

Roll No.

3082

**B. Tech. 4th Semester (Civil)
Examination – May, 2023**

STRUCTURAL ANALYSIS

Paper : PCC-CE-206-G

Time : Three Hours]

[Maximum Marks : 75

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

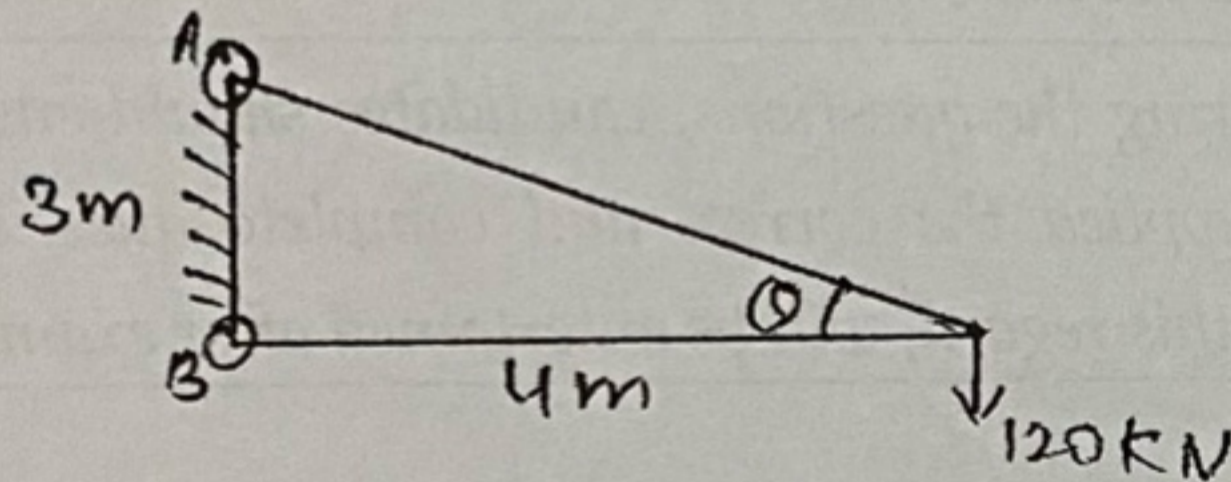
Note : Attempt five questions in all, selecting one question from each Section. Question No. 1 is compulsory. All questions carry equal marks.

1. Describe the following : 15
- (a) ILD for bending moment
 - (b) Kinematic indeterminacies
 - (c) Castigliano's 2nd theorem
 - (d) Horizontal thrust three hinge arch
 - (e) Applications of anchor cable

SECTION - A

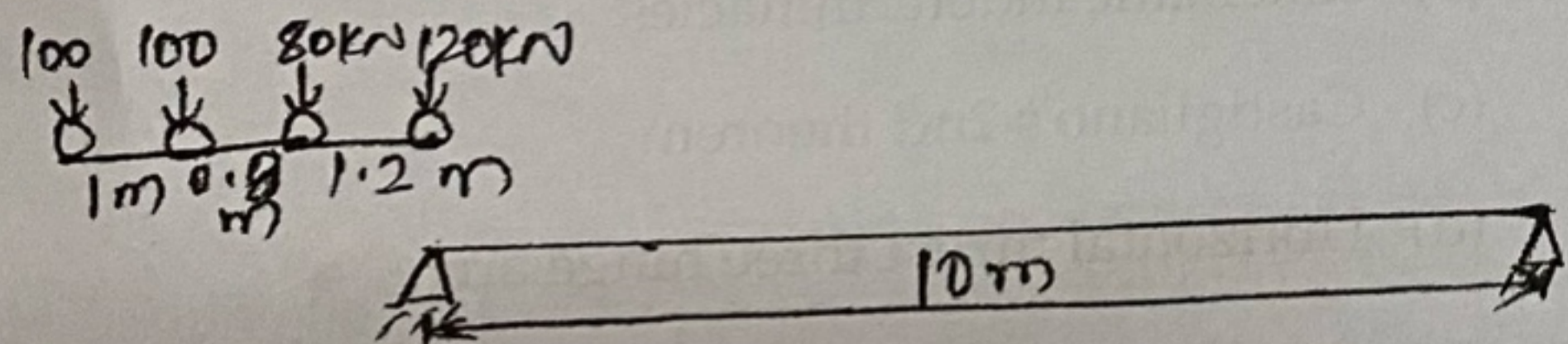
2. A beam ABCD is simply supported at A and D over a span of 10 m. The beam carries point loads 60 kN and 40 kN at a distance of 3 m and 6 m from the end A. Neglecting the weight of the beam find the slopes at A, B, C and D and the deflection at C and D. Take $I = 12 \times 10^8 \text{ mm}^4$ and $E = 200 \text{ kN/mm}^2$. 15

3. Find the vertical and horizontal deflection of joint C of truss shown in fig. The area of the inclined tie is 2000 mm^2 while the area of the horizontal member is 1600 mm^2 . Take $E = 210 \text{ kN/mm}^2$. 15

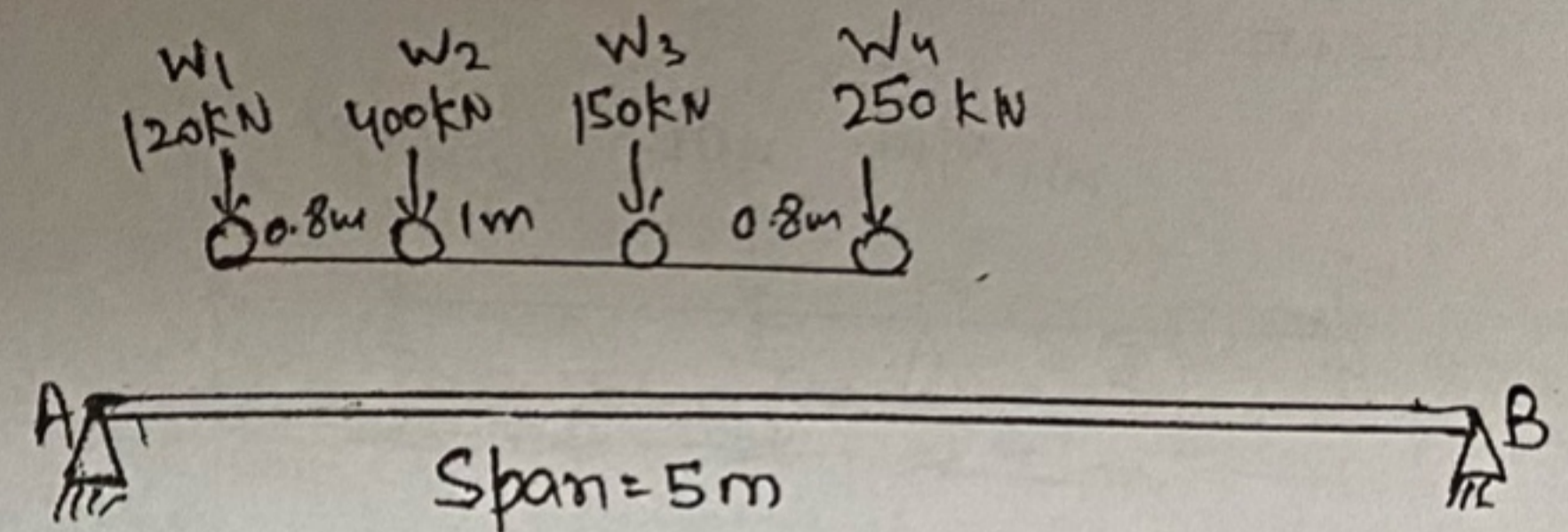


SECTION - B

4. The load system as shown in fig. moves from left to right on a girder of span 10 meters. Find the maximum bending moment which can occur under the 80 kN load. 15



5. The wheel load system shown in fig. can move a girder of span of 5 m. Find the maximum positive and negative force for the girder. 15



SECTION - C

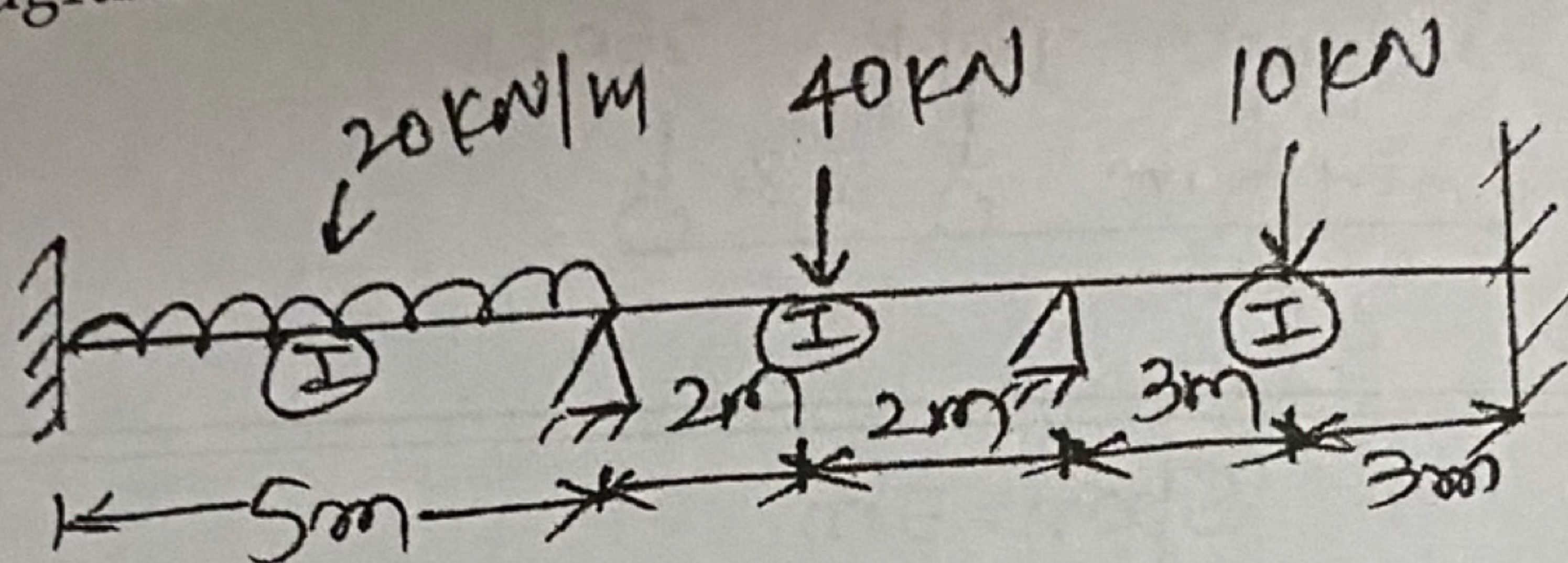
6. A three hinged parabolic arch has a span of 40 m and rise of 7 m. It subjected to a uniformly distributed load of 80 kN acting at 10 m from the right support, find the 15

- (i) Horizontal thrust and vertical reaction on supports
- (ii) Normal thrust and radial shear

7. The three hinged stiffened girder of a suspension bridge of span 120 m is subjected to a two point loads of 240 kN and 300 kN at a distance of 25 m and 80 m from left end. Find the shear force and bending moment for the girder at a distance of 40 m from left end. The supporting cable has a central dip of 12 m. Find also the maximum tension in the cable. 15

SECTION - D

8. Analysis the following beam using slope and deflection method and draw its bending moment diagram. 15



9. Analysis the following frame using Kani's Method. 15

