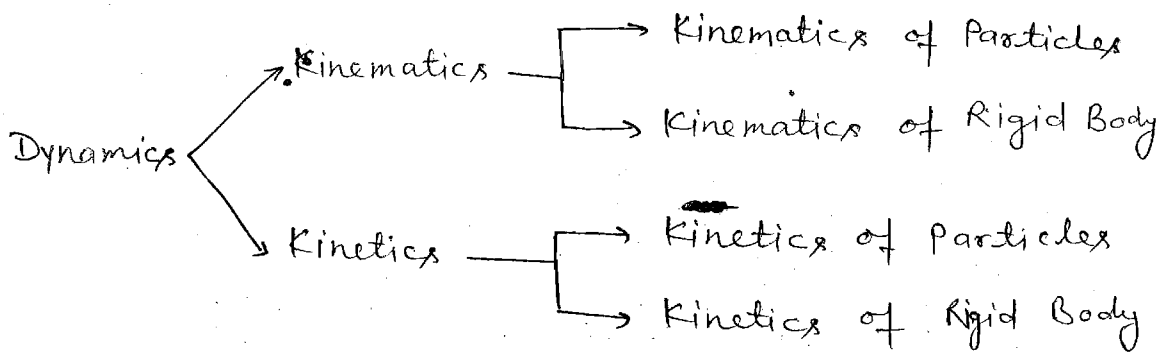
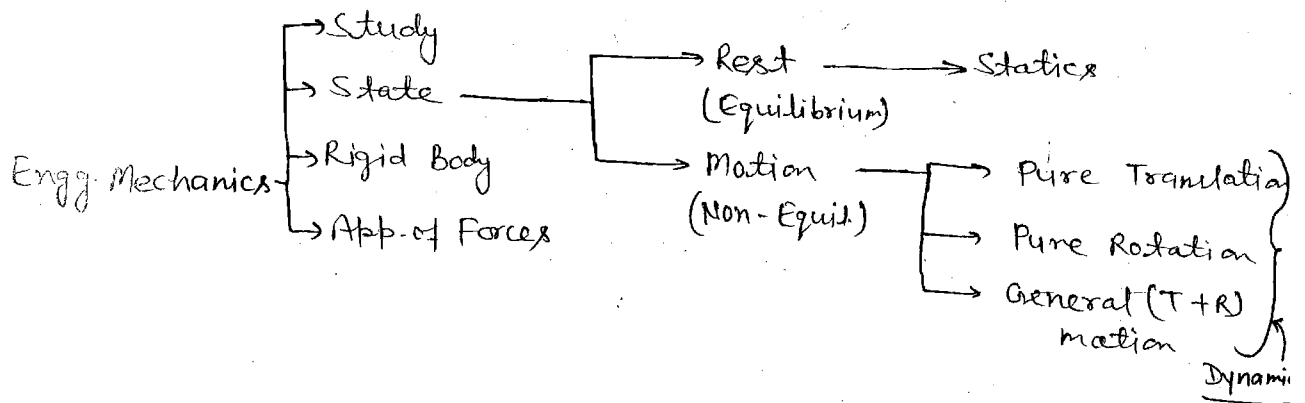


Engineering Mechanics:-

→ It is the study of state of the rigid body under the application of forces

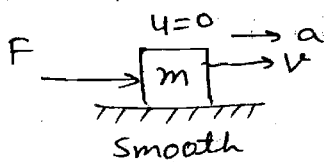


Statics & equ ^m	→	8-10
Tours	→	5-7
MOI	→	2-3
Friction	→	12-15
Simple motion	→	10-12

Application of Forces:-

⇒ (1) Force:-

⇒ It is the some effect of external agent which when applied to a body it can change the state of body not necessary.

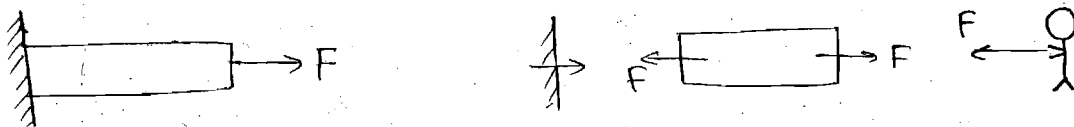


Newton's Law's of Motion:-

1st:- If a body is in rest or in uniform motion it will ^{be} remain in same state until

2nd:- The applied force on the body is given by the rate of change of linear momentum of the body.

3rd:- Each action have equal and opposite reaction but acting on different body or there will be always even no. of the forces in universe.



$$F = \frac{dp}{dt} = \frac{d(mv)}{dt} = m \left(\frac{dv}{dt} \right) + v \frac{dm}{dt} \quad \text{--- ①}$$

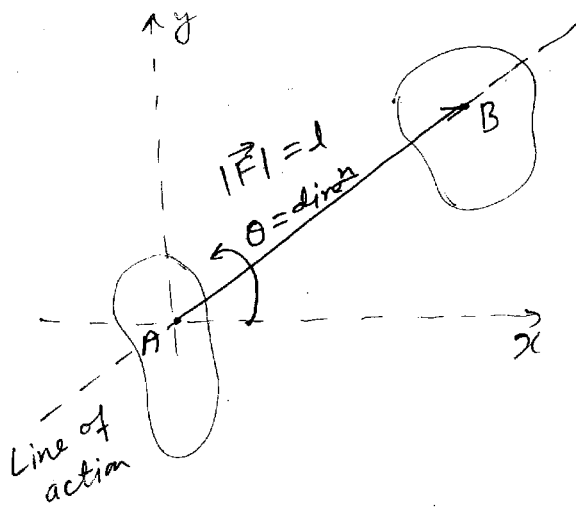
$$p = mv$$

$$m = \text{Constant}$$

$$\boxed{F = m \cdot a} \quad \text{--- ②}$$

If $v = \text{Constant}$ and $m \neq \text{Const.}$

$$\boxed{F = v \frac{dm}{dt}} \quad \text{--- ③}$$



- (1) Magnitude = 1
- (2) direction = θ
- (3) Must follow V.L. of add
- (4) Point of Application
- (5) Line of Action

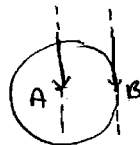
Force System:-

⇒ When more than one forces act on a body is called force system.

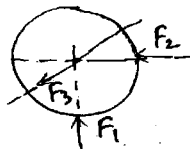
Force System

Coplaner Force System (2-D)

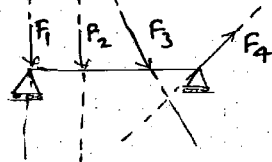
→ Coplaner Parallel Force System



→ Coplaner and Concurrent Force System



→ Coplaner non-parallel non-concurrent Force System

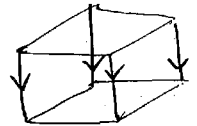


→ Coplaner Collinear Force System

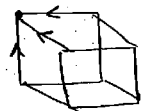


Non-Coplaner Force System (3-D)

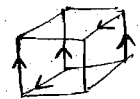
→ Non-Cop P.F.S.



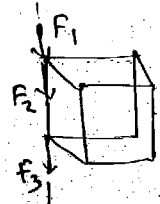
→ Non-Cop. C.F.S.



→ Non-Cop. (N.P.N.C) F.S.

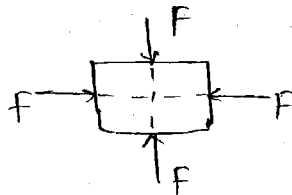
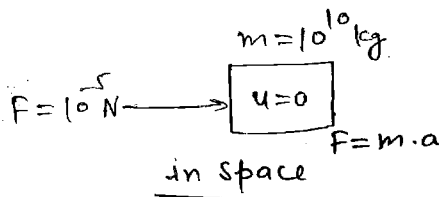
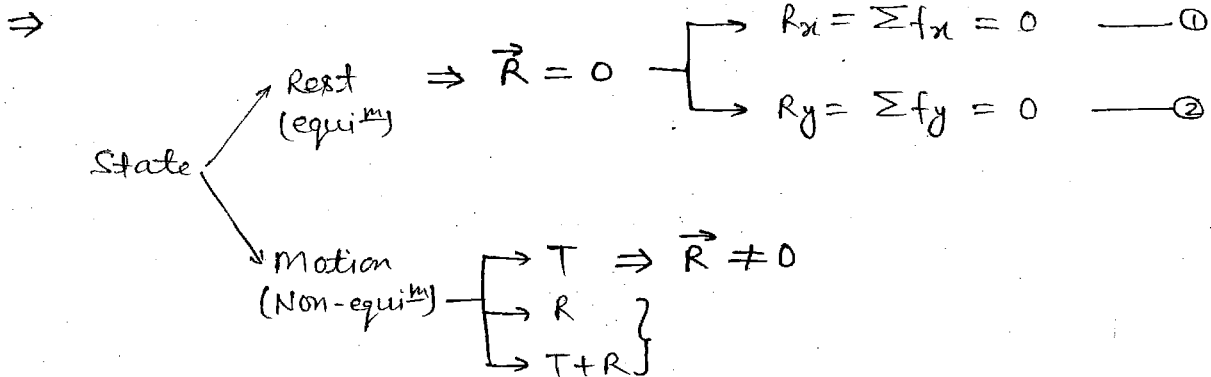


→ Collinear Not Possible

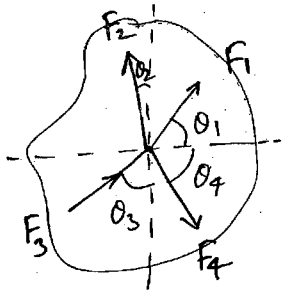


matter \rightarrow mass + space occupies

Coplaner Concurrent Force System:



Resultant of Concurrent force system: (\vec{R})



$$R_x = \sum f_x = F_1 \cos \theta_1 - F_2 \cos \theta_1 - F_2 \sin \theta_2 + F_3 \sin \theta_3 + F_4 \cos \theta_4 = +10 \text{ N}$$

$$R_y = \sum f_y = F_1 \sin \theta_1 + F_2 \cos \theta_2 + F_3 \cos \theta_3 - F_4 \sin \theta_4 = -5 \text{ N}$$

$$R = \sqrt{R_x^2 + R_y^2} = \sqrt{\sum f_x^2 + \sum f_y^2}$$

$$\tan \theta = \left| \frac{\sum f_y}{\sum f_x} \right|$$

