

DEPARTMENT OF CIVIL ENGINEERING, IIT DELHI

MINOR 2 :CEL717 ADVANCED STRUCTURAL ANALYSIS (2013-14)

Time allowed: 1hour

Date: 06 Sep 2013

Venue: V 216

Max marks : 20

NOTE: (a) All questions are compulsory. (b) Draw neat and clear sketches wherever required.
(c) Assume suitable data if necessary. (d) Assume members as extensible unless otherwise stated.
(e) All answers must be supported by calculations/ justification to secure assigned marks.

Q1. For the structure shown in Figure 1, explain how the internal hinge can be taken into consideration in direct stiffness approach without actually modifying the stiffness matrix of the concerned member.

(5 marks)

Q2. Determine the term K_{33} of the stiffness matrix for a non prismatic plane frame member assuming that the moment of inertia linearly varies from 0 at the left end to "I" at the right end. The numbering of the degrees of freedom shall be as for normal 2D plane frame structures, member to be assumed extensible.

(6 marks)

Q3. Determine the shape factor for

- Thin circular section of mean diameter D and thickness t
- I section shown in Figure 2. Determine also M_y and M_p , assuming a yield stress of 250MPa

(3+6= 9 marks)

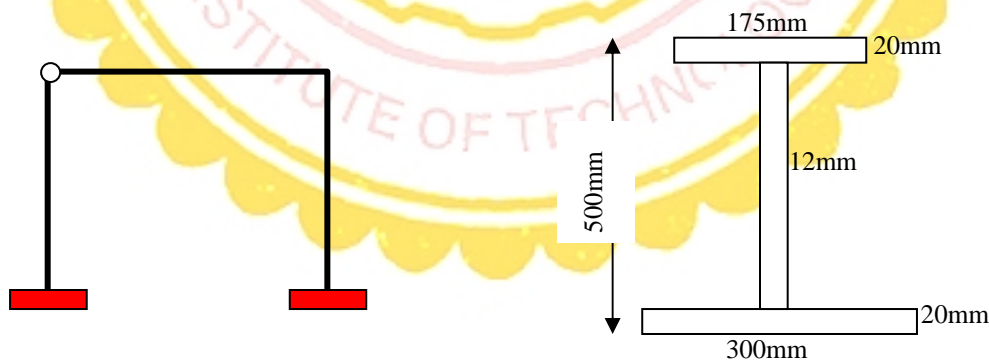


Fig. 1

Fig. 2