

Ex/CE/PC/B/T/322/2024

**B.E. CIVIL ENGINEERING THIRD YEAR SECOND SEMESTER EXAM 2024**

**Subject: THEORY OF STRUCTURES-II**

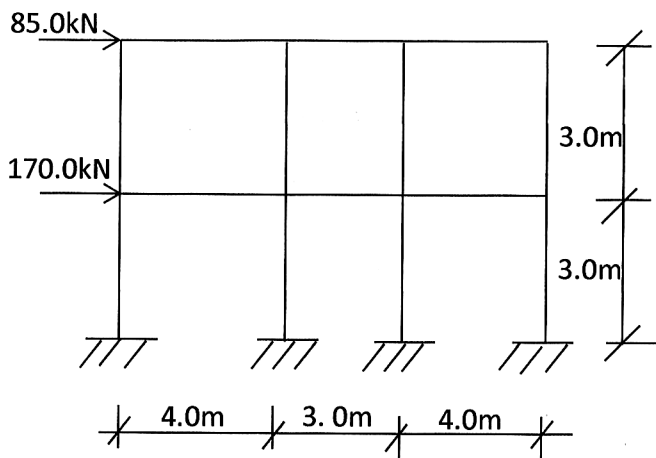
**Full Marks:100**

**Time: 3hours**

**( Use Separate Answer scripts for each Part)**

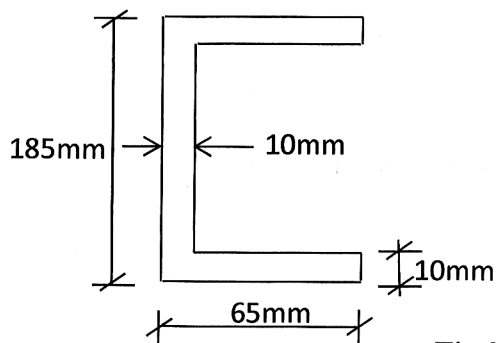
**Part-I (Marks 60)**

1. Determine the bending moment and shear force on beams and columns shown in **Fig.1**. Use **Portal Method**. Also draw bending moment diagram. **(30)**



**Fig.1**

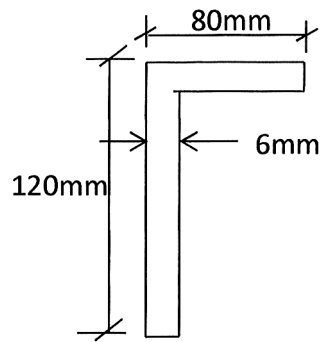
2. Draw the shear flow for the channel section shown in **Fig. 2**, if it is subjected to a shear force of 375kN. Also find the shear centre of this channel section. **(10)**



**Fig.2**

[ Turn over

3. An angle section  $120 \times 80 \times 6$  mm (Fig 3) is used as a simple supported beam over a span of 6 m. If the permissible stress is 80 MPa both for the tensile and compressive, find the uniformly distributed load (UDL) that the beam can carry. Assume the load is passing through the shear centre of the section. **20**



**Fig.3**

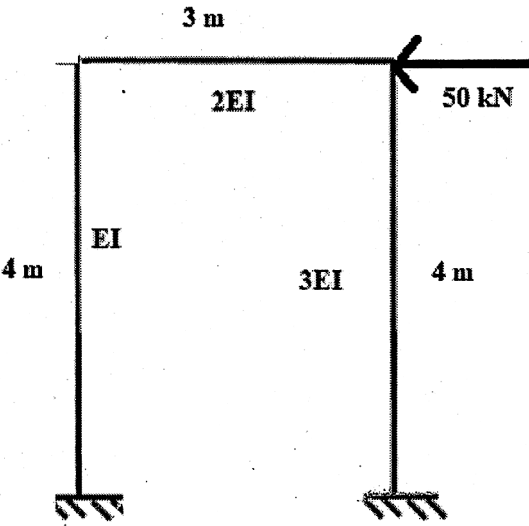
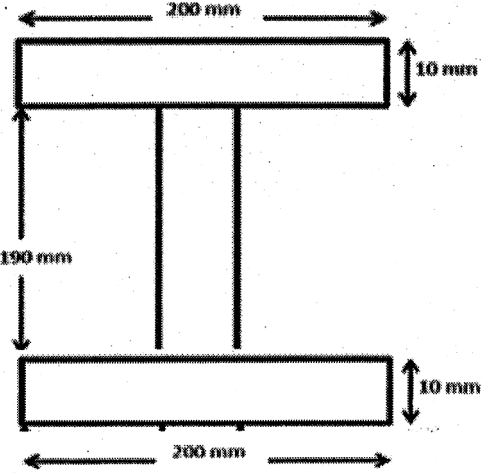
**B.E. CIVIL ENGINEERING THIRD YEAR SECOND SEMESTER EXAM 2024**

**Theory of Structures-II  
PART-II**

Time: Three Hours

Full Marks 100  
(40 marks for 2<sup>nd</sup> 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	<p>Analyze the following portal frame by column analogy method and draw the Bending moment diagram.</p> 	12
2 (a)	<p>Find the Shape factor of the following section.</p> 	6

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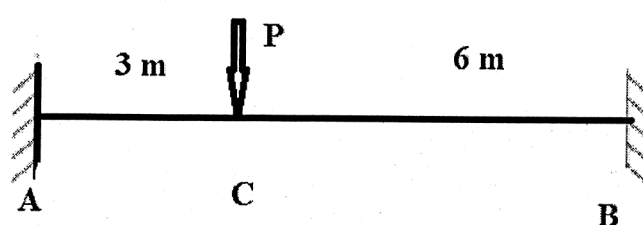
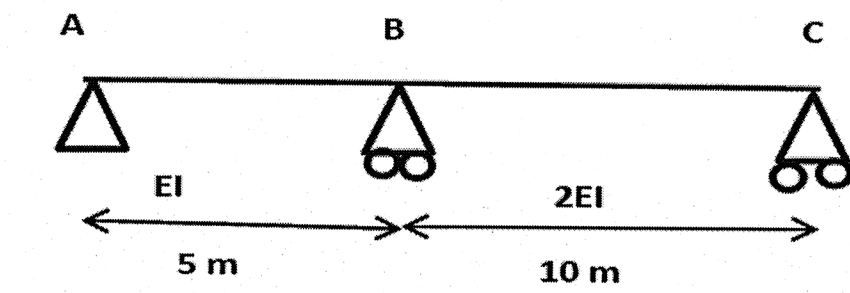
**Theory of Structures-II**

**PART-II**

Time: Three Hours

Full Marks 100  
(40 marks for 2<sup>nd</sup> 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)
2(b)	<p>Find out the ultimate load P by upper bound theorem and lower bound theorem, if the plastic moment carrying capacity of the beam is <math>M_p</math>.</p> 	7
3	<p>Find the maximum value of SFD at midpoint of AC of the beam ABC, if 10 kN concentrated load passes over ABC. The beam is made of M25 grade of concrete. <math>I=0.0864 \text{ m}^4</math>.</p> 	15