BTS 164(I)

B.Tech. Degree III Semester (Supplementary) Examination in Civil Engineering (Habitat Engineering and Construction Management), June 2002

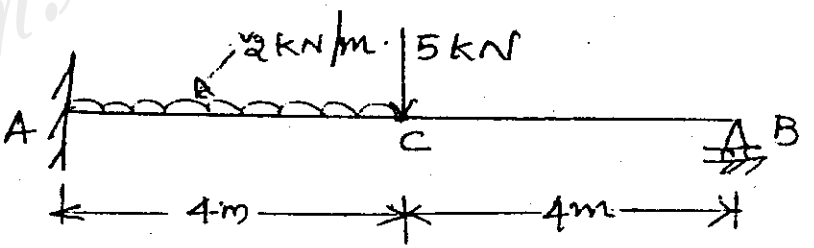
CE 303 ANALYSIS OF STRUCTURES I

(1995 Admissions)

Time: 3 Hours *Max. marks: 100*

I a) Explain Castigliano's theorems. (6)

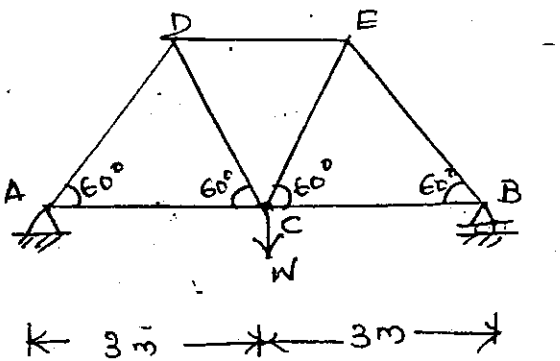
b) Analyse the beam shown in fig.1 and draw the bending moment and shear force diagrams. EI is constant (14)



OR

II a) Explain the theorem of complementary energy. (5)

b) A plane and pin jointed frame is loaded as shown in fig.2, the tension members are designed for a stress of 80 N/mm^2 while the compression members for 50 N/mm^2. Calculate the vertical displacement of joint C. Adopt E = 2 x 10^5 N/mm^2. (15)



(P.T.O)

III a) Distinguish between bending moment diagram and influence line for bending moment. (6)

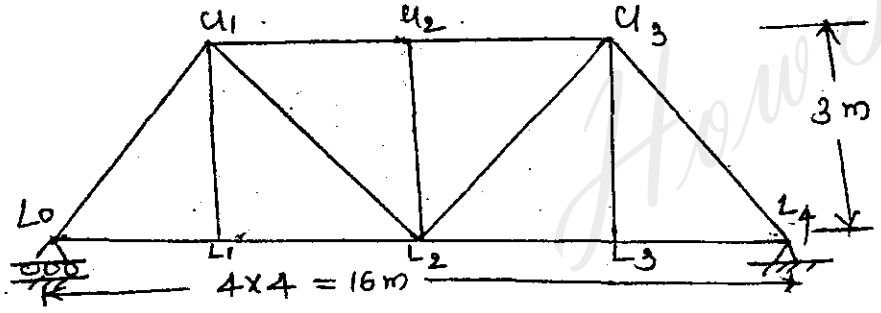
b) Draw the influence line for B.M. at section 15M from left-hand support of a simply supported girder of 25m span. Find the maximum bending moment at that section due to series of wheel loads 100, 200, 200, 200 and 200 KN at centres of 4, 2.5, 2.5 and 2.5 meters respectively. The loads can cross in either direction, the 100 KN load leading in each case. (14)

OR

IV a) State Muller - Breslan's principle and its significance. (5)

b) Two wheel loads 40 KN and 20 KN, 3m apart cross a girder of 10m span with 20 KN leading from left to right. Draw maximum shear and moment diagrams. (15)

V For the truss shown in fig.3, construct the influence line for the force in members L_0U_1, U_1L_1, L_1L_2. Using the influence line diagram, compute the maximum fories in these members due to a moving load of 10 KN/m and greater than span. (20)



OR

VI Determine the ordinates of the influence line for the reaction of C and B of the continuous beam ABC at 2m intervals. EI is constant. Take AB = 4m and BC = 6m. (20)

Contd.....3

VII A suspension cable, stiffened with a three hinged girder, has 100m span and 10m dip. The girder carries a load of 0.4 KN/m. A live load of 10 KN rolls from left to right. Determine (i) the maximum B.M. anywhere in the girder (ii) the maximum tension in the cable. (20)

OR

VIII A suspension cable 160m span and 16m central dip carries a load of 2 KN/m. Calculate the maximum and minimum tensions in the cable. Find the horizontal and vertical forces in each pier if the cable is passed over a pulley on the top of the pier and anchored down, the inclination to the horizontal being 30°. (20)

IX a) State Eddy's theorem. (5)

b) A parabolic arch hinged at the springings and crown has a span of 20m. The central rise of the arch is 4m. It is loaded with a u.d.l. of intensity 2 KN/m on the left 8m length. Calculate (i) the direction and magnitude of reaction at the hinges (ii) the bending moment, normal thrust and shear at 4m and 15m from left end. (15)

OR

X A symmetrical two - hinged parabolic arch has a span of 36m and central rise of 8m. It is loaded with 40 KN/m udl over the left half of the span.
Calculate

(i) Reactions at support
(ii) Bending moent, shear force and axial thrust at 9 m from left support.
(iii) Location and magnitude of maximum Bending moment. (20)

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