KUC

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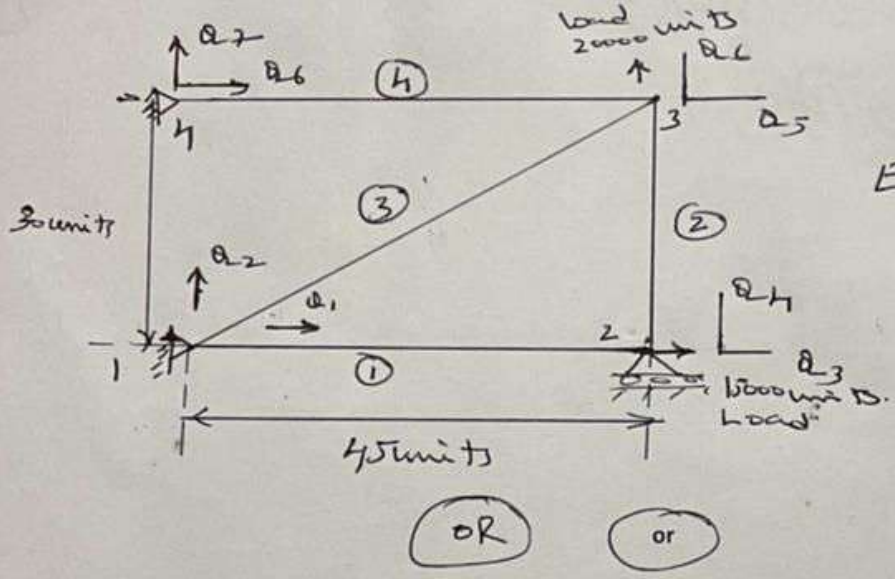
FEM
Test 2
6 Sem
Dept of Mech Engg
UVCE

Answer both the main questions. Internal choice is allowed.
Explain the importance of the Neutral Axis and the Centroid

1a. What is the importance of the determinant of the Jacobian Matrix? Explain

1b. For the four-bar truss shown below

- Find the element stiffness matrix for each element.
- Assemble the structural stiffness matrix K for the entire truss system.



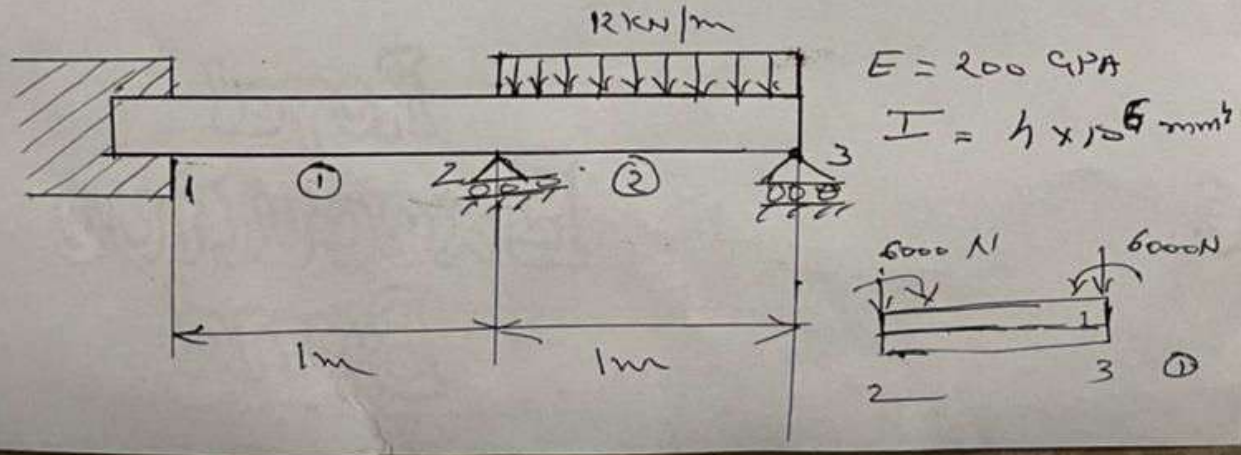
OR

or

1a. Explain the importance of the neutral axis and the centroid of a beam.

1b. For the beam and loading as shown below find:

- The slopes at Nodes 2 and 3
- The vertical deflection at the midpoint pf the distributed load



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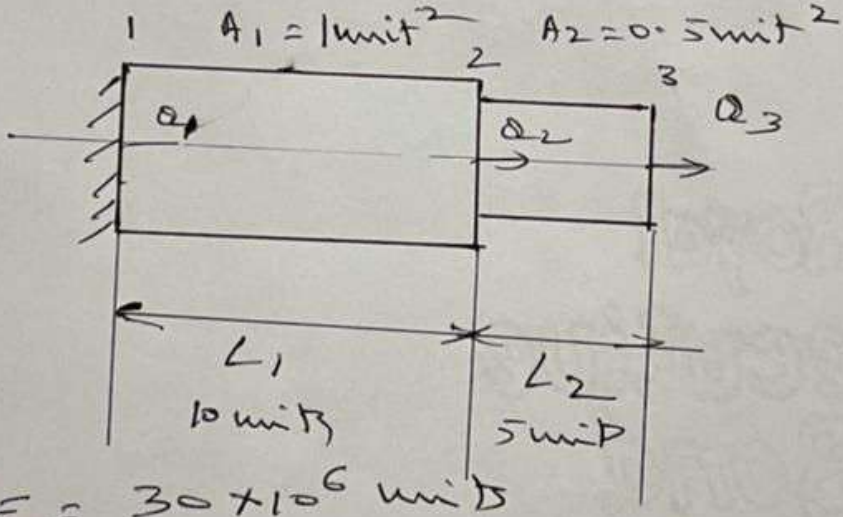
2a Define the following terms

- **Restoring strain energy**
- **Free vibrations**
- **Frequncy**
- **Amplitude**

Using the Lagrangian Principle derive an equation relating
The Eigen vector
The Stiffness
Mass
Eigen value

Or (OR)

Determine the eigen value and the eigen vectors for the stepped shaft shown below



$E = 30 \times 10^6$ units

specific wt $\gamma = 0.283$ units

Sketch the mode shapes.