Printed Pages:03 **Sub Code: NCE 504**

Paper Id: 100504 **Roll No.** | | | | | | | | | | |

B. TECH.
(SEM V) THEORY EXAMINATION 2018-19
STRUCTURAL ANALYSIS-II

Time: 3 Hours ***Total Marks: 100***

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

SECTION A

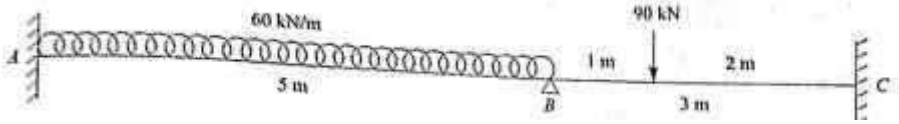
1. Attempt *all* questions in brief. 2 x 10 = 20

a. What are the limitations of slope deflection method?
b. List the methods for analysis of indeterminate structure.
c. State Muller Breslau principle.
d. Draw influence line diagram for horizontal thrust of two hinged arch..
e. What are the limitations of load factor concept?
f. Name the type of support on which the forces on anchor cable and towers depend.
g. What is the effect of varying the dip on the horizontal thrust?
h. What are the advantages and disadvantages of matrix methods?
i. What do you mean by flexibility matrix?
j. Define the term shape factor and plastic hinge.

SECTION B

2. Attempt any *three* of the following: 10 x 3 = 30

a. Determine the support moments and reactions for the continuous beam as shown in figure by slope deflection method. Draw also B.M. diagram.



b. A two hinged semicircular arch of radius R carries a concentrated load W at the crown. Find the vertical deflection of the crown. Assume uniform flexural rigidity.
c. Draw the ILD for bending moment and shear force at any section in three hinged stiffening girder.
d. What is stiffness matrix? Give the step of stiffness matrix method for analysis of indeterminate beam.
e. A beam fixed at both ends and is subjected to a uniformly distributed load 'w' per unit length on the right half portion. Determine the value of collapse load W_c . The beam is of uniform plastic moment.

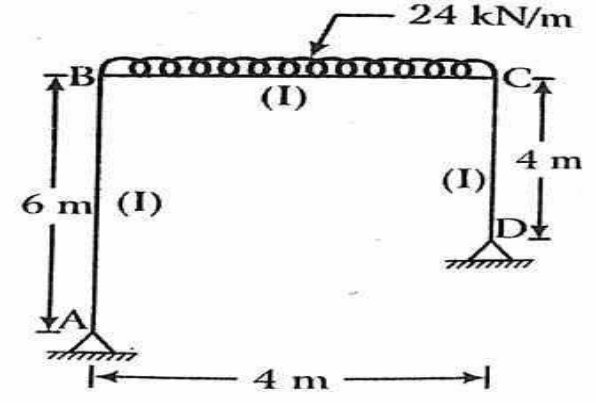
SECTION C

3. Attempt any *one* part of the following: 10 x 1 = 10

(a) A continuous beam ABCD is simply supported at A, B, C and is fixed at D. The span AB, BC and CD are 3m, 4 m and 2m long. The beam carries a point load of 12 KN on AB at 2 m from A, a point load of 20 KN at the middle of BC and a point load of 6 KN at middle of CD. If $I_{ab} : I_{bc} : I_{cd} = 1:2:2$, find the

supports moments using moment distribution method.

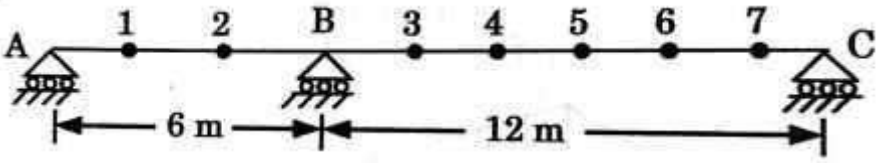
(b) Analyse the portal frame shown in figure by strain energy method.



4. Attempt any *one* part of the following: 10 x 1 = 10

(a) A two hinged parabolic arch has span of 20 m and a rise of 5 m and carries a UDL of 20 KN/m for a distance of 5 m from the left end. Determine the horizontal thrust at each support, bending moment , normal thrust and radial shear at a section of the arch 5 m from the left end

(b) Using Muller Breslau Principle, compute the influence line obtained at 2 m intervals for moment at mid span of BC of the continuous beam ABC shown in figure below:



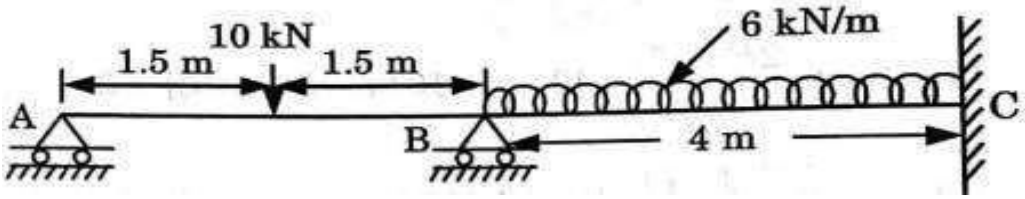
5. Attempt any *one* part of the following: 10 x 1 = 10

(a) A suspension bridge of span 80 m and width 6 m having two cables stiffened with two hinged girders. The central dip of the cable is 8 m. the dead load on the bridge is 5 KN/m^2 and the live load is 10 KN/m^2 which covers the left half of the span. Determine the shear force and bending moment at20 m from the left end. Find also the maximum tension.

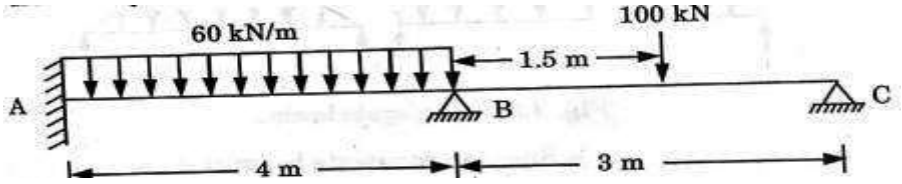
(b) The cables of a suspension bridge have a span of 60 m and central dip of 7.5 m. Each cable is stiffened by a girder hinged at the ends and also at the middle so as to retain a parabolic shape for the cables. The girder is subjected to a dead load of 10 KN/m and a live load of 20 KN/m, 15 m long. Find the maximum tension in the cable when the leading edge of the live load is just at the centre of the girder. Draw also S.F. and B.M. diagrams for the girder.

6. Attempt any *one* part of the following: 10 x 1 = 10

(a) Analyse the continuous beam shown in figure by stiffness matrix method. Take EI is constant.



(b) Analyse the continuous beam shown in figure by flexibility matrix method.



7. Attempt any *one* part of the following: 10 x 1 = 10

(a) A two span continuous beam ABC has span lengths AB = 6 m and BC = 6 m and carries a UDL of 30 KN/m on entire length of the beam. A and C are simply supports. If the load factor is 1.80 and the shape factor is 1.15 for the I – section. Find the section modulus needed. Assume yield stress for the material is 250 N/mm^2.

(b) Determine the plastic modulus and the shape factor for the T section shown in figure. All dimension in mm.