

2005 JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY

II B.TECH. I SEMESTER REGULAR EXAMINATIONS
STRUCTURAL ANALYSIS-I
 (CIVIL ENGINEERING)

MAY 2005

TIME: 3 HOURS
 MARKS: 80

Answer any FIVE Questions
 All Questions carry equal marks

1. A propped cantilever of span 6 m is subjected to a uniformly distributed load of 4kN/m over half the span starting from the fixed support. Find the reactions and moments at the supports. EI is constant.
2. A beam of span L carries a central load W. It is so constrained at the ends that when the slope is θ , the restraining couple at the supports is $\mu \theta$. Find the magnitude of the restraining couple at each end. Also find the central deflection. Deflection at the ends is zero.
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 = 2m and BC = 2.5m. 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.
4. A beam ABC 8 m long is fixed at A and simply supported at B with an overhang BC 2 m long. The beam carries a uniformly distributed load 12 kN/m on AB and a point load of 12 kN load at C. Find the support moments and support reactions. Draw the B.M.D and S.F.D.
5. State and explain Castigliano's first theorem taking any example.
6. Uniformly distributed load of intensity 30kN/m crosses a simply supported beam of span 30m from left to right. The length of uniformly distributed load is 5m. Find the value of maximum bending moment at a section 20m from left end. Find also the absolute value of maximum B.M and S.F in the beam.
7. A beam CABD is simply supported at A and B and has overhangs on both the supports. Overhang CA=2m, span AB=10m and overhang BD=2.5m. Draw the influence lines for B.M at A,B and at the centre of AB.
8. The resultant of two forces acting at a point is 75 kN. It is observed that one force is double than that of the other and if the direction of one of them is reversed the resultant becomes 35 kN. Find the magnitudes of forces and the angle between them graphically.