1. To solve structural models that are statically indeterminate, state one of the important requirements.

Model should be restrained in such a manner that it can be solved using standard set of equations of statics alone.

2. List basic assumptions common to both stiffness method and flexibility method

3. What is the fundamental difference between stiffness and flexibility methods in formulating the mathematical model?
4. Explain static indeterminacy

5. Explain kinematic indeterminacy
6. What are important indicators while solving a statically indeterminate problem?

7. Highlight salient differences between flexibility and stiffness approaches in solving the statically indeterminate systems

<table>
<thead>
<tr>
<th>Flexibility Approach</th>
<th>Stiffness Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kinematic indeterminacy</td>
<td>Kinematic indeterminacy</td>
</tr>
<tr>
<td>Unknowns are actions</td>
<td>Unknowns are joint displacements</td>
</tr>
<tr>
<td>- Shear force</td>
<td>- Rotational</td>
</tr>
<tr>
<td>- Axial force</td>
<td>- Translation</td>
</tr>
<tr>
<td>- Moment</td>
<td>- Kinematically determinate systems</td>
</tr>
</tbody>
</table>

8. List the factors that are important to formulate and solve the problem using computer methods

- Choice of method should not be geometry specific
- It should be more generic
- It should be repetitive in nature

Stiffness method is a better choice.

9. Explain vertically partitioned, horizontally partitioned and cross-partitioned matrices.

10. Show the idealized beam model, used for deriving stiffness coefficients
Neglect axial deformation.

- for stiffness method, one should identify possible displacements (translations and rotations) at each end of the beam:

\[ \begin{align*}
J^R_{\text{end}} & = (q^R_1, q^R_2) \\
J^L_{\text{end}} & = (q^L_1, q^L_2) 
\end{align*} \]

all these displacements happen in the \( y_m-y_m \) plane (-\( X^{'} \)).

\[ K_{ij} \quad (K) \quad \text{represents stiffness coefficient} \]

\[ [K] \quad \text{stiffness matrix} \]

\[ K_{ij} \quad \text{is the force in its dof by imposing unit displacement (translational + rotational)} \]

in \( j \)-th dof by keeping all other degrees of freedom restrained.