3. TRUSSES

TRUSSES	FRAMES
Forces passes through the joints.	Forces passes in between the joints.
Subjected to Only Axial load	Subjected to Axial load + Bending

TRUSS ANALYSIS: Finding the forces/ Stresses in each member.

ASSUMPTIONS IN TRUSS ANALYSIS:

1. All member & external forces are in one plane.
2. Pin joint is friction less.
3. Weight of joining member is very small with respect to force applied.
4. Only axial load is occurring in each member.

$No.of\ Unknown = m + r$ $No.of\ Equation\ Per\ joint = 2j$ $Total\ No.of\ Equation = 2j$	$m =$ No. of Members, $j =$ No. of Joints, $r =$ No. of Constrains or Reactions	
$\boldsymbol{m + r < 2j}$: Un-Stable/ Deficient System	$\boldsymbol{m + r = 2j}$: Determinate/ Stable/ Prefect System	$\boldsymbol{m + r > 2j}$: Indeterminate/ Over-stable/ Redundant System

NOTE:

1. Only Axial Forces acting in member of Truss due to Coplanar Equilibrium Condition.
2. Member which is subjected to load more location than the end points are known as Frames.
3. Direction of Tension in the Member is taken toward the other end.

METHOD OF JOINTS: Applicable only when at the end there is only 3 coplanar and concurrent forces acting.

1. Draw the FBD at the joints.
2. Apply the Lami's theorem at the joint point.

METHOD IS SECTION:

1. Quick and useful method to find internal force in a perpendicular member.
2. A section or cut is to be taken which cuts the system into two completely separate parts.
3. Section can be along a line or it can be curved also. Avoid taking section through joints.
4. Out of the two cut parts, only one part can be considered to find internal forces in members. Select the part which has less number of unknowns.
5. In FBD, consider forces in cut members only. Internal forces in any non-cut member should not considered.
6. FBD will consist, internal forces of cut members, external forces and support reaction.
7. Try to cut maximum three members at a time.

SPECIAL CASE-I: If three members are connected at a point and two members of them are collinear and no external force is acting at the joint, then the axial force is the non-collinear member is zero.

SPECIAL CASE-II: If two members are connected at a joint and the members are non-collinear and no external force is acting at that joint, then the axial force is the both members in zero.

PRIORITY ORDER OF METHOD:	FINDING SUPPORT REACTIONS:
1. Special Cases 2. Method of Joints 3. Method of Sections	1. Draw total body FBD 2. Apply Coplanar Equilibrium condition