



# CBCS SCHEME

15CV42

## Fourth Semester B.E. Degree Examination, July/August 2022 Analysis of Determinate Structures

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### 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.

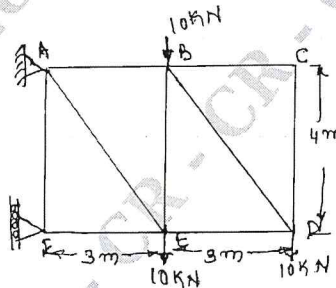


Fig.Q1(b)

(12 Marks)

### OR

- 2 a. What are assumptions in analysis of trusses? (03 Marks)
- b. Determine degree of static indeterminacy of structures shown in Fig.Q2(b).



Fig.Q2(b)

(04 Marks)

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

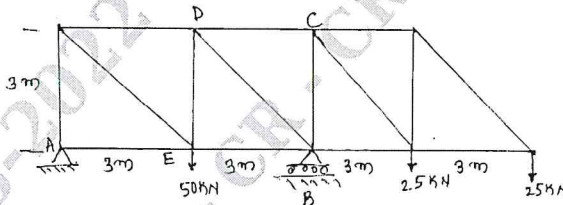


Fig.Q2(c)

(09 Marks)

### Module-2

- 3 a. Determine slope at support and maximum deflection for simply supported beam of span 'l' carrying udl of 'w/m' throughout the span. Use double integration method. (08 Marks)
- b. Using conjugate beam method determine the slope and deflection at free end 'A' for the beam shown in Fig.Q3(b).



Fig.Q3(b)

(08 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. Using moment area method compute slope at 'B' and deflection at 'C' for the beam loaded as shown in Fig.Q4(a).

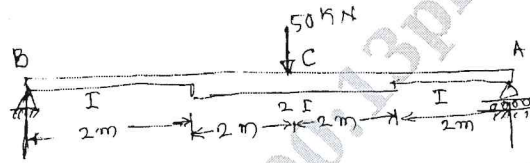


Fig.Q4(a)

(08 Marks)

- b. Using Macaulay's method determine the deflection under loading for the figure shown in Fig.Q4(b).

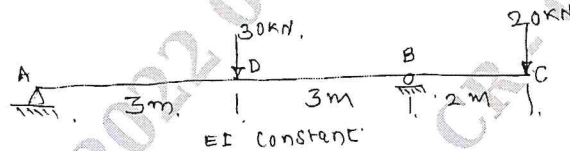


Fig.Q4(b)

(08 Marks)

**Module-3**

- 5 a. Derive expression for strain energy stored in member due to axial load. (04 Marks)  
 b. Find the vertical deflection at free end of a bent frame. Shown in Fig.Q5(b). Use unit load approach.

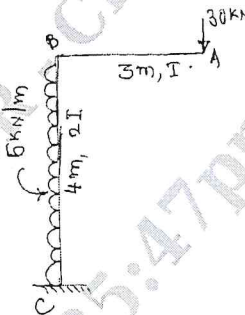


Fig.Q5(b)

(12 Marks)

OR

- 6 a. State the Castigliano's theorems for computing slope and deflection. (03 Marks)  
 b. Determine horizontal and vertical displacement components of joint 'C' of the truss loaded as shown in Fig.Q6(b). Take  $AE = 2 \times 10^4$  kN.

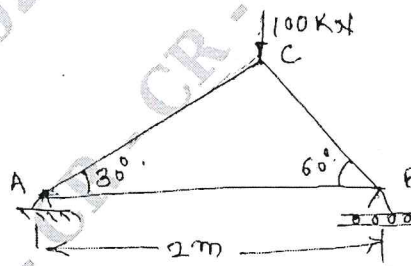


Fig.Q6(b)

(13 Marks)

**Module-4**

- 7 a. A three hinged arch of span 30m rise 5m carries uniformly distributed load of 15kN/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 1kN/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.

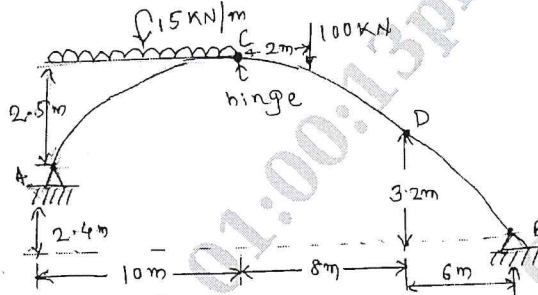


Fig.Q8(a)

(09 Marks)

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

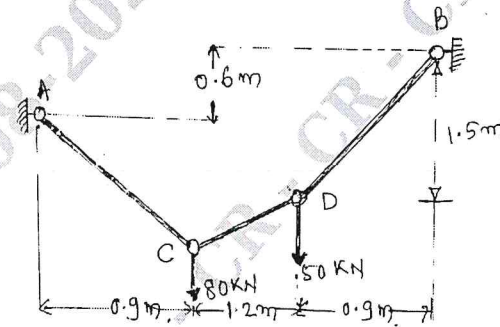


Fig.Q8(b)

(07 Marks)

**Module-5**

- 9 a. What is influence line? Explain its use. (04 Marks)  
 b. To determine maximum moment at C and absolute maximum moment for the beam shown in Fig.Q9(b) when series of concentrated loads shown moving from left to right.

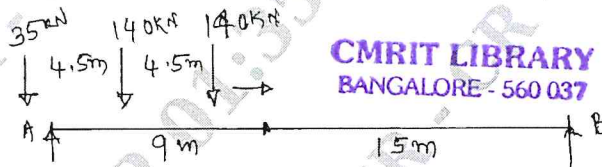


Fig.Q9(b)

(12 Marks)

OR

- 10 a. For the beam shown in Fig.Q10(a) draw influence lines for  
 i) Reaction at A  
 ii) Shear force at B  
 iii) Bending moment at C.

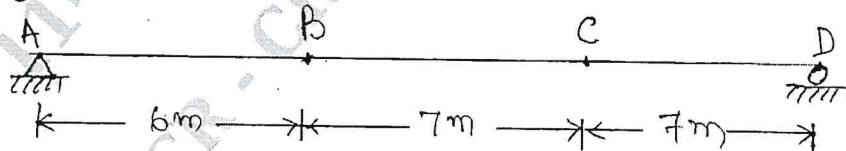


Fig.Q10(a)

(06 Marks)

- b. A girder simply supported has a span of 24m. A udl of intensity 20kN/m and 6m long crosses the girder. Calculate maximum SF and BM at a section 9m from the left support.

(10 Marks)

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