COLLEGE OF ENGINEERING PUNE
End Semester Exam 2013-2014 (VII SEM)
Matrix Analysis of Structures (CE 472)

Programme: B. Tech. (Civil) Date: 20-11-2013
Duration: 180 minutes Max. Marks: 60

Instructions :
1) **Answer all questions.**
2) **Figures to the right indicate full marks.**
3) **Use of non-programmable calculator is allowed.**
4) **Assume suitable data if required.**

Q1. Analyze the plane truss shown. Use member approach. E = 200GPa and A = 2000 mm^2. (12)

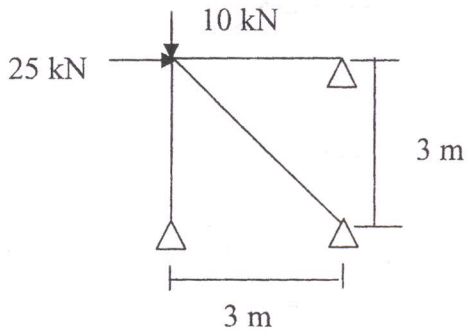

Fig. Prob.1

Q2. For the frame shown, determine the member end actions for both the members. EI is uniform. Use member approach. (12)

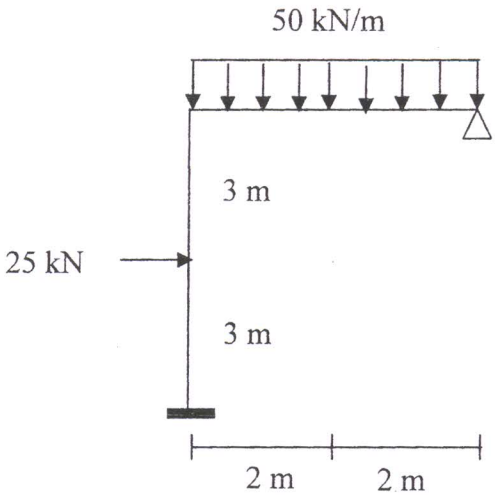

Fig. Prob.2

Q3. 1. For a vertical member of a space frame, obtain the Rotation matrix. (6)

2. Obtain the member stiffness matrix for a space truss member with reference to the global axes. (6)

Q.4 For the grid shown, obtain the global joint displacements at joint 1. (12)

E = 200 GPa. Diameter of each member = 100 mm.

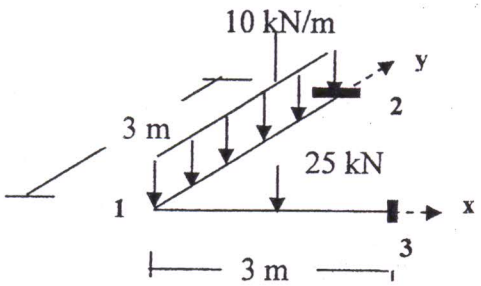

Fig. Prob.4

Q5. For the truss of problem 1, if the temperature of the inclined member rises through 30 degrees Celsius, what would be the member forces due to this temperature rise alone? Coefficient of thermal expansion $\alpha = 12 \times 10^{-6} / {}^{0}C$ (12)