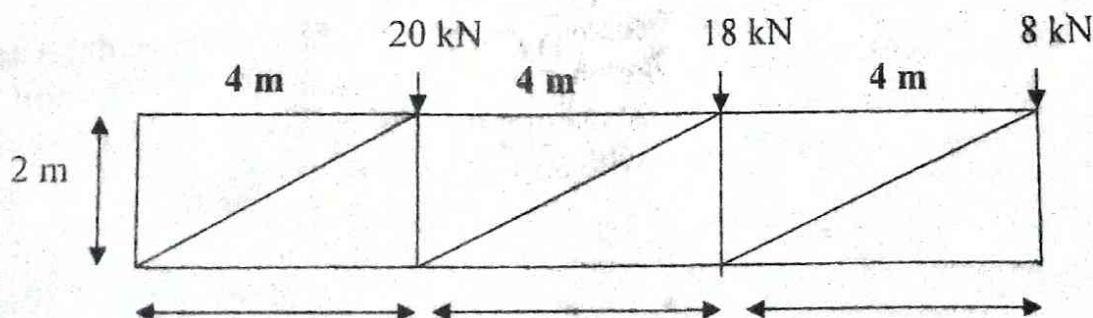


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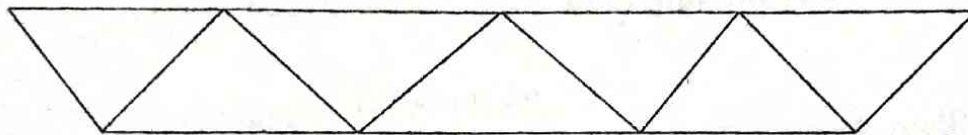


State castigliano's first theorem and its application.

- Q. 4. Three wheel loads 60kN, 40kN and 50kN spaced 2m and 2m respectively roll on a simply supported girder of span 20m from left to right with the 60kN load leading, find the following: CO3
- Maximum bending moment that can occur at a section 8m from the left support.
  - Maximum bending moment that can occur under 40kN load.
  - Absolute maximum bending moment for the girder.

OR

A warren girder having a span of 30 m consists of four equal panels shown in figure. Plot the influence line for force in all the members CO3



All angles of  $60^\circ$

- Q. 5. The 3 hinged stiffening girder of a suspension bridge of span 120 m is subjected to two point loads 240 kN and 300 kN at distance 25 m and 80 m from the left end. Find the S.F and B.M for the girder at a distance 40 m from the left end, dip is 12 m. Find also  $T_{\max}$  and draw the B.M diagram. CO4

OR

A Suspension bridge with Three hinged stiffening girder has span of 100m and central dip of 10m. The self weight of the bridge carried by one set of cable is 15kN/m. The bridge is to be designed to carry a live load of 30kN/m to be equally divided between two sets of cables. The working stress is 15kN/cm<sup>2</sup> for cable and 120kN/cm<sup>2</sup> for girder. Find (a) Cross sectional area of one set of suspension cable. (b) The Section modulus of the stiffening girder. CO4

- Q. 6. A masonry dam of Trapezoidal section is 9 m high retaining water upto the top. The water face of the dam is vertical. If the top width of the dam is 1.5 m find the minimum bottom width required to avoid tension in the masonry. Water and masonry weigh 9810 N/m<sup>3</sup> and 22000N/m<sup>3</sup> respectively. CO5

OR

A masonry Retaining wall of trapezoidal section 8m high 2.5m wide at top and 4.5 m wide at the bottom. The earth face of wall is vertical. The soil is level with top of the wall. Find the maximum pressure intensities at the base of wall. Soil weighs 16000N/cum with angle of repose of 30 degree. Masonry weight 22500N/cum. CO5