

2005 JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY**III B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS
STRUCTURAL ANALYSIS
(CIVIL ENGINEERING)**NOVEMBER 2005TIME: 3 HOURS
MAX MARKS: 80**Answer any FIVE Questions
All Questions carry equal marks**

1. A cantilever of length 6 meters carries a uniformly distributed load of 2kN/m run on the whole length. The cantilever is propped rigidly at the free end. If $E = 1 \times 10^5 \text{ N/mm}^2$ and $I = 108 \text{ mm}^4$ determine

(a) Reaction at the rigid prop.

(b) The deflection at the centre of the cantilever and

(c) Magnitude and position of maximum deflection.

[4+6+6]

2. A fixed beam AB of length 6m carries a udl of 3kN/m over the left half of the span together with a point load of 4kN at a distance of 4.50m from the left end. Determine the fixing end moments and the support reactions. Also draw S.F and B.M. diagrams.

[16]

3. Figure 1 shows two views of a tripod bracket. All connections are pinned. Find the forces in magnitude and nature in the three members due to a vertical load of 100kN action at O. Use tension coefficient method.

[16]

4. A continuous beam, 12m long supported over spans $AB=BC=CD=4\text{m}$, carries a udl of 3kN/m run over span AB, a concentrated load of 4kN at a distance of 1m from point B on support BC and a load of 3kN at the centre of the span CD, find

(a) Support moments

(b) Support reactions and

(c) Draw the S.F and B.M. diagrams

[8+4+4]

5. (a) A simply supported beam carries a point load P eccentrically on the span. Find the deflection under the load. Assume uniform flexural rigidity. Use energy theorem.

(b) The bend ABC shown in figure 2 carries a concentrated vertical load P at A, Find the vertical deflection at A using energy theorem.

[8+8]

6. A series of five point loads 130kN, 300kN, 200kN, 150kN and 50kN all spaced at 4m c/c crosses a simply supported girder of span 60m from left to right with 50kN leading. Determine the maximum, bending moment at the left quarter span point. Also determine the value of absolute maximum bending moment.

[16]

7. A Warren girder of 30m span consists of 6bays of 5m each. It is traversed by a udl of 50kN/m longer than the span and a single concentrated load of 100kN which can be anywhere on the span. By drawing dimensioned sketches of the influence lines for forces in the members of the third bay from the left, determine the maximum forces in them. [16]

8. Develop graphically the bending moment and shear force diagrams for the beam shown in 3

[16]