Total number of printed pages–4

53 (CE 402) STAN-I

2016

STRUCTURAL ANALYSIS-I

Paper : CE 402

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

Answer ***any five*** *questions out of* ***seven.***

1. Discuss the following : 4×5=20

   (a) Conjugate beam method & theorems

   (b) Moment area theorems

   (c) Static and Kinetic indeterminacy

   (d) Difference between determinate and indeterminate structure.

Contd.

2. Determine the vertical and the horizontal displacements at the free end E in the frame shown in *Fig.*01. Given $EI = 20000\,kNmm^2$. 20

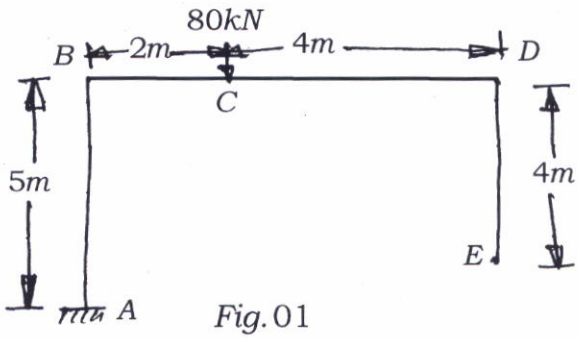

*Fig.*01

3. Determine the vertical and horizontal deflection at the free end of the beam shown in *Fig.*02. Given $E = 200\,kN/mm^2$ and $I = 30\times10^7\ N/mm^2$. 20

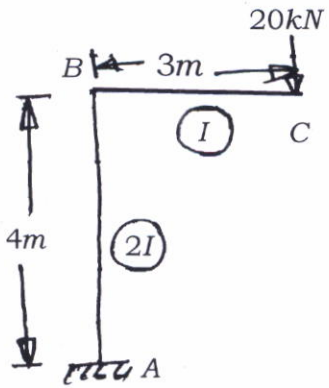

*Fig.*02

4. A light cable is supported at two points $20m$ apart which are at the same level. The cable supports three concentrated load as shown in *Fig.* 03. The deflection at first point is found to be $0{\cdot}8m$. Determine the tension in the different segments and total length of the cable. 20

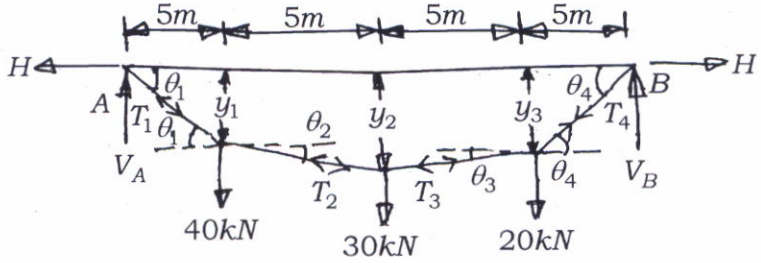

Fig. 03

5. Find the vertical deflection of the joint B in the truss loaded as shown in *Fig.* 04. The cross sectional area of the members in mm are shown in the brackets. Take $E=200kN/mm^2$. 20

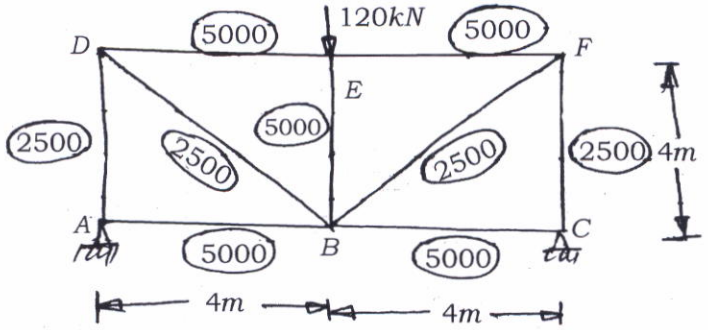

Fig. 04

6. *(a)* A three hinged symmetric circular arch has a span of $36m$ and a rise of $6m$. Determine the bending moment, normal thrust and radial shear of $9m$ from the left support, if the arch is subjected to a uniformly distributed load of $30kN/m$ over left half portion and a concentrated load of $60kN$ at $27m$ from the left springing. 15

(b) What do BMD & SFD represent for a given beam ? Discuss their significances with reference to a structural member. 5

7. *(a)* Find the rotation and deflection at the free end in the Cantilever beam shown in *Fig.*05. 10

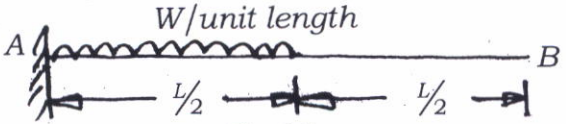

*Fig.*05

(b) Determine the slope and deflection at the free end of a cantilever beam as shown in *Fig.*06, by moment area method. (Take $EI = 4000kNm^2$) 10

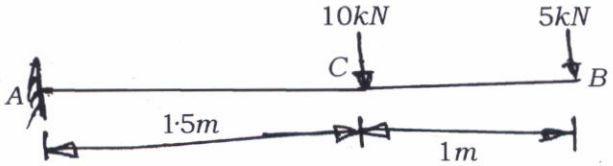

*Fig.*06