MINOR II :CEL331 STRUCTURAL ANALYSIS II (2008-09)

Time allowed: 1hour   **Date:** 17 October 2008
Venue: VI 301   **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 inextensible unless otherwise stated.

Q1. The structure shown in Fig. 1 needs to be analyzed **manually** using matrix stiffness method. Identify the degrees of freedom clearly and perform following steps:

- a) Determine the force vector
- b) Determine stiffness matrix.
- c) Determine the rotations at B and C and the horizontal displacement of the beam

(**2+6+ 3 = 11 marks**)

Q2. The structure shown in Fig. 2 is to be analyzed using direct stiffness approach with the aid of a **computer** program.. The user has numbered the joints as shown in circles and the members as shown in squares. All members have Young's modulus *E*, area *A* and moment of inertia *I* and are **extensible**. Note that local x axis of members is directed left to right for beams and upwards for columns.

- (a) Determine the sizes of K_{pp}, K_{px} and K_{xx}.
- (b) Determine half band width of K_{pp}.
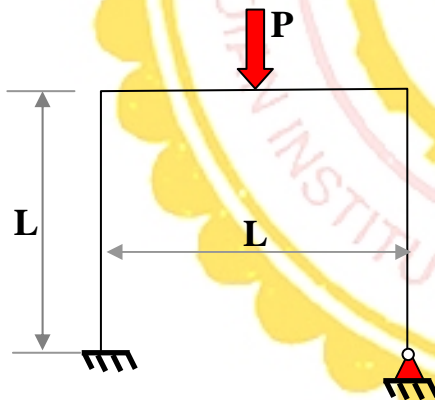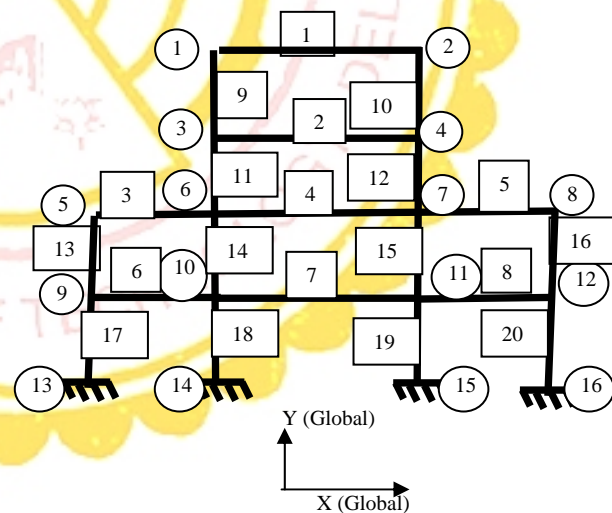- (c) Determine the term $K_{TS(1,9)}$

(**1+3+5 = 9 marks**)

FIG. 1

FIG. 2