GALGOTIAS UNIVERSITY

ADMISSION NUMBER

School of Engineering

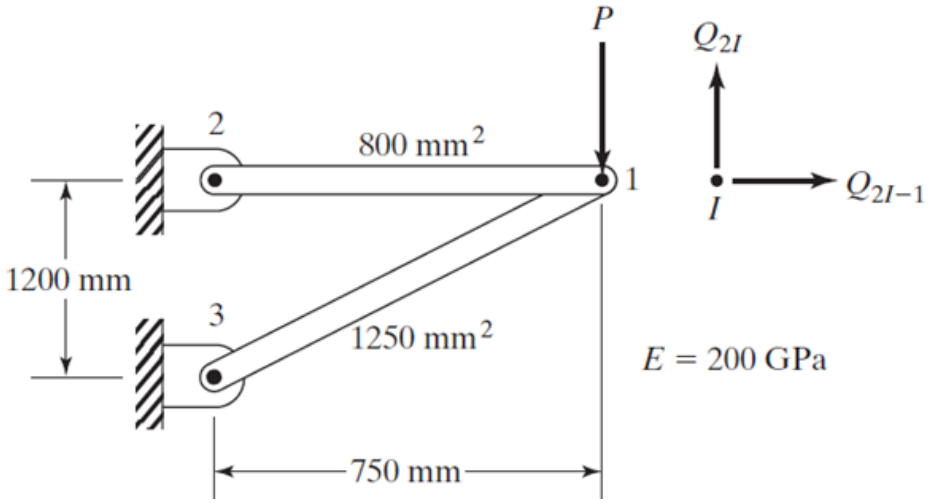
B.TECH Mechanical Engineering
Semester End Examination - Jun 2024

Duration : 180 Minutes
Max Marks : 100

Sem VI - G3UB604C - FEM PBL Mode

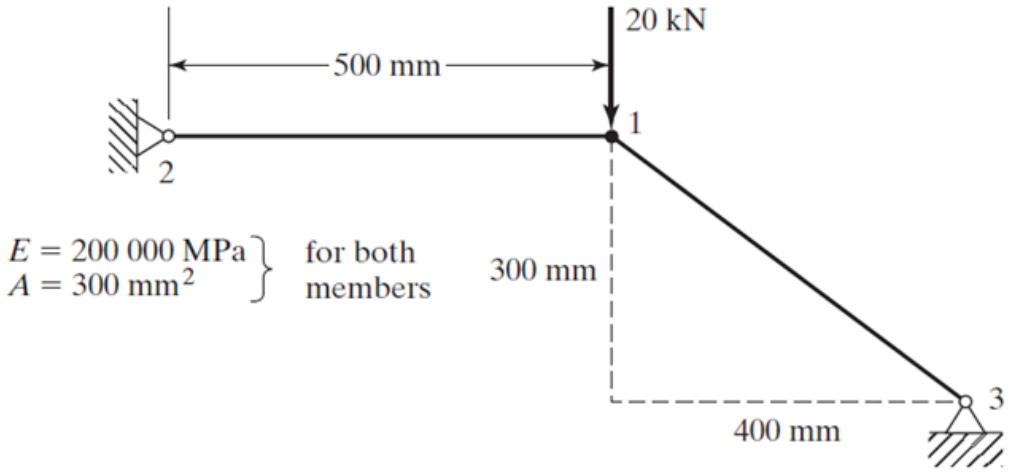
General Instructions
Answer to the specific question asked
Draw neat, labelled diagrams wherever necessary
Approved data hand books are allowed subject to verification by the Invigilator

1)	What is meant by plane stress and plane strain in elasticity?	K1(2)
2)	Explain the methods used to discretize the problem in Finite Element Method.	K2(4)
3)	Demonstarte the concept of discretization in detail, explaining how continuous problems are approximated into discrete systems within the framework of FEM.	K2(6)
4)	Identify the differences in the following terms: (i) Nodes, primary nodes, secondary nodes and internal nodes, (ii) Local coordinates, global coordinates, natural coordinates (iii) Higher order elements and lower order elements.	K3(9)
5)	A beam element is loaded by a moment at the mid-span. Construct the consistent nodal force vector. How Would the result change if the moment were applied at one-third the span rather than at the centre.	K3(9)
6)	For the pin-jointed configuration shown in Fig. below, determine the stiffness values K11, K12, and K22 of the global stiffness matrix.	K5(10)

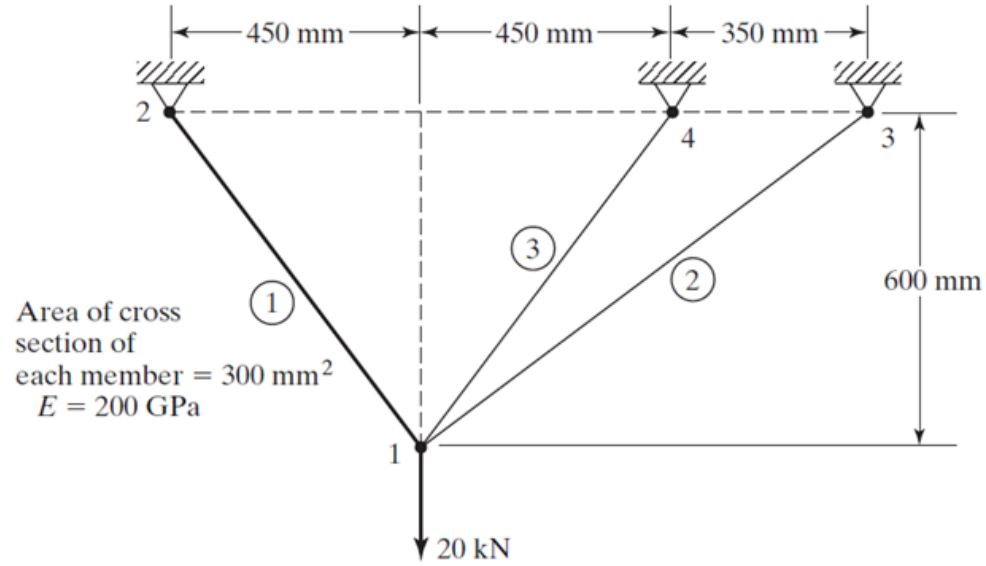


7) Using Lagrange polynomial discover shape functions for (i) Two noded bar element (ii) Three noded bar element and (iii) Five noded bar element K4(12)

8) For the two-bar truss shown in Fig. below, determine the displacements of node 1 and the stress in elements 1–3. K5(15)



9) For the three-bar truss shown in Fig. below, determine the displacements of node 1 and the stress in element 3. K5(15)



10) Using Langrange functions, develop shape function for hexahedron (brick) element. K6(18)