



AJEENKYA

D Y PATIL UNIVERSITY

End of Term Examinations (APRIL 2019)

School: School of Engineering.

Program: B-Tech

Course: Finite Element Analysis

Course Code: MTE-306

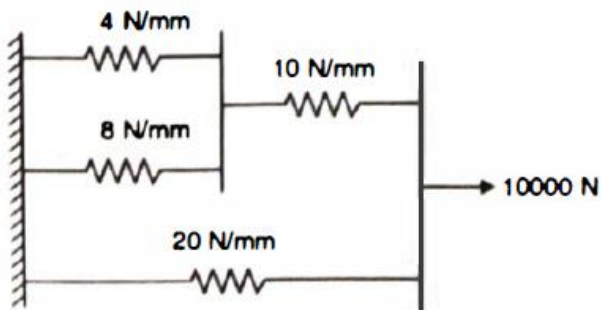
Semester: VI **Max Marks:** 30

Duration (mins): 120

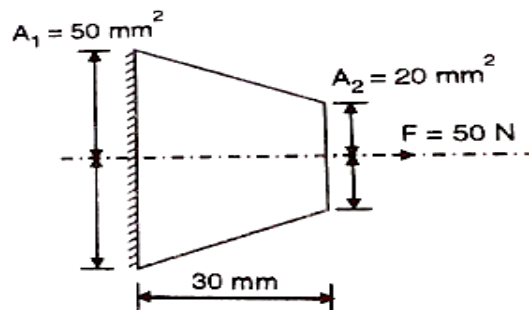
Note:

- (i) Answer to Q1 is mandatory; Solve any 3 out of the 5 problems from Q2, Q3, Q4, Q5, Q6.
- (ii) Figures to the right side indicate full marks.
- (iii) Assume suitable data if necessary.

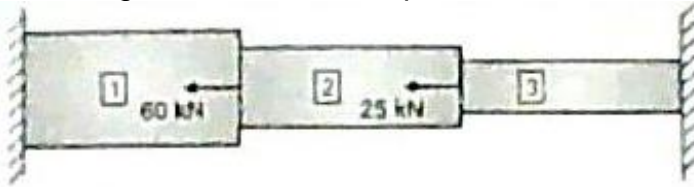
1. Explain the concept of FEM briefly and outline the procedure. While doing so, explain briefly the terminologies and types of nodes, elements, DOF, BC's, CS's [6]
2. Using the finite element method determine the deflection of each spring and the reaction at the support. [8]



3. For the taper bar shown in the figure below determine the displacement by modelling the made of three elements. Assume modulus of elasticity as 200Gpa [8]

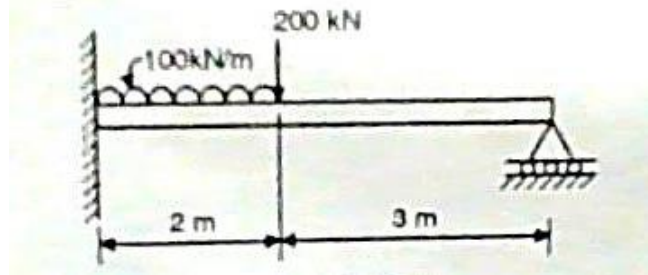


4. A composite bar of 3 different materials, rigidly fixed at both the ends, is subjected to a uniform temperature rise of 80°C in addition axial loads are applied at two points on the bar as shown in figure. Determine the displacements stress and support reactions. [8]

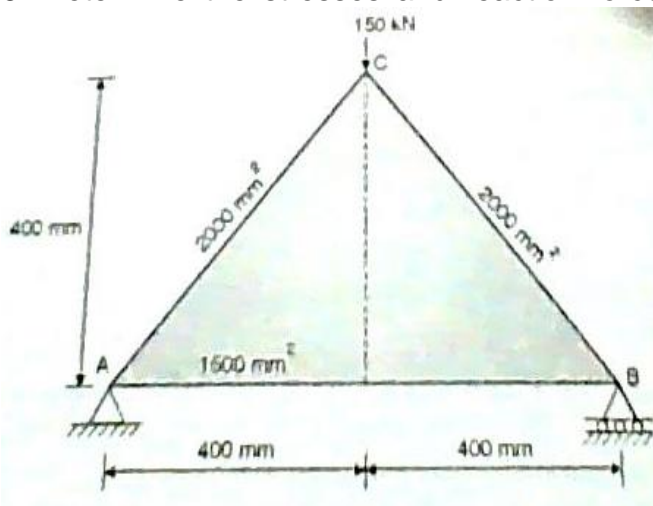


Material	Section 1 Bronze	Section 2 Aluminium	Section 3 Steel
Area of cross section (mm ²)	2400	1200	600
Length mm	800	600	400
Modulus of Elasticity (GPa)	83	70	200
Coefficient of expansion ($10^{-6} / ^{\circ}\text{C}$)	18.9	23	11.7

5 Find the deflection and slopes at nodes and reactions at supports for the beam as shown in figure Take $EI = 4000 \text{ kN-m}^2$ [8]



6. Determine the stresses and reaction forces in structures shown below. Take $E = 200 \text{ GPa}$



[8]