

**B.TECH
(SEM V) THEORY EXAMINATION 2019-20
STRUCTURAL ANALYSIS**

Time: 3 Hours

Total Marks: 100

Note: Attempt all Sections, If require any missing data; then choose suitably.

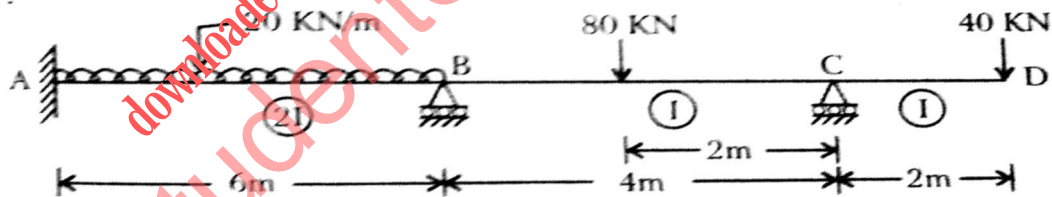
SECTION A

1. Attempt all questions in brief. 2X10=20
- a. Write the slope deflection equations explaining the notations used.
 - b. What do you mean by carry over moment ?
 - c. What is flexibility & Stiffness matrix ?
 - d. What do you mean by restrained structure ?
 - e. What are the basic theorems for finding collapse load ?
 - f. What do you mean by compatibility condition ?
 - g. Two hinged arch is a indeterminate structure .Why ?
 - h. What is influence line diagram ?
 - i. What is meant by relative stiffness of a member ?
 - j. How horizontal thrust can be obtained by using castigliano;s theorem ?

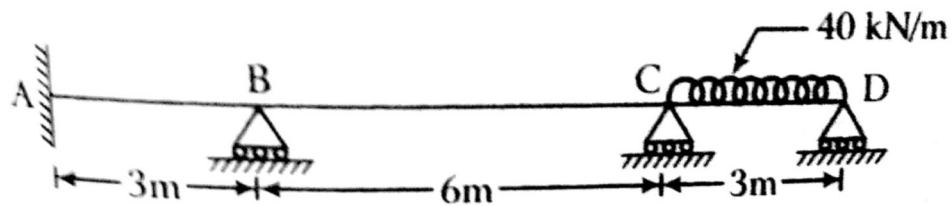
SECTION B

2. Attempt any three of the following. 10X3=30

- a. Analyse the beam by using slope deflection method and draw BMD.



- b. A two hinged parabolic arch of span 30 m and rise 6 m carries two point loads, each 60 kN, acting at 7.5 m and 15 m from the left end respectively. Determine the horizontal thrust and maximum positive and negative moment in the arch.
- c. Derive an expression for Effect of temperature on cable.
- d. Analyse the continuous beam by flexibility matrix method . If the support B of the continuous beam has a downward settlement of 30 mm .Take $EI = 5600 \text{ KN-m}^2$

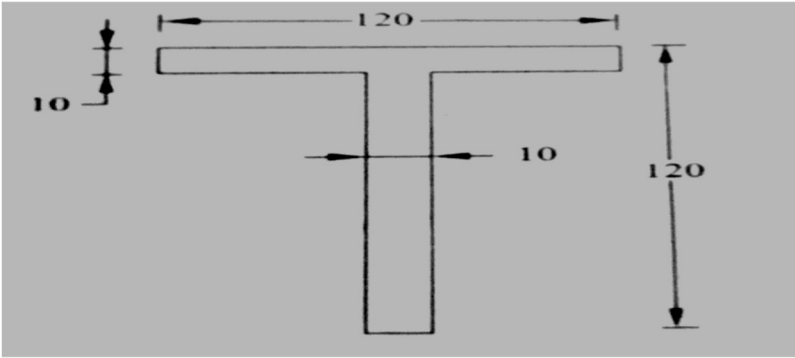


- e. Define Shape factor and obtain its value for T –Section with the following dimension shown in fig. If the yield stress is 250 N/mm^2 . Find plastic moment capacity of section.

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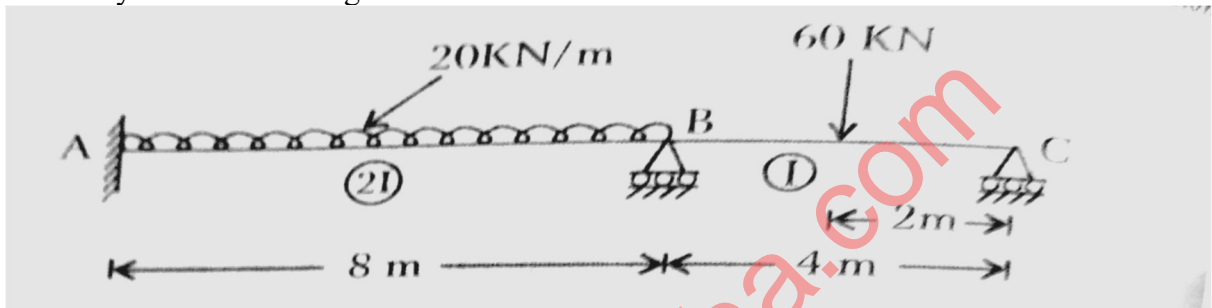
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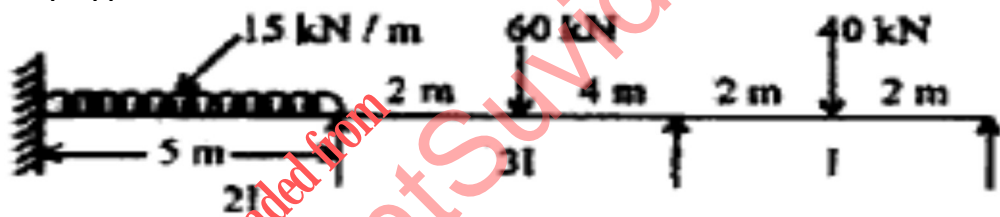
SECTION C

3. Attempt any one part of following. **10X1=10**

a. Analyse the beam using Moment Distribution method.

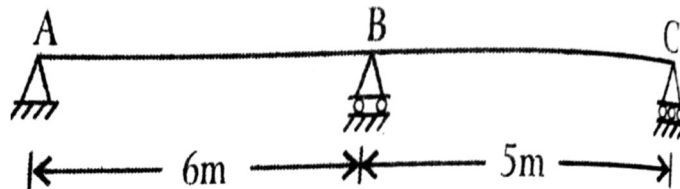


b. Determine reactions at the supports and draw bending moment and shear force diagram for the propped cantilever beam.



4. Attempt any one part of following. **10X1=10**

- a. Determine the horizontal thrust developed in a semicircular arch of radius 'R' subjected to a concentrated load 'W' at the crown.
- b. Explain Muller Breslau Principle. Using the principle draw the influence line diagram for reaction at B in the continuous beam shown. Take EI as constant



5. Attempt any one part of following. **10X1=10**

- a. A foot bridge is carried over a river of span 90 m, the supports are 3 m & 12 m highest than the lowest point of the cable. Determine the length of the cable. If the horizontal deck is located by UDL of 20 kN/m, find the tension in the cable.
- b. A three hinged stiffening girder of a suspension bridge of span 100 m is subjected to two point loads of 200 kN and 300 kN at a distance of 25 m & 50 m from left end. Find the shear

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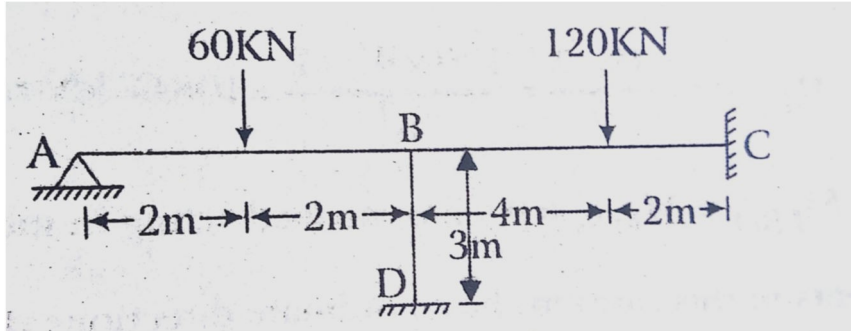
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force and bending moment for girder at a distance 30 m from left end. The supporting cable has a central dip of 10 m. Find also the max tension & slope in the cable.

6. Attempt any one part of following.

10X1=10

- a. State & establish relation between flexibility and stiffness matrix.
- b. Analyse the frame shown in fig. by stiffness matrix method. Take EI as constant throughout.



7. Attempt any one part of following.

10X1=10

- a. Explain methods of Plastic analysis & Derive the safe factor for Rectangle and Circular sections.
- b. Determine the collapse load for the frame shown in fig.

