

III B.Tech I Semester Supplementary Examinations, November 2006
STRUCTURAL ANALYSIS-I
(Civil Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
 All Questions carry equal marks

1. Draw the bending moment and shear force diagram of a propped cantilever beam of span 6 m due to a point load of 6 kN at the mid span. [8+8]
2. Find the fixed end moments for the fixed beam shown in figure2. [16]

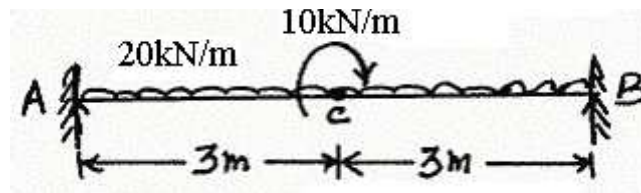


Figure 2

3. Four straight wires AO, BO, CO and OD are made of the same material and have the same cross section. Their upper ends are connected to a horizontal ceiling, the points A, B, C and D forming a rectangle in which $AB = 2\text{m}$ and $BC = 2.5\text{m}$. The junction O is 3m vertically below a point Q on the ceiling, 1m from AB and 0.75m from AD. The connections are adjusted so that initially there is no slackness in any wire and a load of W is then suspended from O. Denoting the pull in the wire AO as P, find the pull in each of the remaining wires in terms of P and W. Use the method of tension coefficients. [16]
4. A two span continuous beam of constant moment of inertia is loaded as shown in Figure4. Find the support moments using Clapeyron's theorem of three moments. Also plot BM and SF diagrams for the beam. [10+4+2]

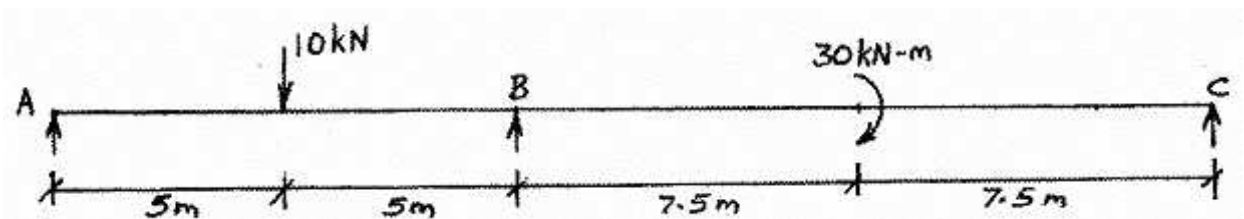


Figure 4

5. Define Strain energy. Derive an expression for Strain energy for a linear elastic system under shear force. [4+12]
6. A system of wheel loads crosses a girder of 21.60m span, which is simply supported at its ends. The loads and their distances are as follows.
 Wheel load (kN) : 100 100 200 200 150
 Distance between
 centre (metres) : 1.80 2.70 2.40 2.10
 Determine

(a) the maximum B.M at quarter span

(b) the maximum B.M in the girder. [8+8]

7. An over hanging beam DABC , 14m long is supported at A and B . DA=BC=2m; AB=10m. Draw the influence lines for the reactions at A and B, shear and bending moment at section 3m from A. Hence obtain their values for a uniformly distributed load of 10kN/m, 5m long acting from A. [4+4+4+4]

8. A beam of 9m long rests on two supports one at 1.5m from the left hand end and the other at 3m from the right hand end. The beam carries a u.d.l of 60kN/m over a length of 6m from the left hand end and a concentrated load of 30kN at the right hand end. Draw shear force and bending moment diagram. Find the position and magnitude of maximum bending moment. Also locate the points of contra flexure. Use graphical procedure. [4+4+4+4]
