STRUCTURAL ANALYSIS-II

May 2012
Paper Code: CE-202 - F

Note: Attempt any five questions. All questions carry equal marks.

Q.1.(a) Determine the vertical deflection at free end C of the beam ABC shown in fig.(i). Consider $E = 2 \times 10^5$ N/mm^2 and $I = 8 \times 10^8$ mm^4. (10)

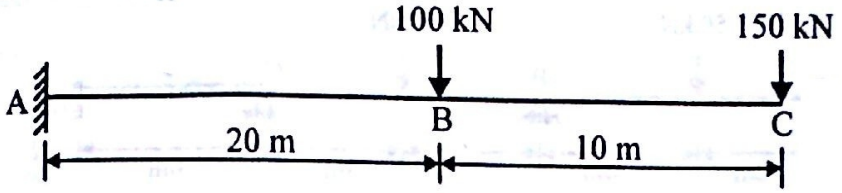

Fig. : (1)

Q.1.(b) Find Static and Kinematics Indeterminacies for the following structures. (10)

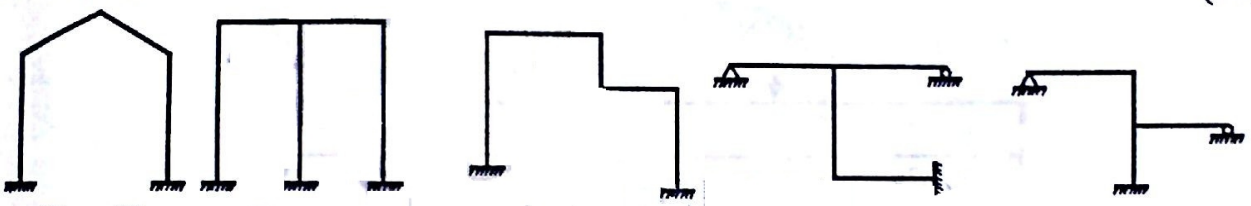

Fig. : (2) **Fig. : (3)** **Fig. : (4)** **Fig. : (5)** **Fig. : (6)**

Q.2.(a) A parabolic arch is hinged at the ends, which are at the same level. The span is 50 meter with a central rise of 8 meters. It carries a point load of 180 kN at the crown. Calculate the normal thrust, redial shear and bending moment at the left hand quarter point. (10)

Q.2.(b) A two-hinged parabolic arch has span of 60m and carries uniformaly distributed load of 6 kN/m on left hand half of the span and also a point load of 60 kN at the crown. Determine the horizontal thrust at the supports and the maximum positive and negative B.M. (10)

Q.3.(a) A suspension bridge 130 meter span has two three hinged stiffening girders supported by two cables having a central dip of 8.5 meters. The width of the roadway is 6 meter. The dead load is 20 kN/m^2 of floor area and a live load of 30 kN/m^2 covers the left hand half of the bridge. Find the S.F. and B.M. at the 30 meter from left point. Also, determine the maximum tension in the cables. (10)

Q.3.(b) A foot bridge, 8 meter wide is carried over a river by a suspension bridge of 80 meter span, by two cables of uniform section having a central dip of 6 meters. If the platform load is 10 kN/m^2 calculate the maximum pull in the cables, their sectional area and length, if the permissible stress in the cables is 140 MN/m^2 and the specific weight of the cable is 76.5 kN/m^3. (10)

Q.4. Determine the support moments at A, B, C and D for the continuous girder shown in figure below by moment distribution method. Also draw S.F. and B.M. diagrams. (20)

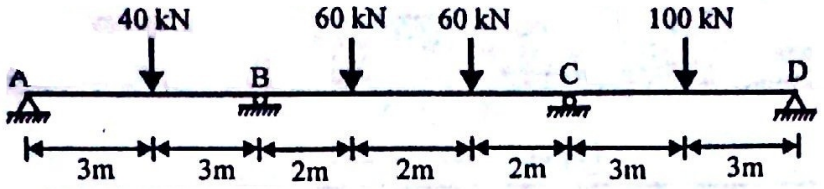

Fig. : (7)

Q.5. Determine the end moments for the beam by moment distribution method. Consider EI constant. Also draw S.F. and B.M. diagrams. **(20)**

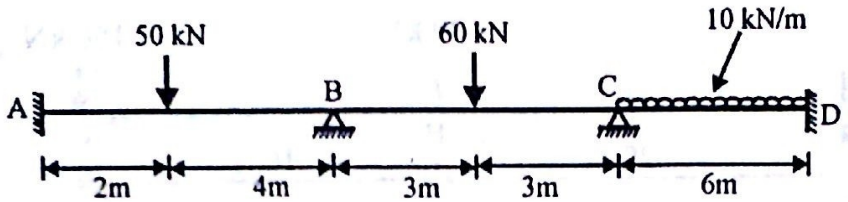

Fig. : (8)

Q.6. Determine the fixed end moments for the fixed beam by column analogy method. Consider EI constant. **(20)**

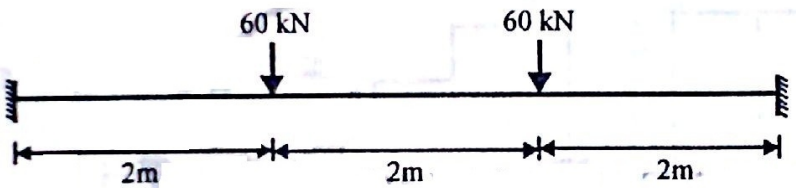

Fig. : (9)

Q.7. A 100 × 100 × 20 mm angle section used as a simply supported beam over a span of 2.5 m. It carries a load of 500 N along the line YG , where G is the centroid of the section. Calculate : **(20)**

(i) Stresses at the points A, B, and C of the mid section of the beam.

(ii) Deflection of the beam at mid section and its direction with the load line.

(iii) Position of the neutral axis.

Take E = 200 GN/m^2

Q.8. State the following : **(20)**

(a) Define statics and kinematics indeterminacies.

(b) State Castigliano's First & Second Theorem.

(c) Define Two-Hinged Arch.

(d) Define Carryover moment.

(e) What is the use of Influence Line Diagrams?

(f) What is the equation of length for cable?

(g) Define flexibility and stiffness coefficients.

(h) List Advantages and disadvantages of continuous beam.

(i) Explain disadvantages of continuous beam.

(j) What is strain energy?