B.E. CIVIL ENGINEERING THIRD YEAR SECOND SEMESTER EXAM 2022

Theory of Structures-II

PART-I

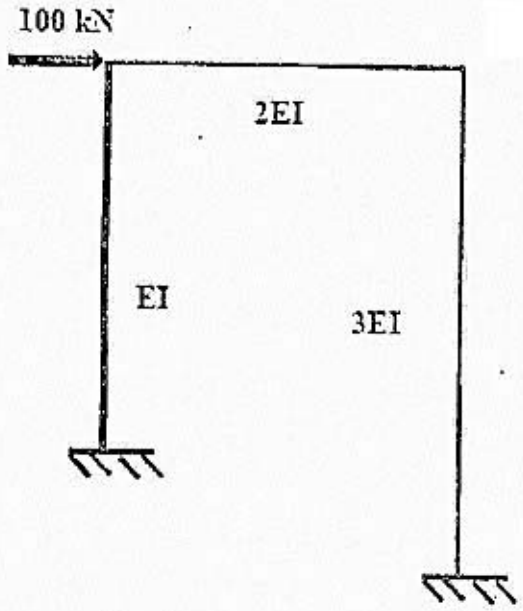
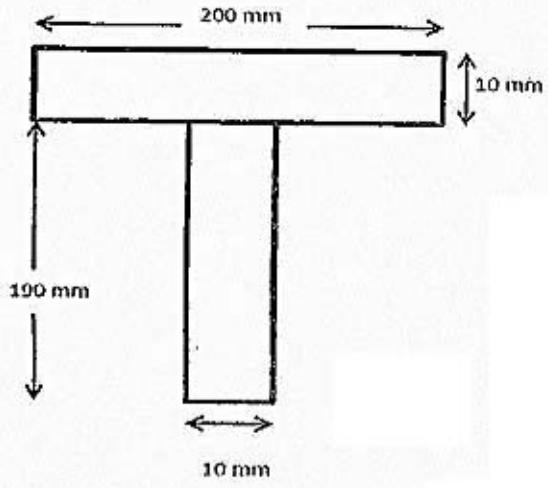
Time: Three Hours

Full Marks 100

40 marks

Use a separate Answer-Script for each part

[No code or handbook is allowed]

No. of questions	Part I (answer all questions)	Marks
1	Analyze the following portal frame by column analogy method and draw the Bending moment diagram. 	12
2 (a)	Find the Shape factor of the following section. 	6

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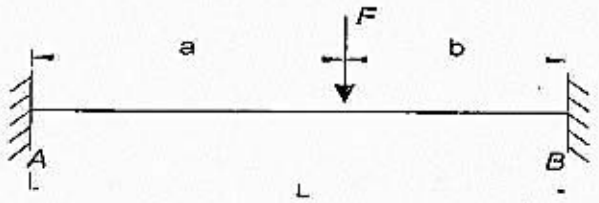
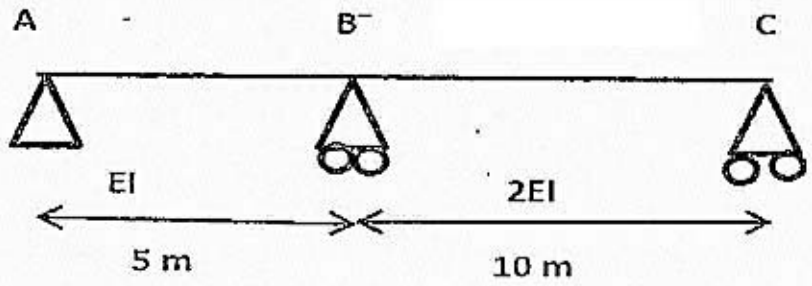
No. of questions	Part I (answer all questions)	Marks
2(b)	Find out the ultimate load F by upper bound theorem and lower bound theorem, if the plastic moment carrying capacity of the beam is Mp. 	7
3	Find the maximum value of **BMD** at midpoint of BC of the beam ABC, if 10 kN/m UDL of length 30m load passes over ABC. The beam is made of M30 grade of concrete. I=0.0864 m^4. 	15

Ex/CE/PC/B/T/322/2022

B.E. CIVIL ENGINEERING THIRD YEAR SECOND SEMESTER EXAM 2022

Subject: THEORY OF STRUCTURES-II

Full Marks:100 **Time: 3hours**

(Use Separate Answer scripts for each Part)

Part- II (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. Area of exterior column is one half of the area of interior column. **(30)**

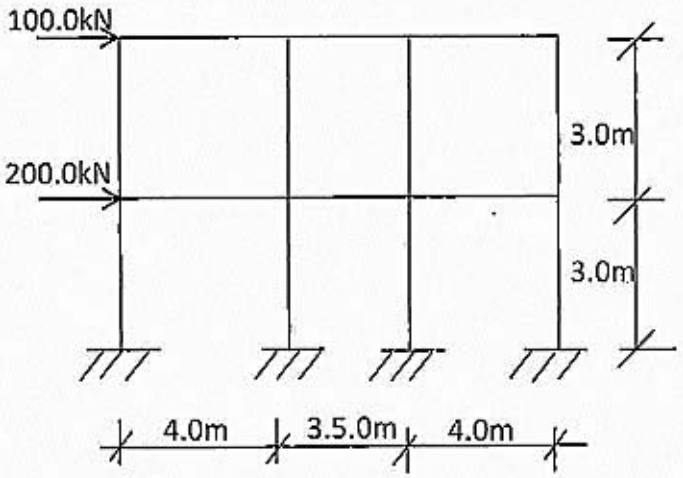


Fig.1

2. Draw the shear flow for the channel section shown in **Fig. 2,** if it is subjected to a shear force of 100kN. Also find the shear centre of this channel section. **(10)**

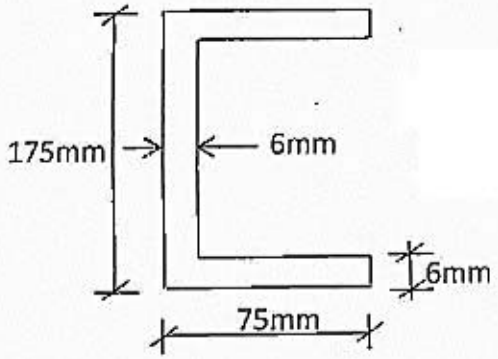


Fig.2

3. A horizontal cantilever 3.5m long is constructed from Z-section shown in **Fig. 3**. A load of 30 kN is applied to the end of the cantilever at an angle of 60^0 to the vertical. **(20)**
   a) Determine the stress at point A and B.
   b) Determine the principal second moments of area of the section and hence by applying the simple bending theory about each principal axis, check the answer obtained in *(a)*.
   c) What will be the deflection at the end of cantilever? Given $E=2\times10^5 N/mm^2$, $I_{xx}=50.0\times10^{-6}m^4$, $I_{yy}=4.5\times10^{-6}\ m^4$

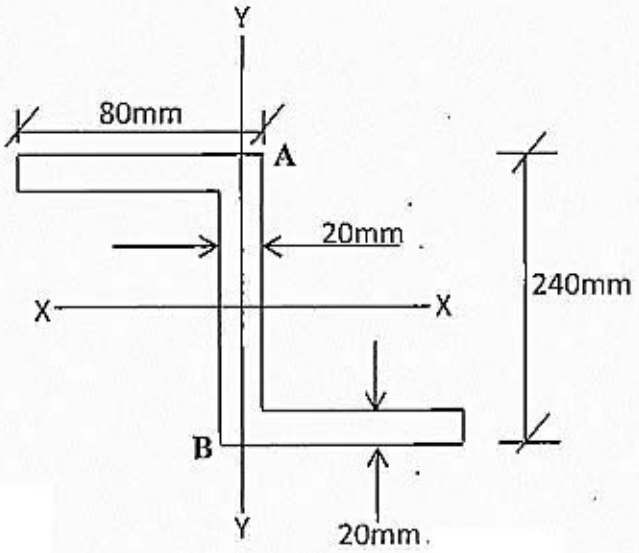


Fig.3