



UNIT -II

FORCE ANALYSIS

Static Equilibrium

- A body or group of bodies is said to be in equilibrium if all the forces exerted on the system are in balance.

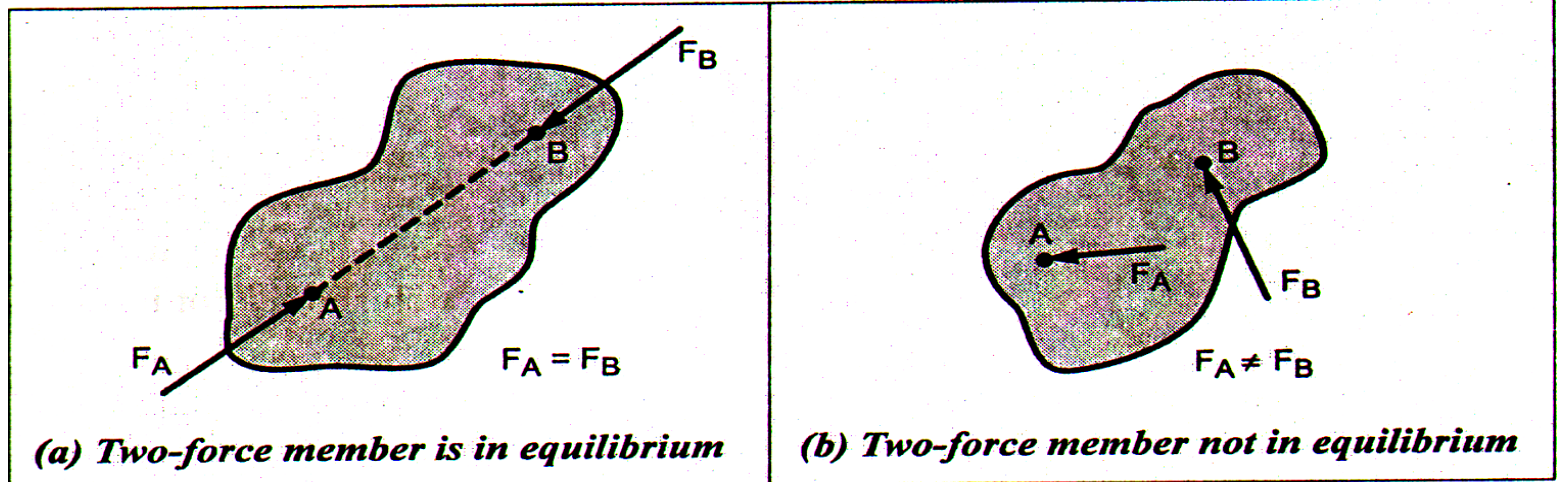
Condition for Static Equilibrium:

- The vector sum of all the external forces acting on the body is zero i.e., $\Sigma F=0$
- The vector sum of all the moments of all the external forces acting on the body any arbitrary point is zero i.e., $\Sigma M=0$

Equilibrium of Two Force Members

Condition for the action of two forces will be in equilibrium.

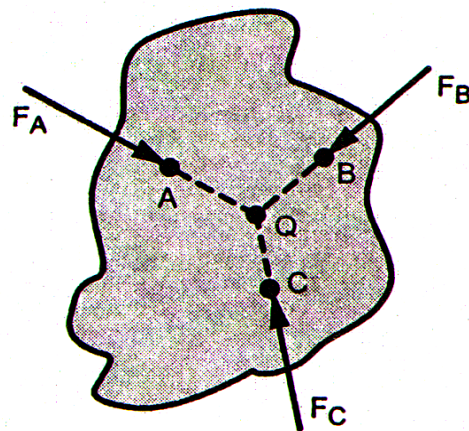
- ✓ The forces are of the same magnitude
- ✓ The forces act along the same line of action
- ✓ The forces are in opposite directions



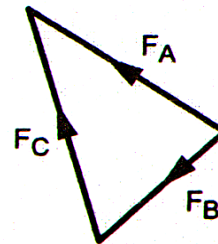
Equilibrium of Three force members

A body or member will be in equilibrium under the action of three forces only when.

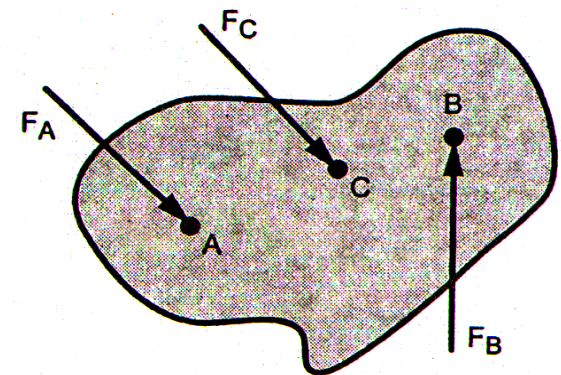
- ✓ The resultant of the forces is zero.
- ✓ The line of action of the forces intersect at a point.



(a) *Body in equilibrium*



(b) *Force polygon*



(c) *Body not in equilibrium*