DEPARTMENT OF CIVIL ENGINEERING, IIT DELHI

MINOR I :CVL756
ADVANCED STRUCTURAL ANALYSIS (2019-20)

Time allowed: 1hour (9:30-10:30 AM) **Date:** 26 August 2019
Venue: LH 408 **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. Determine the half-band width of K_{TS} matrix of the structure shown in Figure 1, assuming that the joint numbering is done horizontally.

(3 marks)

Q2. Form the R matrix for the member marked as "m" in Figure 2.

(3 marks)

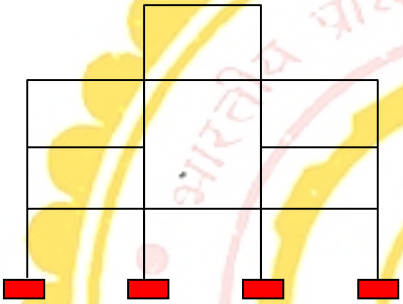

Fig. 1

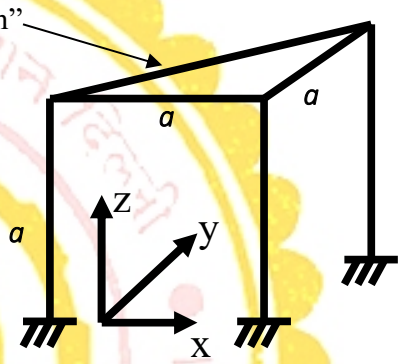

Fig. 2

Q3. For the structure shown in Fig. 3,

(a) Show all degrees of freedom and compute the sizes of K_{pp}, K_{px}, K_{xp} and K_{xx}
(b) Form the force vector
(c) Form association matrix of left column and the beam connected to it.

State your assumptions and the methodology adopted clearly. Assume EA to be $2x10^{10}$ N for all members.

(2+5+3= 10 marks)

Q4 Derive F_{66} for a rectangular deep beam of length and cross section **a** by **a** and length **4a** .

(4 marks)

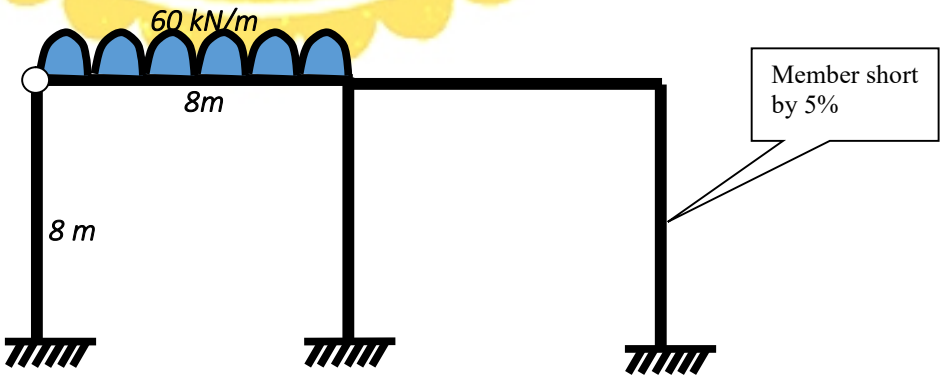

Fig. 3