FAQ's

1. What are indeterminate beams? State its advantages and disadvantages?

Number of unknown Reactions or Internal forces > Number of equilibrium equations Note: Most structures in the real world are statically indeterminate.

Advantages:

- Smaller deflections for similar members
- Redundancy in load carrying capacity (redistribution)
- Increased stability

Disadvantages:

- More material => More Cost
- Complex connections
- Initial / Residual / Settlement Stresses

2. Cite the difference between determinate and indeterminate structures?

Determinate Structures	**Indeterminate Structures**
Equilibrium conditions are fully adequate to analyze the structure.	Conditions of equilibrium are not adequate to fully analyze the structure.
Bending moment or shear force at any section is independent of the material property of the structure.	Bending moment or shear force at any section depends upon the material property.
The bending moment or shear force at any section is independent of the cross-section or moment of inertia.	The bending moment or shear force at any section depends upon the cross-section or moment of inertia.
Temperature variations do not cause stresses.	Temperature variations cause stresses.
No stresses are caused due to lack of fit.	Stresses are caused due to lack of fit.
Extra conditions like compatibility of displacements are not required to analyze the structure.	Extra conditions like compatibility of displacements are required to analyze the structure along with the equilibrium equations.

3. What are the condition of equilibrium?

The condition of equilibrium is given by

$\Sigma M=0$

$\Sigma V=0$

$\Sigma H=0$

Where,

M= moments acting in the beam

V= vertical forces acting in the beam

H= horizontal forces acting in the beam

4. Give some examples of indeterminate structures?

a. fixed beams
b. continuous beams
c. fixed arches
d. two hinged arches
e. portals
f. multistoried frames

5. Mention the methods to analyze indeterminate structures?

Indeterminate structures are analyzed by two methods

1. Force method of analysis (also known as flexibility method of analysis, method of consistent deformation, flexibility matrix method)
2. Displacement method of analysis (also known as stiffness matrix method).