`Mid-West University

Examinations Management Office

End Semester Examinations 2081

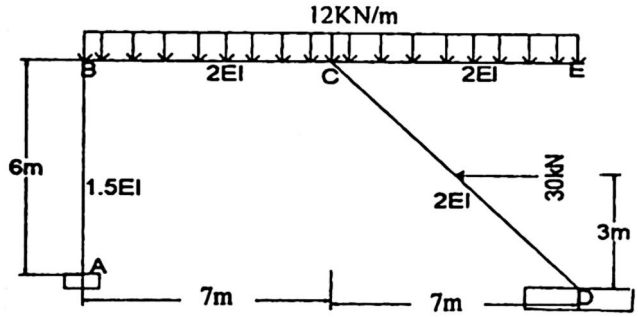
Master level/ M. Sc. (Structural Engineering)/ 1st Semester — Full Marks: 60

Time: 3 hours — Pass Marks: 30

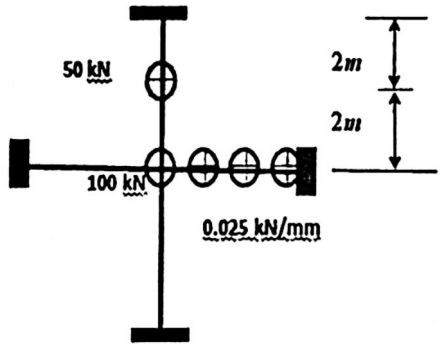
Subject: Advance Structural Analysis (STR511)

- *Attempt all the questions.*
- *Figures in the margin indicate full marks.*
- *Assume suitable values, with a stipulation, if necessary.*
- *Candidates are required to answer the questions in their own words as far as possible.*

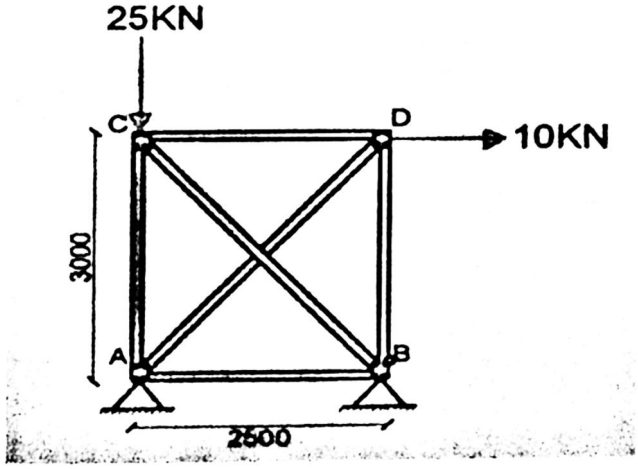
1. Create Flexibility matrix of the following using Flexibility matrix method and draw bending moment and Share force diagram. **[12]**



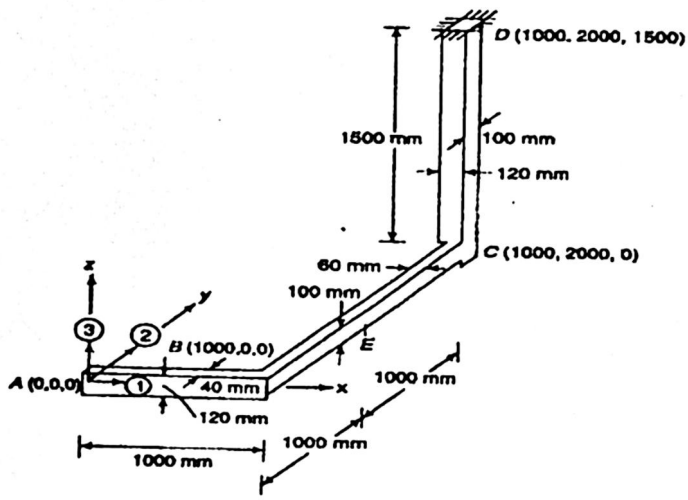
2. What is grid structure and how it is analysed? Create stiffness matrix for unit displacements and load displacements following grid structure symmetric in geometry. A horizontal member section is 300x600mm. Take E= 20 KN/mm^2 and G=5KN/mm^2. Tale all members are 4m in length. **[12]**



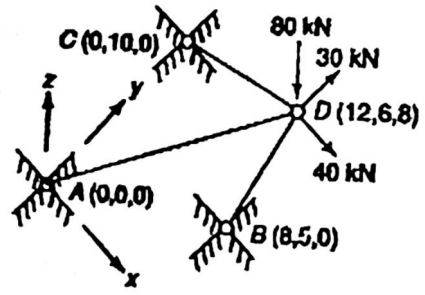
3. A truss system consisting of six bar elements is shown below. The modulus of elasticity of all the elements in this truss system is E= 200GPa. The cross-sectional areas all Members are given as A1 = 0.010m^2. Calculate the member forces and stiffness matrix. **[12]**



4. A cranked Frame ABCD shown in figure below where end A is Free and D is Fixed. Cross section of all section as per shown. Developed the flexibility matrix with reference to coordinate 1, 2 and 3 axis. Also calculate the displacement due to application of point load at end A 2KN, 2KN and -2KN along 1,2 and 3 coordinate axis respectively [12]



5. Using the tension coefficient method calculate the support reaction and member forces of following pin jointed space frame with assigning the significant nature of members. [8]



6. Write short notes on (any one): [4]
   a) Banded matrix, skyline frontal solver.
   b) Ritz approach.

The End