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Total Number of Pages : 03

B.Tech
PCI51101

5th Semester Regular / Back Examination 2018-19

STRUCTURAL ANALYSIS - II

BRANCH : CIVIL

Time : 3 Hours

Max Marks : 100

Q.CODE : E380

Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.

The figures in the right hand margin indicate marks.

Part- I

Q1 Short Answer Type Questions (Answer All-10)

(2 x 10)

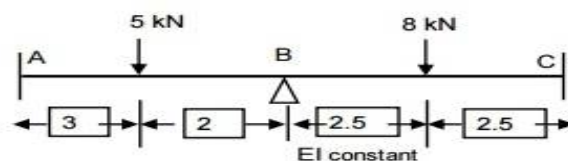
- Define carry over moment and distribution factor.
- How do you account for sway in slope deflection method for portal frames?
- Define Rotation factor.
- What are cable structures? Mention the different types of cable structures.
- Give the range of central dip of a cable. Give the expression for determining the tension T in the cable.
- What are the different methods of analysis of indeterminate structures?
- Write the element flexibility matrix for a truss member & for a beam element.
- Define shape factor.
- Define plastic modulus of a section Z_p .
- What are unsymmetrical frames and how are they analyzed?

Part- II

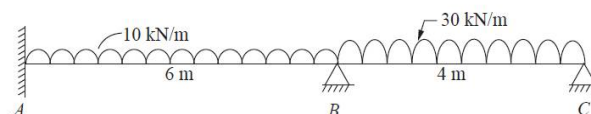
Q2 Focused-Short Answer Type Questions- (Answer Any EIGHT out of TWELVE)

(6 x 8)

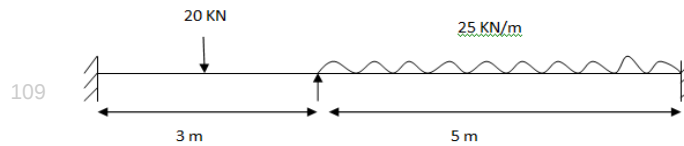
- A beam ABC, 10m long, fixed at ends A and C is continuous over joint B and is loaded as shown in Fig. Using the slope deflection method, compute the end. The beam has constant EI for both the spans.



- Analyse the continuous beam shown in Fig by moment distribution method. The beam is of uniform section.

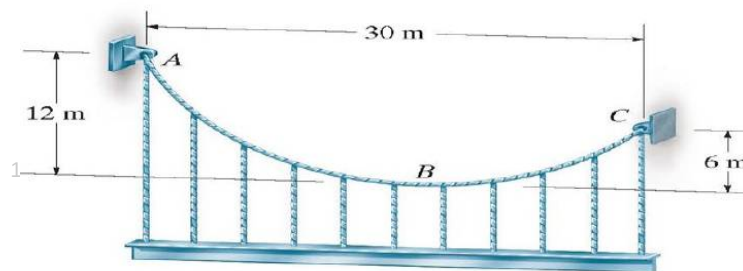


c) Analyse the beam as shown in Fig. by kani's method.



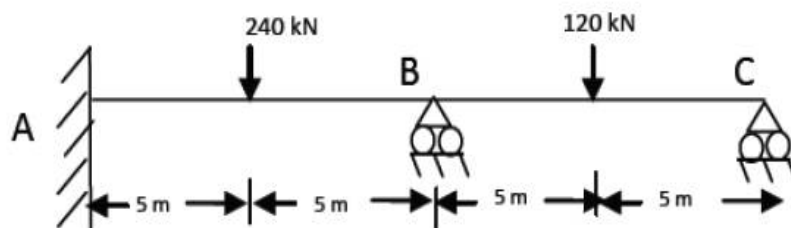
d) A two hinged parabolic arch of span 20 m and rise 4 m is loaded with a uniformly distributed load of 100 kN/m over the left half of the span and a concentrated load of 80 kN at the midpoint of the right half of the arch. Calculate the horizontal reaction at a section just to the right of concentrated loads.

e) The cable supports a girder which weighs 12kN/m. Determine the tension in the cable at points A, B & C.



f) A suspension cable is supported at 2 points 25m apart .The left support is 2.5m above the right support. The cable is loaded with a uniformly distributed load of 10kN/m throughout the span. The maximum dip in the cable from the left support is 4m.Find the maximum and minimum tensions in the cable.

g) Analyze the continuous beam shown in figure below. Assume EI is constant. Use matrix flexibility method.



h) Compare flexibility method and stiffness method.

i) A two span continuous beam ABC is fixed at A and C and rests on simple support at B. All the three supports are at same level. The span AB=4.5m and span BC=6.3m. The span AB carries a uniformly distributed load of 48kN/m and span BC carries a central point load of 75kN. EI is constant for the whole beam. Find the moments at all the support Using stiffness method.

j) Derive the shape factor for a Triangular section.

k) Explain the lower and upper bound theorem.

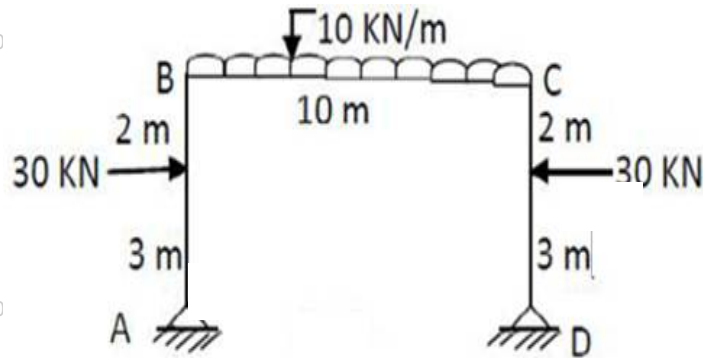
l) List out the assumptions made for plastic analysis.

Part-III

Long Answer Type Questions (Answer Any TWO out of FOUR)

Q3

Analyse the structure shown in figure using Kani's method and draw BMD. (16)

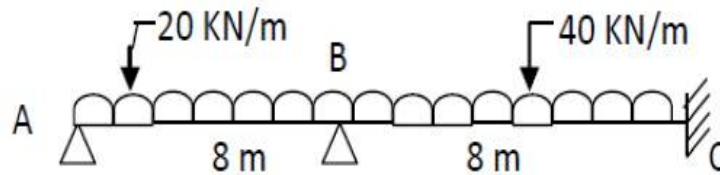


Q4

A two hinged parabolic arch of span 30m and rise 6m carries a uniformly distributed load of 20kN/m covering a distance of 12m from left end. Find the horizontal thrust and the reactions at the two supports. Also calculate the maximum hogging moment in the arch. (16)

Q5

Analyse the beam shown in figure using flexibility matrix method if the support B' sinks by 50 mm. $E = 25 \times 10^3$ MPa, $I = 140 \times 10^3$ cm⁴. (16)



Q6

Calculate the collapse load for the beam shown in figure below. (16)

