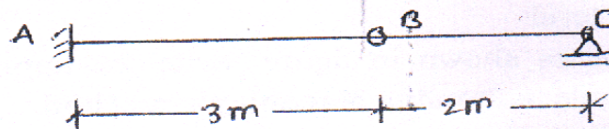


Q.3 a) A suspension bridge of span 80 m and central dip 8 m is strengthened by a three hinged stiffening girder. The girder is hinged at each end and also at mid span. The girder carries a dead load of 16 kN/m along with a point load of 100 kN acting at a point 20 m to the left of central hinge. Calculate maximum SF and BM in the girder. Also draw SFD & BMD for the girder. (12)

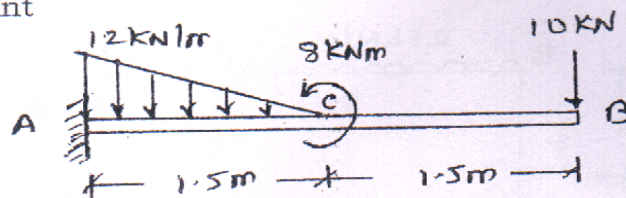
b) A column of hollow circular cross section having external diameter 250 mm & internal diameter 200 mm is 4.5 m long. The column is hinged at both ends and carries longitudinal compressive load of 125 kN at eccentricity of 20 mm. Find the intensity of maximum & minimum stresses produced in the column section. Take  $E = 0.90 \times 10^5$  MPa. (8)

Q.4 a) For a beam shown in figure draw ILD for BM at A and shear force at hinge B. Using drawn ILD, find the magnitude of above quantities if a live load of 20 kN/m covers the entire span. (6)

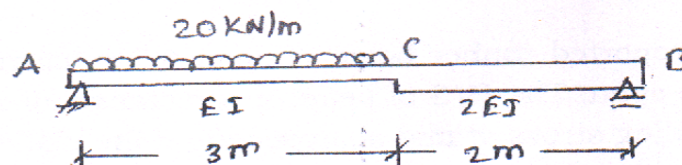


(b) A three hinged symmetrical parabolic arch ACB hinged at the ends A & B and at the crown 'C' is of span 30 m with central rise 6 m. It is loaded with udl of intensity 12 kN/m over left half portion of the arch along with a point load of 36 kN at the crown. Find- (i) Support reaction (ii) NT, RSF & BM at section 10 m away from left support (iii) Location & magnitude of maximum +ve & -ve BM. Draw BMD (14)

Q.5 a) A cantilever beam of span 3 m is loaded as shown in figure. Find the slope and deflection at the free end 'B'. Use **Moment Area Method**. Take  $EI = \text{Constant}$  (10)



b) Using **Conjugate Beam Method**, determine slope at 'A' and deflection 'C' of a non-prismatic simply supported beam loaded as shown in figure.  $EI = 5000 \text{ kNm}^2$  (10)



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