

Ex/CE/PC/B/T/322/2025

B.E. CIVIL ENGINEERING THIRD YEAR SECOND SEMESTER EXAM 2025

Subject: THEORY OF STRUCTURES-II

Full Marks:100

Time: 3hours

(Use Separate Answer scripts for each Part)

Part- I (Marks 60)

1. Determine the bending moment and shear force on beams and columns shown in **Fig.1**. Use **Cantilever Method**. Also draw bending moment diagram. All columns have same cross sectional area. **(30)**

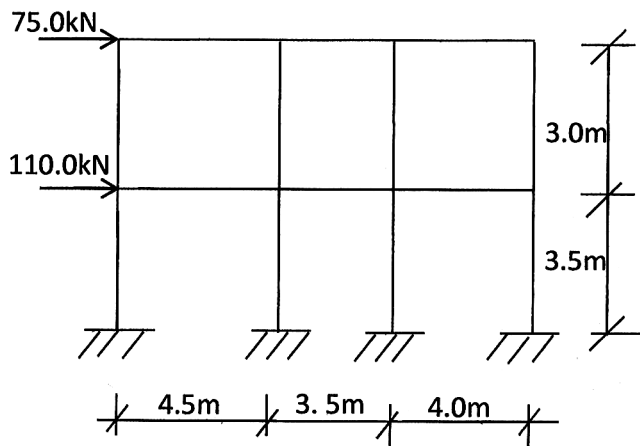


Fig.1

2. Draw the shear flow for the channel section shown in **Fig. 2**, if it is subjected to a shear force of 225kN. Also find the shear centre of this channel section. **(10)**

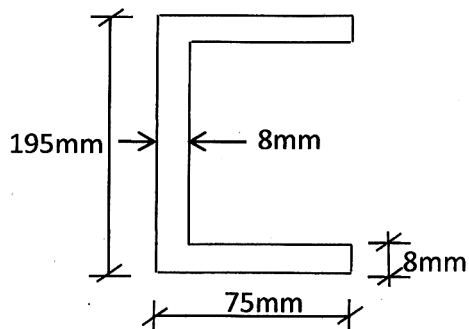


Fig.2

[Turn over

3. A horizontal cantilever 3.75m long is constructed from Z-section shown in **Fig. 3**. A load of 75 kN is applied to the end of the cantilever at an angle of 40° to the vertical. (20)
- Determine the stress at point *A* and *B*.
 - What will be the deflection at the end of cantilever? Given $E=2 \times 10^5 \text{ N/mm}^2$,
 $I_{xx}=59.0 \times 10^{-6} \text{ m}^4$, $I_{yy}=3.8 \times 10^{-6} \text{ m}^4$

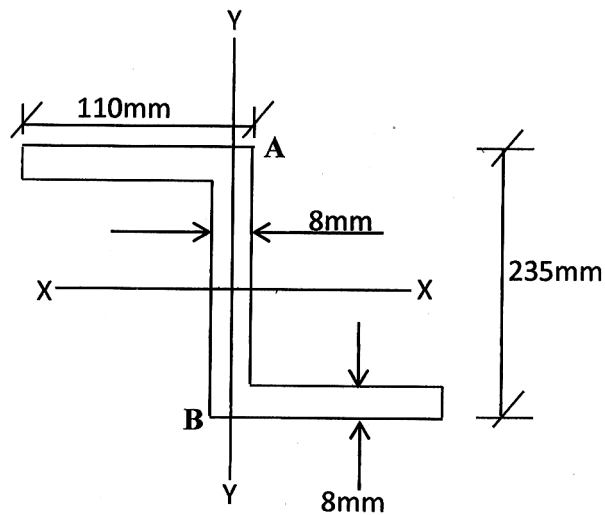


Fig.3

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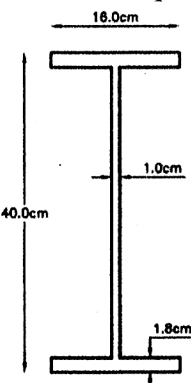
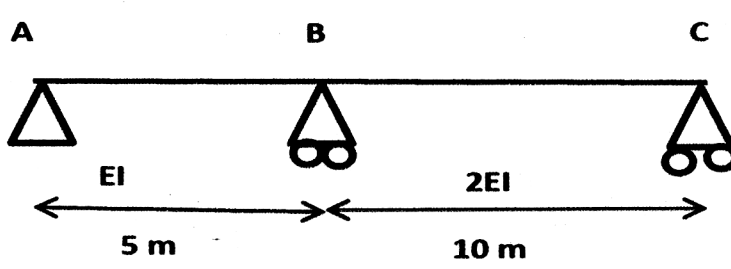
Theory of Structures-II

PART-II

Time: Three Hours

Full Marks 100
(40 marks for 2nd part)

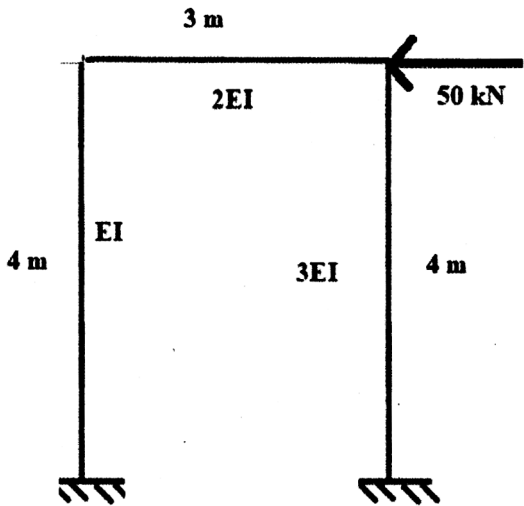
Use a separate Answer-Script for each part
[No code or handbook is allowed]

No. of questions	Part II (answer all questions)	Marks (40)
1 (a)	Find the Shape factor of the following section. 	6
1(b)	A beam is carrying a UDL (w) having length L. Find out the ultimate load w_u by either upper bound theorem or lower bound theorem, if the plastic moment carrying capacity of the beam is M_p.	7
2	Find the maximum value of SFD at midpoint of AB of the beam ABC, if 80 kN concentrated load passes over ABC. The beam is made of M40 grade of concrete. $I=0.09 \text{ m}^4$. 	15

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PART-II**

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Full Marks 100
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No. of questions	Part II (answer all questions)	Marks (40)
3	Analyze the following portal frame by column analogy method and draw the Bending moment diagram. 	12