

2- $W = F \Delta r \cos\theta$

3- $W = \frac{1}{2} m v_f^2 - \frac{1}{2} m v_i^2$ [⌐ , x]

4- $v_f^2 = \sqrt{\frac{2W}{m} + v_i^2}$ قانون الشغل لوطلب السرعة

5- $W = -\frac{1}{2} k x^2$ لوفي السؤال spring

6- $W = mgy - mgy$ لوطلب الشغل وعندي مسافتين .

② kinetic Energy :

$k = \frac{1}{2} mv^2$

unit :
joule (J)

③ power :

$P = \frac{W}{t}$

$P = F \cdot v$

$P = T \cdot V$

unit :
watt (w)
d/s
horse power (hp)
$kg \cdot m^2/s^3$

④ Hooke's law :

$F = -kx$

unit :
N/m

$f = F - ma$

⑤ Potential Energy :

$U = mgy$

unit :
Joule (J)

⑥ $F = mg + f$

* spring

لوطلب :

W

$W = -\frac{1}{2} k x^2$

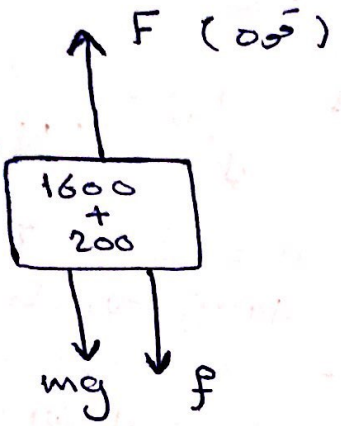
k

$k = \frac{mg}{x}$

km/h

□ x 1000
60 x 60

* مثال المصعد :-



استخدم ① $P = F \cdot V$

$\downarrow$

$F = mg + f$ ②

* مثال العضلة :-

① $W_1 = F \cdot \Delta r \cos\theta$

$= (20)(10)\cos 60 =$ □

$W_2 = F \cdot \Delta r \cos\theta$

$= (20)(10)\cos 60 =$ □

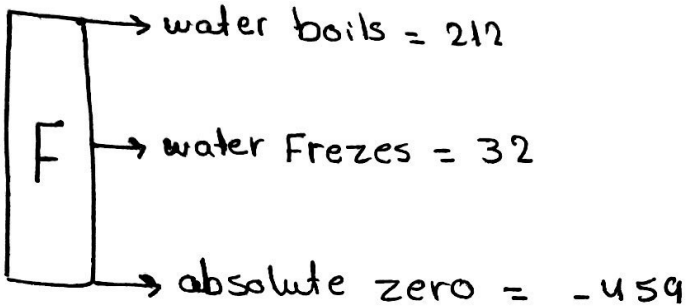
□ + □

* مثال الطائرة :-

$P = F \cdot V$

$P = \frac{W}{t}$

قوانين شابتر 5 :-



التحويلات :

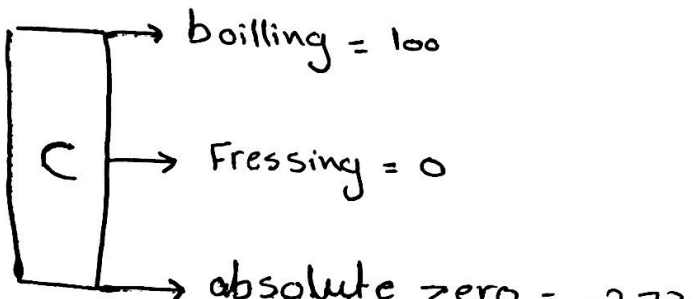
F → C
shift + 8 = 37

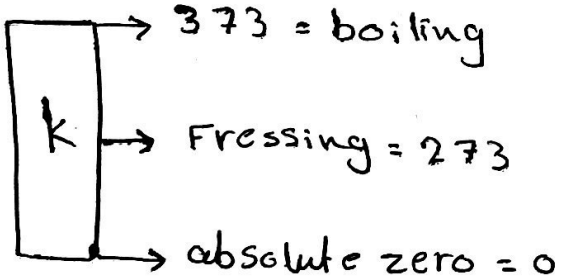
C → F
shift + 8 = 38

C → K
+ 273

K → C
- 273

F C K





① linear expansion:

$$L_f - L_i = \alpha L_i (T_f - T_i)$$

unit:
$(1/C)$
$(C)^{-1}$

② Area expansion:

$$A_f - A_i = \underbrace{2\alpha}_{\gamma} A_i (T_f - T_i)$$

③ Volume expansion:

$$V_f - V_i = \underbrace{3\alpha}_{\beta} V_i (T_f - T_i)$$

* قوانين شابتر ٦ :

① Coulomb's law:-

$$F_e = k \frac{|q_1||q_2|}{r^2}$$

② Newton's law of universal gravitition:

$$F_g = G \frac{m_e m_p}{r^2}$$

③ $E = \frac{F}{q}$

unit:
N/C

Electric Field

② $E = k \frac{q}{r^2}$

④ $\frac{N_2}{N_1} = \frac{Q_2}{Q_1}$

⑤ $a = \frac{qE}{m} \Rightarrow e = a = -\frac{eE}{m}$

⑥ $v_f^2 = \frac{2qE}{m} x$

⑦ $q = Ne$

$W = qE\Delta x$

$e = 1.6 \times 10^{-19} C$

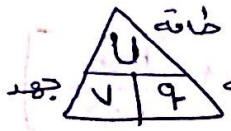
$k = 8.9 \times 10^9 N.m^2/C^2$

$G = 6.6 \times 10^{-11} N.m^2/kg^2$

* قوانين شابتر V :

① Electric Potential :

① $V = \frac{U}{q_o}$



② $V = k\frac{q}{r}$ اذا كان في السؤال رسمه او نقاط كولوم

unit :

vole(V) ≡ J/C (Joule per coulum)

② The potential difference :

- $\Delta V = V_B - V_A$
- $V = -E.d$
- $\Delta V = \frac{\Delta U}{q}$

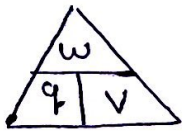
unit :

N/C ≡ V/m

volte per meter.

③ Work and Electric Ponential :

$W = q\Delta V$



④ Potential energy :

- $\Delta U = -qEd$ $U = Vq$
- $U = k\frac{qq}{r}$

⑤ Potential Difference in a Uniform Field :

$V = -Ed$

⑥ لو يبغى السرعة ويعطيك جهد :

$V = \sqrt{\frac{2qV}{m}}$

⑦ لو يبغى الجهد ويعطيك سرعة

$V = \frac{V^2 m}{2q}$

⑧ Electric potential Due to point

$V = kq\left[\frac{1}{r} - \frac{1}{r}\right]$ اذا في السؤال مسافتين

$1eV = 1.6 \times 10^{-16}$ C.V or J

(9) The potential energy of a system of more than two chargerd partical

$$U = k\left[\frac{q_1 q_2}{r_{12}} + \frac{q_1 q_3}{r_{13}} + \frac{q_2 q_3}{r_{23}}\right]$$

(10) $F = E\,q$

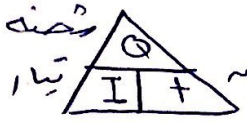
$$\downarrow$$

$$\frac{V}{d}$$

* قوانين شابتر ٨ :

① $\Delta Q = ne$ 

1.6×10^{-19}

② $I = \frac{Q}{t}$ 

unit:
Ampere (A)
$1A \equiv \frac{1C}{1s}$

③ $V = RI$ 

④ $R = \frac{L}{\sigma A}$

⑤ $\rho = \frac{1}{\sigma}$ or $\sigma = \frac{1}{\rho}$

unit:
ohm-meters (Ωm)

⑥ $R = \rho \frac{L}{A}$

⑦ $P = I^2 R$

⑧ $R = \frac{\Delta V}{I}$

unit:
Ohm (Ω)
$1\Omega \equiv \frac{1V}{1A}$

قوانين شابتر ٩ :

* Energy of a photon (E):

$E = hf$

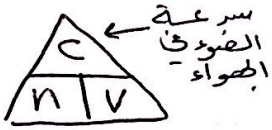
ثابت بلانك

$h = 6.63 \times 10^{-34}\ J.S$

* $\frac{\sin\theta_2}{\sin\theta_1} = \frac{v_2}{v_1} = \text{constant}$

* index of refraction:

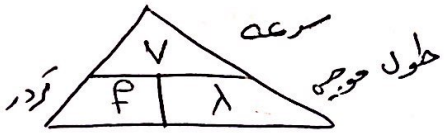
$n = \frac{c}{v}$



سرعة الضوء في الهواء

* index of refraction Extended:

$v = f\lambda$



سرعه

طول موجي

تردد

* ratio of indices:

$$\frac{\lambda_1}{\lambda_2} = \frac{v_1}{v_2} = \frac{n_2}{n_1}$$

طرديه

عكسيه

* Criticcal angle :

$\sin\theta_c = \frac{n_2}{n_1}$, $n_1 > n_2$

* Snell Law

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

قوانين شابتر ٩ الجزء الثاني:

① magnification (M):

1- $M = \frac{h'}{h}$

2- $M = -\frac{q}{p}$

② $\frac{1}{p} + \frac{1}{q} = \frac{2}{R}$

③ $q = \frac{R}{2}$  (very far)

④ $f = \frac{R}{2}$ 

⑤ $\frac{1}{p} + \frac{1}{q} = \frac{1}{f}$

① C between object and mirror
- real
- inveted
- smaller

② object between the mirror and focal point
- virtual - behind the mirror
- upright
- larger

③ object front convex mirror
- virtual
- upright
- Smaller