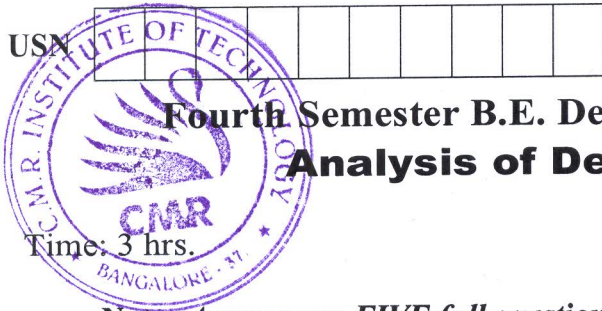


CBCGS SCHEME

15CV42



Module-1

- 1 a. Explain with example statically determinate and indeterminate structure. (04 Marks)
- b. Find the forces in pin jointed truss members shown in Fig.Q1(b) by method of joints. Tabulate the results.

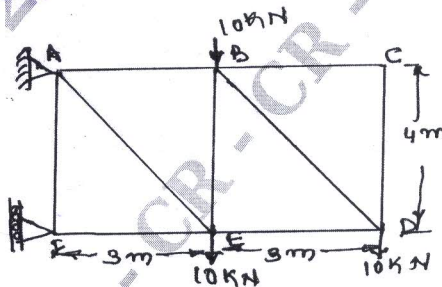


Fig. Q1(b)

(12 Marks)

OR

- 2 a. What are assumptions in Analysis of trusses?
- b. Determine degree of static indeterminacy of structures shown in Fig Q2(b).



Fig. Q2(b)

(03 Marks)

- c. Determine the forces in members BE, BD and BC by method of section Fig.Q2(c).

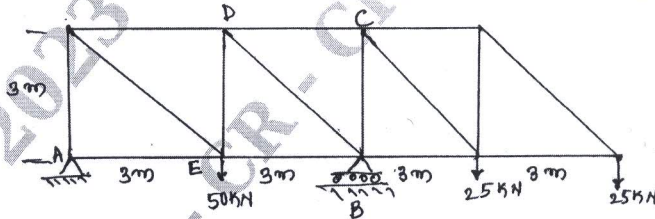


Fig. Q2(c)

(09 Marks)

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Module-2

- 3 a. Derive the second order differential expression $EI \frac{d^2y}{dx^2} = m$ with usual notations. (06 Marks)
- b. Calculate the deflection at point C and slope at point A for the beam loaded as shown in Fig. Q3(b) by Moment Area method. (07 Marks)

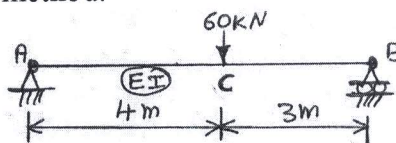


Fig. Q3(b)

- c. State the Moment Area Theorem.

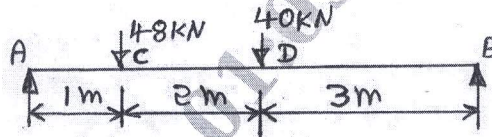
(03 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

OR

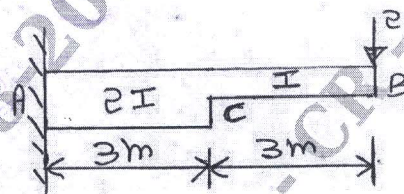
- 4 a. Calculate the deflections at points C and D and maximum deflection and its location for the beam as shown in Fig. Q4(a) by Machaulay's method. Take value of $EI = 17000 \text{ kN-m}^2$. (09 Marks)

Fig. Q4(a)



- b. Calculate the maximum deflection and slope in the beam loaded as shown in Fig. Q4(b) by Conjugate Beam Method. (07 Marks)

Fig. Q4(b)

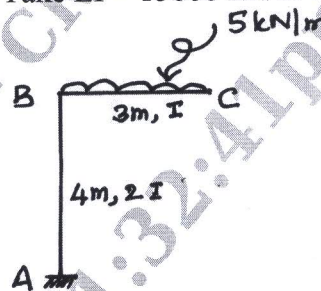


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Module-3

- 5 a. Derive the expression for the strain energy stored in a member due to axial force. (04 Marks)
b. Using Castigliano's approach, find the vertical and horizontal deflection at 'C' of a bent loaded as shown in Fig. Q5(b). Take $EI = 15000 \text{ kN/m}^2$.

Fig. Q5(b)

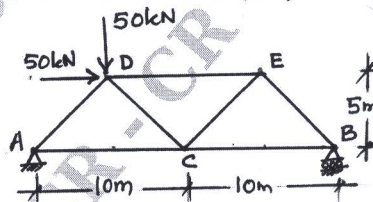


(12 Marks)

OR

- 6 a. Determine the horizontal movement at support B of the steel truss loaded as shown in Fig. Q6(a) by unit load method. Take $A = 1000 \text{ mm}^2$, $E = 200 \text{ GPa}$. (10 Marks)

Fig. Q6(a)



- b. Determine the deflection at the mid span of a simply supported beam subjected to a point load 'W' at its mid span using strain energy method. (06 Marks)

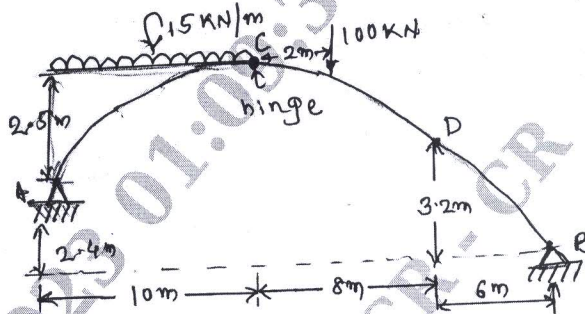
Module-4

- 7 a. A three hinged arch of span 30m rise 5m carries uniformly distributed load of 15 kN/m for right half of the span. Determine the support reactions. Also determine normal thrust, radial shear and BM at a section 9m from left support. (11 Marks)
b. A suspension cable 140m span and 14m central dip carries a load of 1 kN/m . Determine maximum tension in cable. (05 Marks)

OR

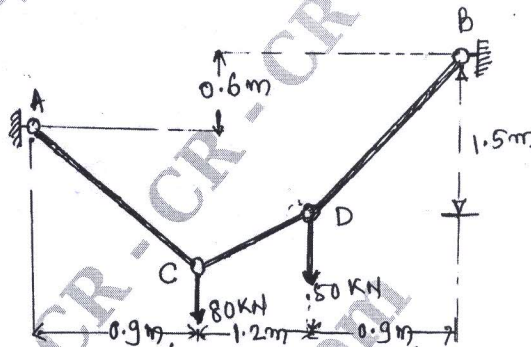
- 8 a. For three hinged arch shown in Q8(a) determine support reactions. Also determine internal forces at D. (09 Marks)

Fig. Q8(a)



- b. Determine the tension in each segment of cable subjected to loading shown in Fig.Q8(b).

Fig. Q8(b)



(07 Marks)

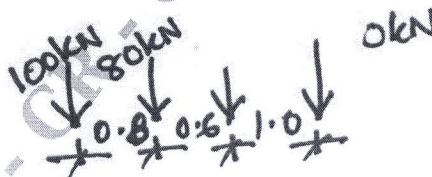
Module-5

- 9 a. Establish the expression for load position to get maximum bending moment at a section which is at a distance of 'a' from left support 'A' in a simply supported beam AB of span 'L' and traversed by a udl w/mt run which is shorter span. (06 Marks)
 b. A beam has a span of 20m subjected to two point loads 80kN and 40kN 2m apart rolls from left to right with 40kN load leading. Draw ILD for reaction at B, BM and SF at section 5m from left support, hence find the maximum values of above quantities. (10 Marks)

OR

- 10 a. Wheel loads shown in Fig.Q.10(a) moves from left to right on a S.S. beam of 12m span. Find the absolute maximum BM any where in the beam and also find equivalent udl to be placed over the entire span. (08 Marks)

Fig. Q10(a)



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- b. Draw the ILD for axial force in member 1 of the truss shown Fig.Q.10(b) and hence find its maximum tensile/ compressive value when a udl of 10kN/m of length traverse from left to right. (08 Marks)

Fig. Q10(b)

