d. Write short notes on the following :   5 each

(a) Kinematic indeterminacy

(b) Flexibility and stiffness matrices

(c) Structural instability

(d) Unit load method

MVSE–103

M. Tech. (Struct.) (First Semester)
EXAMINATION, Jan.-Feb., 2008

ADVANCE STRUCTURAL ANALYSIS

(MVSE—103)

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note :   Attempt any *five* questions. All questions carry equal marks.

1. (a) Describe static indeterminacy.   5

    (b) Develop the flexibility matrix for the spring system
         shown below.   15
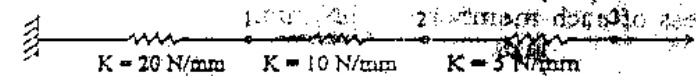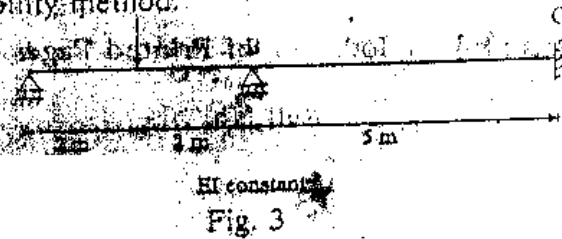

Fig. 1

2. (a) Describe the principle of virtual work.   5

    (b) Develop the flexibility matrix for the simply supported
         beam AB with reference to the co-ordinate system
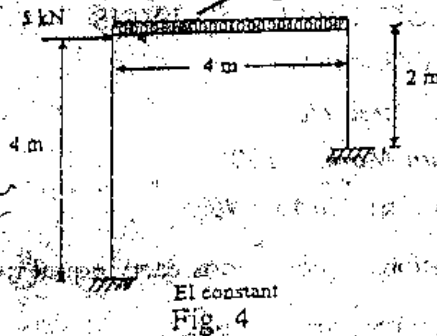   shown below.   15

Fig. 2

P. T. O.

3. (a) Describe generalised systems of co-ordinates.   5

(b) Analyse the continuous beam shown below using flexibility method.   15

EI constant

Fig. 3

4. (a) Classify the structures.   5

(b) Analyse the portal frame ABCD using stiffness method.   15
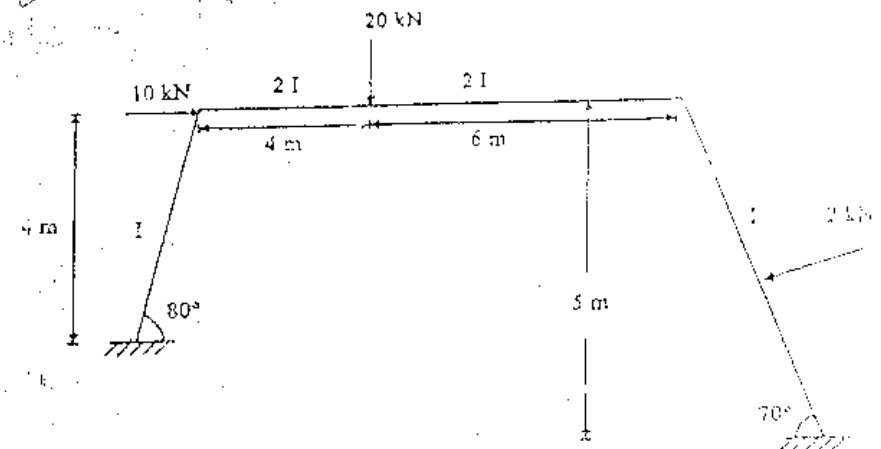
30 kN/m

EI constant

Fig. 4

5. (a) Describe force and displacement methods.   5

(b) Analyse the pin jointed frame shown below. The axial stiffness of each member is 4 kN/mm.   15

Fig. 5
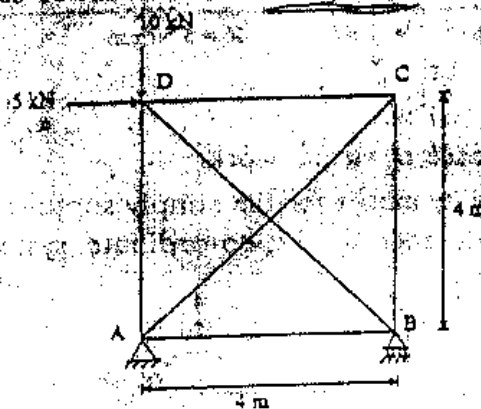
6. (a) Determine degree of static indeterminacy of plane frame member.

Fig. 6
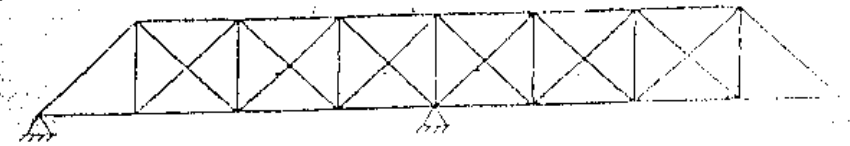
(b) Analyse the portal frame with inclined legs as shown in fig.

Fig. 7

7. (a) Derive the stiffness matrix of a plane truss member.   5

(b) Calculate slopes at 1, 2 and 3 due to applications of unit moment at 3.

Fig. 8