BTS (C) 048(D)

B.Tech. Degree IV Semester Examination
June 2002

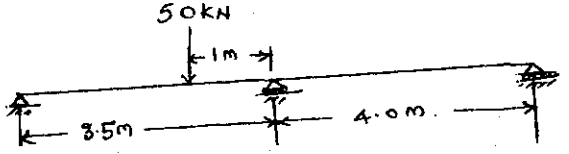
CE 403 ANALYSIS OF STRUCTURES I

Time: 3 Hours *(2000 Admissions)* *Max. Marks: 100*

(All questions carry equal marks)

I a) Explain and state the uses of the following
(i) Unit load method (ii) Muller Breslan's principle. (8)

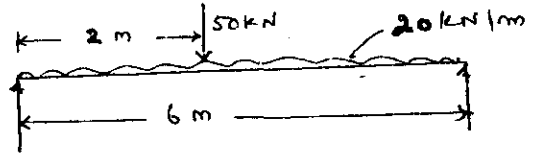
b) Analyse the beam shown in figure below and draw the SFD and BMD. EI is constant and its value is 4200 kN/m^2. (12)



OR

II a) Explain and state the use of virtual work principle. (6)

b) Find the deflection under the load 50 kN for a beam as given in fig. below. Take E = 2.1 x 10^5 N/mm^2 and I = 2.1 x 10^8mm^4. (14)



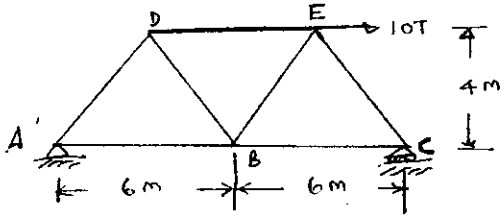
III a) Two concentrated loads w_1 and w_2 placed at a distance of d moves over a girder of span L which is simply supported at its ends. Derive expressions and draw influence lines for positive SF, negative SF and Bending moment. (8)

(P.T.O)

b) A simply supported beam 20m span is subjected to a uniform dead load of 5 T/m. In addition a live load of 5 T/m longer than the span crosses over the beam. Determine the maximum shear force at 5M from support, maximum BM at the section and absolute maximum moment. (12)

OR

IV Evaluate the horizontal component of the deflection at point E and vertical component of deflection at B in the truss as shown in fig. below:- (20)

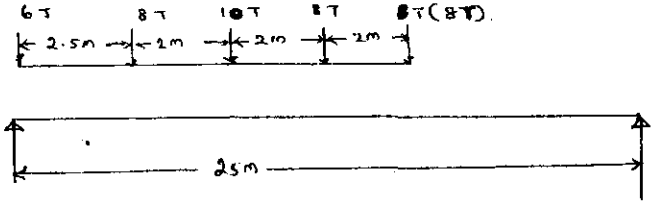


V a) What do you mean by influence lines? Explain its uses in structural analysis. (6)

b) A simply supported beam 15m span of uniform section carries a train of three concentrated loads and the train moves from left to the right. The loads are 15T, 20T and 10T separated by 2.5 M each. Find the maximum BM and its locations and also find the EUDL to give maximum moment. (14)

OR

VI A train of five loads as in fig. crosses a girder of 25M span. Calculate the maximum positive SF, negative SF and BM anywhere on the span. (20)



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VII a) What do you understand by cable suspension bridge? Derive expression for horizontal thrust when it is loaded with UDL on entire length. (6)

b) Draw influence lines for Horizontal thrust and bending moment for a UDL longer than span rolling over the suspension bridge of 40M span, dip 4M and loading 5T/m. The bridge is made up of girders and suspended from cables and pin jointed at ends and its centre. (14)

OR

VIII A suspension cable of 30m span and 3m dip is stiffened by three hinged girders. The load is 15 kN/m. Determine the maximum tension in the cable and maximum horizontal thrust and BM in the girder when an 8T concentrated load rolls over assuming that the whole load is carried by cable without stressing the girders. (20)

IX a) State and derive Eddy's theorem and state its uses. (8)

b) A parabolic arch bridge 30M span is hinged at springings and at its crown. The rise is 6M. Determine the magnitude of maximum positive and negative moment at a section 7.5m from left end when a point load of 10T rolls over the bridge. (12)

OR

X Write short notes on the following:-

(i) Fixed arches
(ii) Reaction locus
(iii) Rib shortening
(iv) Two hinged arches
(v) Temperature effects on arch bridges. (20)

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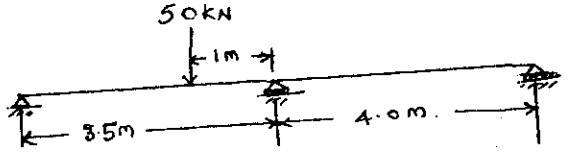

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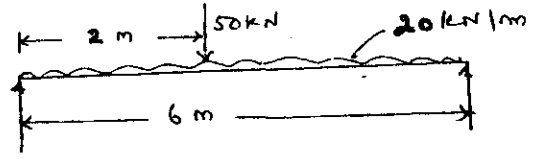

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