****Last Date of Submission …….** **Section CE 31/CE 32**

Babu Banarasi Das -National Institute of Technology & Management, Lucknow

B. Tech Third Year (Fifth Semester) 2018-19

Department of Civil Engineering

Design of Structure-1 (RCE- 502)

Assignment: I (Unit 1)

1:- Define stiffness of the member.

2:- Define distribution factor.

3:- Explain 'Force method' by simple example.

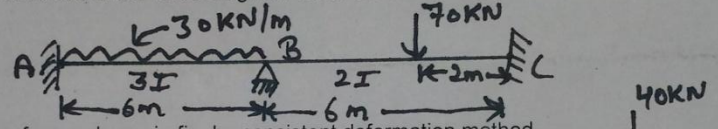
4:- What are the limitations of slop deflection method?

5- Write the slop deflection equations explaining the meanings of notations used.

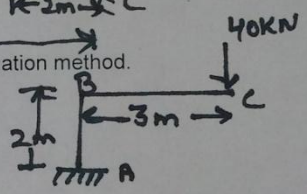
6:- What are the assumptions are made while developing slope deflection method?

7:- Explain non-sway and sway type of portal frames with diagrams.

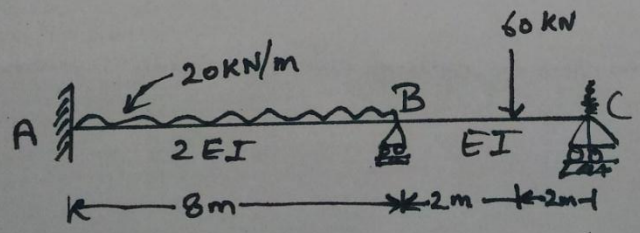
8:- Analyse the continuous beam shown in fig. by moment distribution method and draw bending moment and shear force diagram. Draw the elastic curve also.



9:- Analyse the frame shown in fig. by consistent deformation method.



10:- Analyse the continuous beam shown in fig. by slop deflection method. Also draw bending moment diagram.



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Department of Civil Engineering

Design of Structure-1 (RCE- 502)

Assignment: 2 (Unit 2)

1:- Two hinged arch is a indeterminate structure. Why?

2:- State Muller-Breslau principle.

3:- Explain normal thrust and radial shear in brief.

4:- Draw influence line diagram for horizontal thrust.

5: How horizontal thrust can be obtained by using castigliano theorem?

6:- A two hinged parabolic arch of span 'L' and rise 'h' carries a concentrated load 'W' at the crown.Determine the expression for horizontal thrust developed at springing.

7:- 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.

8:- A two hinged parabolic arch of span 20 m and rise 4 m carries a uniformly distributed load of 50 kN/m On the left half of the span. Find the reactions at the supports and the position and amount of maximum bending moment.

9:- A two hinged parabolic arch of span 25 m and rise 5 m carries a uniformly distributed load of 40kN/m over the left half of the span and a concentrated load of 100 kN at the crown. Find the horizontal thrust at each support.

10:- A two hinged parabolic arch has a varying moment of inertia given by $I = I_o \sec \theta$. It has a span of 40 m and a central rise of 8 m. Calculate the maximum positive and negative bending moments at a section D 12 m from the left support, due to a moving point load of 6 kN

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Design of Structure-1 (RCE- 502)

Assignment: 3 (Unit 3)

1:- What is the range of central dip of cable?

2:- What is the shape of cable under self weight?

3:- What is the effect of varying the dip on the horizontal thrust.

4:- What is the effect of temperature change in the cable?

5:- A cable is suspended from point A and B, which are 80 m apart horizontally and are atdifferent levels, the point A being 5 m vertically higher than the point B and the lowest point in the cable is 10 m below A. The cable is subjected to a uniformly distributed load of 30 kN/m over the horizontal span. Determine the horizontal and vertical reactions at the each end and also the maximum tension in the cable. Also calculate the total length of the cable.

6:- A bridge cable is suspended from tower 80 m apart and carries a load of 30 kN/m on the entire span.If the maximum sag is 8 m, calculate the maximum tension in the cable. If the cable is supported by saddle which are stayed by wires inclined at 30^0 to the horizontal, determine the forces acting on the tower. If the same inclination of back stay passes over pulley, determine the forces on the towers.

7:- A cable of span 120 m and dip 10 m carries a load of 6 kN/m on the horizontal span. Find the maximum tension in the cable and the inclination of the cable at the support. Find also forces transmitting to the supporting pier, if the cable passes over smooth pulley on the top of pier. The anchor cable is at 30^0 to the horizontal. Determine the maximum bending moment for the pier if the height of the pier 15 m.

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

9:-- A cable of span 20 m and dip 4 m carries a uniformly distributed load of 20 kN/m over the whole Span. Find the

(i) Maximum tension in the cable (ii) Minimum tension in the cable ,(iii) The length of the cable.

10:- What is suspension bridge? Explain main components of suspension bridge with neat sketch.

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Design of Structure-1 (RCE- 502)

Assignment: 4 (Unit 4)

1:- What do you mean by flexibility and stiffness matrix?

2:- The flexibility method is also known as force method, compatibility method. Give reasons.

3:- What are the advantages and disadvantages of matrix method?

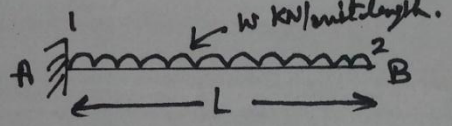
4:- What do you mean by restrained structure and how it is formed?

5:- What are different approaches to matrix method?

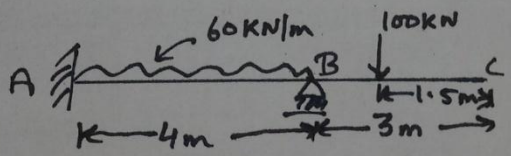
6:- The stiffness method is also known as displacement method or equilibrium method. Why?

7:- What is the relationship between flexibility and stiffness matrices.

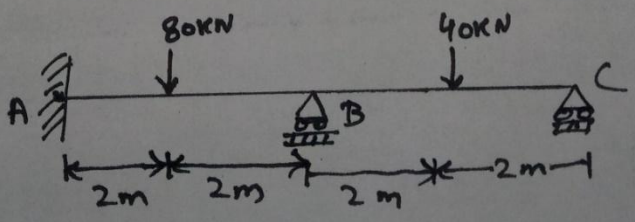
8:- Derive the flexibility matrix for the cantilever with co-ordinates as shown in fig. Take EI is constant.



9:- Develop the stiffness matrix for the beam element shown in fig.



10-:- Analyse the continuous beam shown in fig. by flexibility matrix method. Take EI is constant



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Design of Structure-1 (RCE- 502)

Assignment: 5 (Unit 5)

1:- What is the shape factor.

2:- What do you mean by plastic bending of beam?

3:- Explain collapse mechanism.

4:- What are the limitations of load factor concept?

5:- What are the methods of plastic analysis?

6:- Determine the shape factor of any rectangular section and a circular section.

7:- A mild steel I-section 200 mm wide and 250 mm deep has a mean flange thickness of 20 mm and a web thickness of 10 mm. Calculate the shape factor. Also find the fully plastic moment if σ_y = 252 N/mm^2

8:- A beam fixed at both ends and is subjected to a uniformly distributed load 'w' per unit lengt on the right half portion. Determine the value of collapse load Wc. The beam is of uniform plastic moment Mp.

9:- State upper bound and lower bound theorems for collapse load.

10:- Differentiate between plastic modulus and section modulus.