) The towers of a 150m span suspension bridge are of unequal heights. One is 20 m and the other is 5 m above the lowest point of the cable which is immediately above the inner pin of the three-hinged stiffened girder hinged at the towers. Find the maximum tension in the cable due to a point load of 100 kN crossing the bridge.

2.5 (a) Explain the mechanism method of plastic analysis.

(b) Define shape factor and collapse load factor.

(c) Take a numerical example of a fixed beam of moment capacity M_P suitably loaded and explain the determination of collapse load factor and verify the result by applying a statical check.

Total No. of pages 02 Roll No._____

V th SEMESTER B.Tech.[Evening][Civil Engg.]

Branch/ Group code

END SEMESTER SUPPLEMENTARY EXAMINATION FEB. 2019

CCE301 **Analysis of Indeterminate Structures**

Paper Code Title of the Subject

Time: 03 Hours **Max. Marks: 50**

Note: Attempt all five questions. Attempt any two options out of three from each. Assume suitable missing data if any. If required, take EI and AE as flexural and axial rigidities. All questions carry equal marks.

Q.1(a) Analyze the fixed beam shown in figure 1(a) using the method of consistent deformation and determine the fixed end moments.

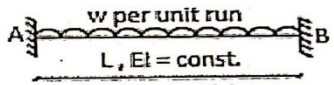


Figure 1(a)

(b) Analyze the two-span beam shown in figure 1(b) below using the strain energy method and draw the BMD. Take $R_B^V = Q$ as redundant.

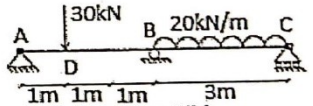


Figure 1(b)

(c) Obtain the influence coefficients at quarter span points to draw ILD for the two-span beam shown in figure 1(c) below using conjugate beam method and draw the ILD for R_A^V. Take EI = Constant.

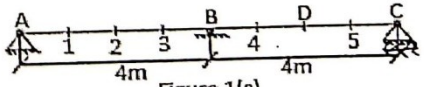
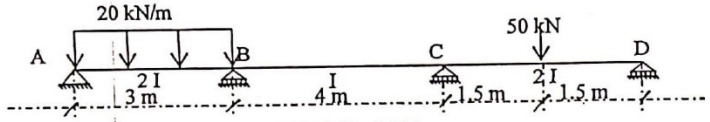


Figure 1(c)

Q.2 (a) Analyze the three-span beam shown in figure 2(a) below using moment distribution method. Draw the BMD.



FIGURE– Q2(a)

(b) Analyze the frame shown in figure 2(b) below using slope deflection method. Draw the BMD for the frame.

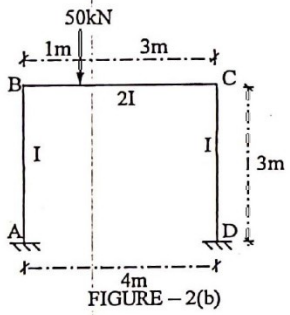


FIGURE – 2(b)

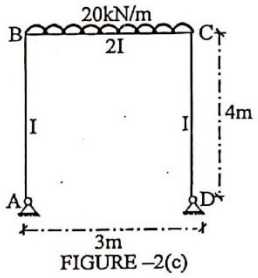


FIGURE –2(c)

(c) Analyze the frame shown in figure 2 (c) above using moment distribution method. Draw the BMD for the frame.

Q.3(a) Analyze the truss shown in figure 3(a) below using the flexibility method. Take AE constant for all the members. Determine forces in all the members. Take $F_{BD} = Q$ as redundant.

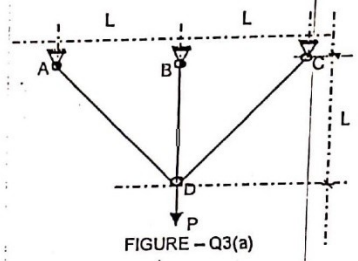


FIGURE – Q3(a)

Q.3(b) Analyze the quadrangular frame as shown in figure 3(b) below having hinge at joint C, using the stiffness method. Draw BMD and SFD.Take EI = constant for all the members.

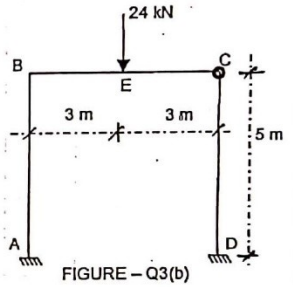


FIGURE – Q3(b)

(c) Explain Muller Breslau principle.

Q.4 (a) Analyze a two hinged symmetric parabolic arch having span L and rise f, subjected to a static udl w/run in full span length at crown level. Obtain reactions and draw BMD.

(b) A cable of span L carries equally spaced downward load P, at quarter span points. Verify that the cable takes the shape of a funicular polygon.