## Newton's laws of motion

First law: Every object maintains its State of rest, on uniform motion along a straight line, unless impressed upon by an external force.

1. Force does not manistain motion, but only causes change in motion.

21. Absunce of forces (not just a complete Cancellation of forces) implies the heed to Define force as something that changes motion.

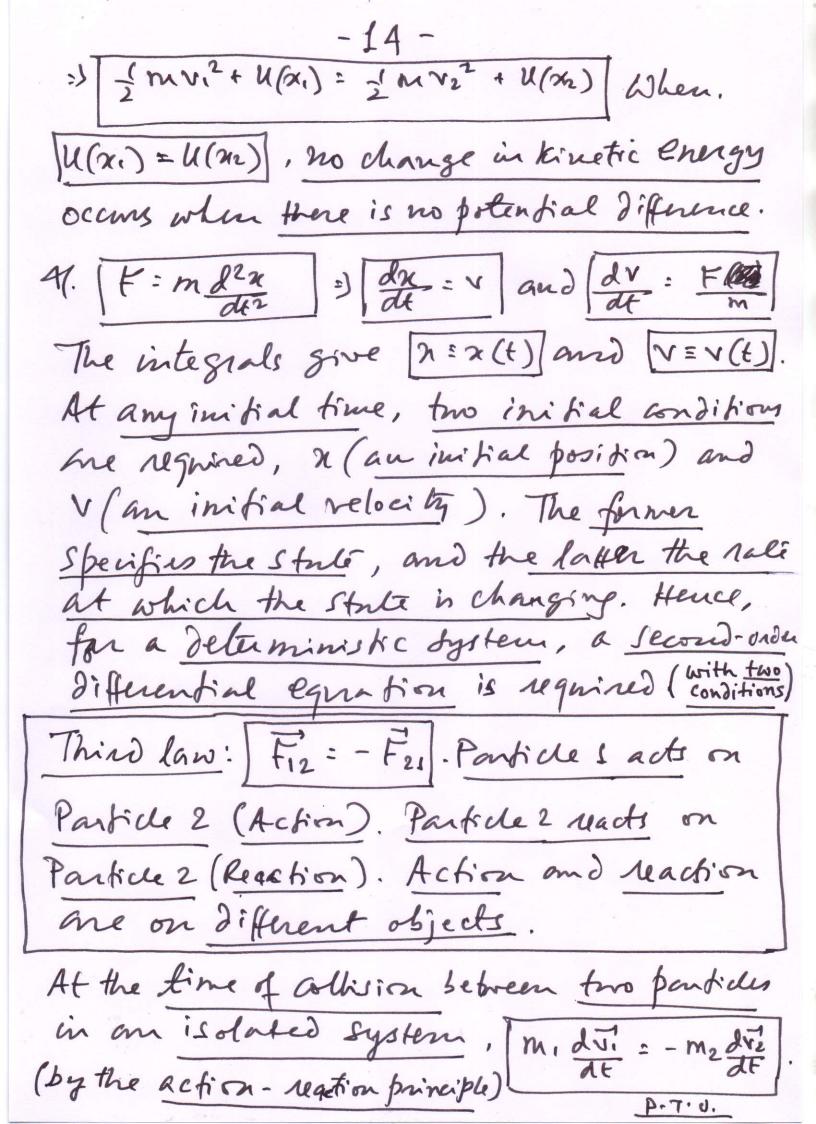
31. Law of inertia i implies a natural tendency to resist change in motion.

Second hw: Fx ma à: dit : F=kma k=1 in suitusty chosen units

1/ For the same force acting on two objects of different masses | F | = milail = me | Rel = | alas |

Hence, with greater wars, the tendency to rest change in motion would be greater. i. Mans in a measure of inertia. 21. F: m dv F. v: m V. dv Now  $\vec{V} = d\vec{i}$  =  $\vec{F} \cdot d\vec{i} = m \vec{v} \cdot d\vec{v}$ . =) F. di' = a d (1mv2) =) [F. di' = d (mv2)] .. Work done = F.di' = change in kineticknings In one-dimension, di = dan ||Fa) = Fa)  $\frac{F \cdot di}{s} = F(n) dn = d\left(\frac{mn^2}{2}\right)$   $\frac{f \cdot di}{s} = \frac{m v_2^2 - m v_1^2}{2} = \frac{f(n)}{f(n)} dn$ Work done is difference of Kinetic energy 5 3/. Further,  $d\left(\frac{mv^2}{2}\right) - F(n)dn = 0$ Write F(n): - dU(n) U(n) - Polential
fruction i d (mv²) + du dx = 0 =) fd (mv²) + fdu

=> mv² + u(n) = & Consuration of Longy . v.o.



=) d (m, vi) + d (m, vi) = d [m, vi + m, vi) = o. : M. Vi + m2 ve = P' ] - Conservation of Momentum Man, & Energy and Momentum il. Mars -> Emerges from the first law as a measure of inentia. ii/ Energy -> & merges from the second law as a consured quantity. 111. Momentum -> Emerges from the third low as a consured quantity. Physical Baracouttes reserves Points of Newton's laws 1. Objects have inertia. Mass in a measure of the inertia. Fince is needed to overcome (change in motion) - inertia. If The second low quantifies force, and makes it measmable in physical work. 31. The third law, ( the knowledge of force), relates force to interactions among