COURSE CODE (CREDITS): 13M1WCE131(3)   MAX. MARKS: 25

COURSE NAME: Finite Element Method

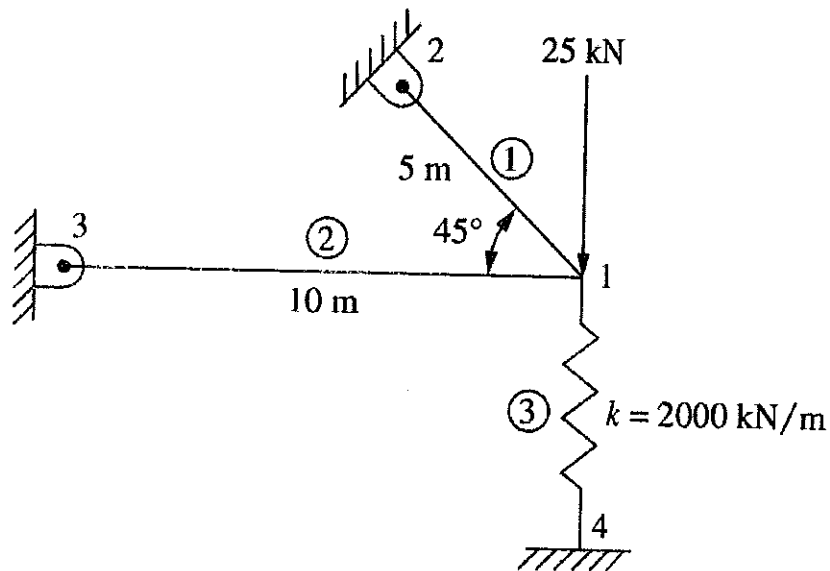COURSE INSTRUCTOR: Dr. Sugandha Singh   MAX. TIME: 1 Hour 30 minutes

Note: All questions are compulsory. Marks are indicated against each question in square brackets.

1. Describe with the help of appropriate examples the different types of indeterminacies in a structure.
   [5 marks]
2. Derive the stiffness matrix for a **Beam Element with Nodal Hinge.** **[10 marks]**
3. Find the displacements at node 1 and stresses in elements 1, 2, and 3, for the following pin-jointed frame. Assume $E=2.1X10^{11}$ N/m²; $A=5X10^{-4}$ m². **[10 marks]**