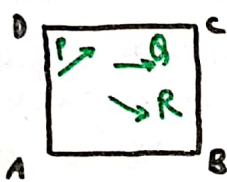


SYSTEM OF FORCES

(4)

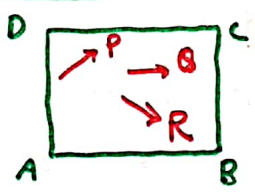
COPLANAR FORCES



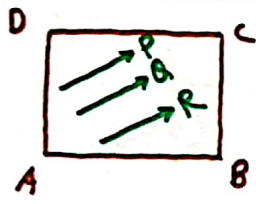
(1) Concurrent forces :-



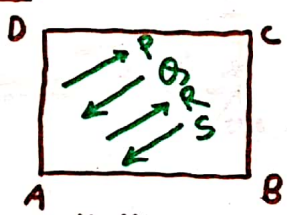
(2) Non-Concurrent forces :-



(3) Parallel forces



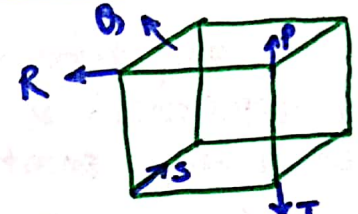
Like parallel forces



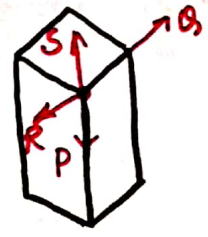
Unlike parallel forces

NON-COPLANAR FORCES

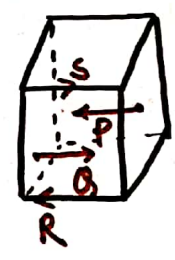
(1) Non-Concurrent forces :-



(2) concurrent :-

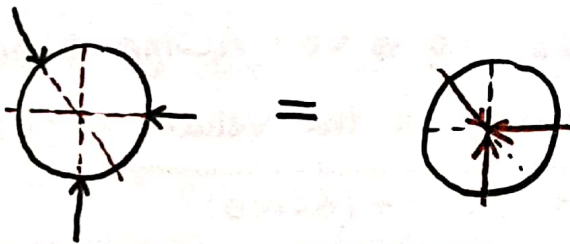
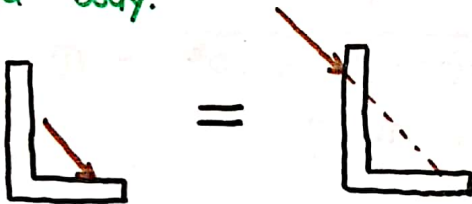


(3) parallel :-



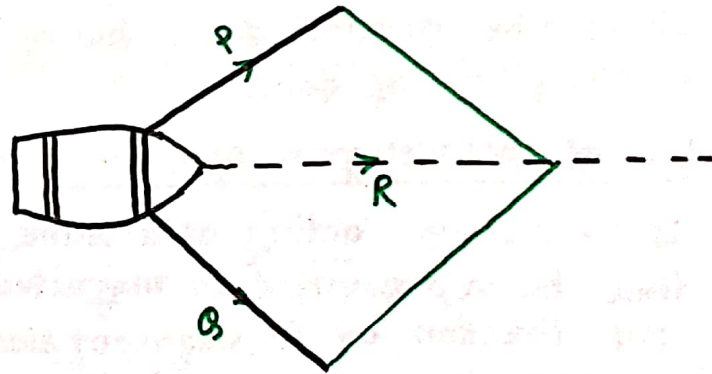
PRINCIPLE OF TRANSMISSIBILITY OF FORCES:-

States that point of application of force can be moved anywhere along its line of action without changing the external reaction forces on a rigid body.



LAW OF SUPERPOSITION:-

The combined effect of force system acting on a rigid body is the sum of the effects of individual forces.



The diagonal will give you the resultant. Called net force.

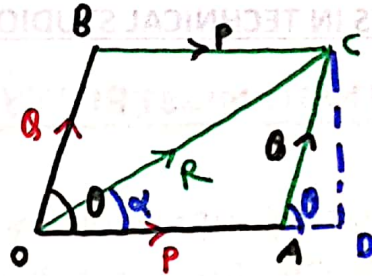
COMPOSITION OF 2- CONCURRENT FORCES:-

The process to find Resultant of all the forces acting on a body is called composition of forces.

It can be obtained from law of parallelogram of forces.

Law of parallelogram of forces:-

If 2- vectors acting at a same time be represented in magnitude and direction by 2- adjacent sides of parallelogram drawn from a point, then their resultant is represented in magnitude and direction by diagonal of parallelogram drawn from the same point.



Taking ΔOCD -

$$R = OC = \sqrt{OD^2 + CD^2}$$

$$R = \sqrt{(OA + AD)^2 + CD^2} \quad \text{--- (1)}$$

* $OA = P$; $AD = ?$

* ΔACD -

$$\cos \theta = \frac{AD}{AC} \Rightarrow AD = AC \cos \theta = P \cos \theta$$

$$\sin \theta = \frac{CD}{AC} \Rightarrow CD = AC \sin \theta = P \sin \theta$$

By putting all the values in eqn (1)-

$$R = \sqrt{(P + P \cos \theta)^2 + (P \sin \theta)^2}$$

$$R = \sqrt{P^2 + P^2 + 2P^2 \cos \theta}$$

Magnitude of Resultant.