B.TECH. CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

June, 2013

BICEE-017 : ADVANCED STRUCTURAL ANALYSIS

Time : 3 hours   *Maximum Marks : 70*

Note :   *Attempt **any five** questions. Assume **any** missing data suitably.*

1. In Fig 1. Wind Loads are transferred to joints A,   **14** D, and G are 12 kN, 24 kN and 24 kN respectively. Analyse the frame by Portal Method
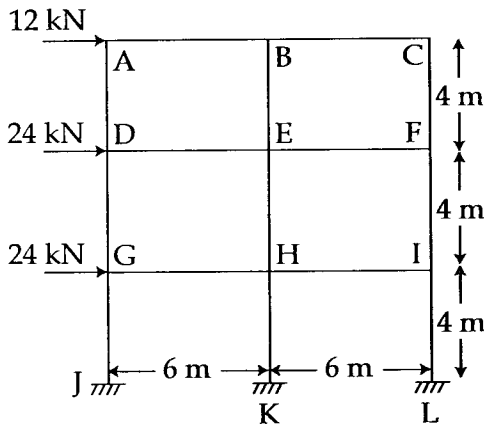

Fig. 1

2. (a) Differentiate between stiffness and flexibility   7
        method.

    (b) Prove that stiffness and flexibility matrices   7
        are reciprocal of each other.

3. Analyse the frame given in Fig. 2. by stiffness   **14**
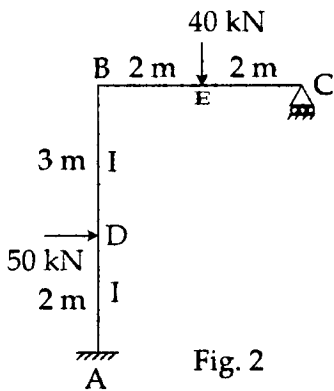   method.

Fig. 2

4. Analyse the pin - jointed plane frame shown in   **14**
    Fig 3. by flexibility matrix method. The number
    in parenthesis are cross-sectional area of members
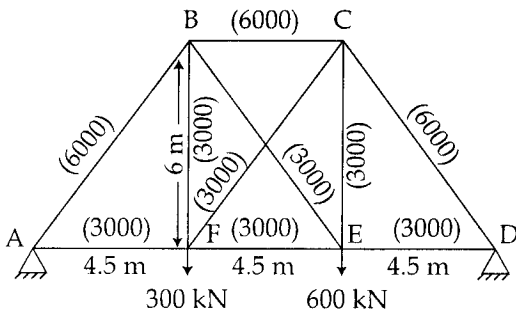   in mm^2.

Fig. 3

5. Analyse the continuous beam shown in fig 4. by stiffness method. The downward settlement of supports B and C in time units are $\dfrac{150}{EI}$ and $\dfrac{75}{EI}$ respectively.   **14**
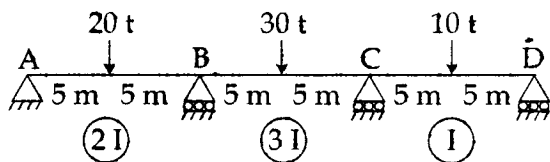

Fig. 4

6. Construct the direct stiffness matrix for the truss shown in fig 5. Take $E = 200 \times 10^6 kN/m^2$, $A = 2500 \times 10^{-6}\ m^2$ **14**
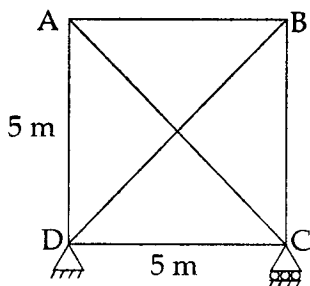

Fig. 5

7. (a) Summarize the finite element analysis procedure.   **7**

(b) Find the reaction and moments developed at the ends of a prismatic member with "Rotation without transverse displacement of one end of a prismatic member with other end hinged".   **7**