QPC: RJ20MTECH057 AR 19 Reg. No

# GIET UNIVERSITY, GUNUPUR – 765022

M. Tech (First Semester – Regular) Examinations, June – 2021

## MPCSE1030 – MATRIX METHOD OF ANALYSIS OF STRUCTURE

(Structural Engineering)

Time: 2 hrs Maximum: 50 Marks

**The figures in the right hand margin indicate marks.**

**PART – A** **(2 x 10 = 20 Marks)**

Q1. Answer **ALL** questions

a. Determine the degree of redundancy for a propped cantilever.

b. Determine the degree of kinematic indeterminacy for the rigid frame shown in Fig.1.

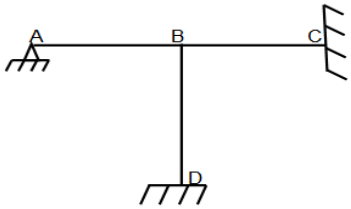


**Fig.1**

c. Why is it necessary to have local co-ordinates or element co-ordinates?

d. What are the transformation matrices?

e. What is the element flexibility matrix for a truss member?

f. Write the relationship between flexibility and stiffness matrix.

g. Define the term : stiffness co-efficient.

h. "The stiffness method is also called as a displacement method". Justify this statement.

i. Why does the stiffness method preferred by software for structural analysis?

j. Find the indeterminacy of space rigid frame as shown in Fig. 2?

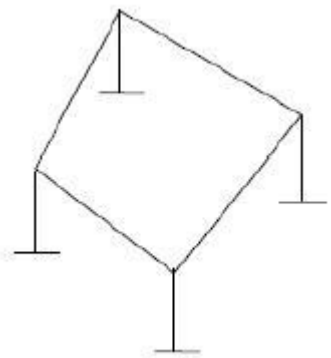

**Fig. 2**

**PART – B** **(6 x 5 = 30 Marks)**

Answer ***ANY FIVE*** questions **Marks**

2. Derive the stiffness matrix for the frame with respect to the reference co-ordinates as shown in Fig. 3. Assume EI = 1 and L = 1 unit. **(6)**

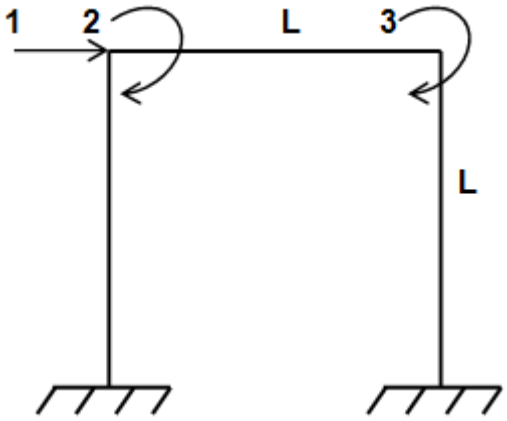


**Fig. 3**

3. Analyse the continuous beam shown in Fig. 4 by flexibility matrix method. Assume EI as constant. Also, draw the BMD. **(6)**

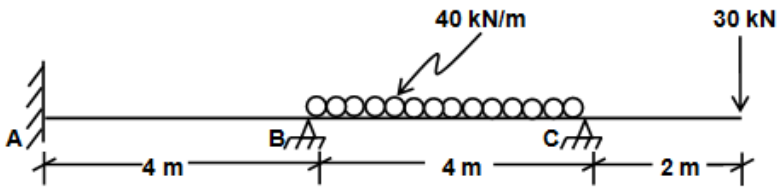


**Fig. 4**

4. A portal frame is shown in Fig. 5 is subjected to a clockwise moment of 50 kNm at B. Analyse the frame by flexibility method. Assume flexural rigidity is constant for all the members. **(6)**

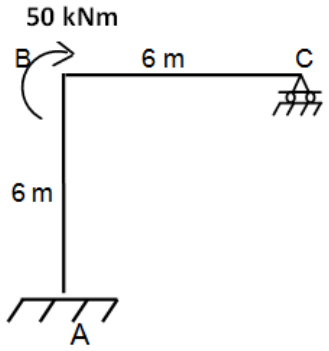


**Fig. 5**

5. Analyse the continuous beam shown in Fig. 6 by stiffness method. Assume flexural rigidity as constant for all the members of the beam. Also, draw the BMD. **(6)**

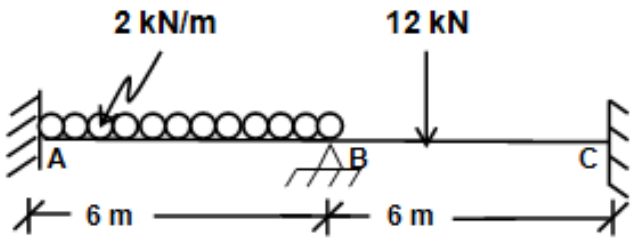


**Fig. 6**

6. Analyse the pin-jointed plane truss shown in Fig. 7 by stiffness matrix method. **(6)**

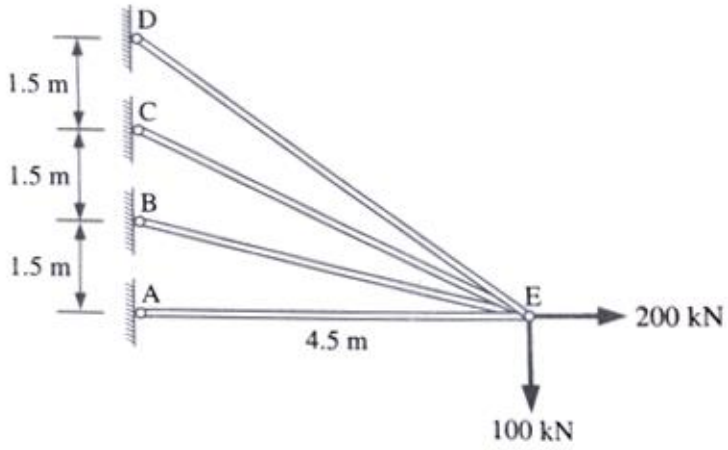


**Fig. 7**

7. Analyse the frame shown in Fig. 8 by displacement matrix method. **(6)**

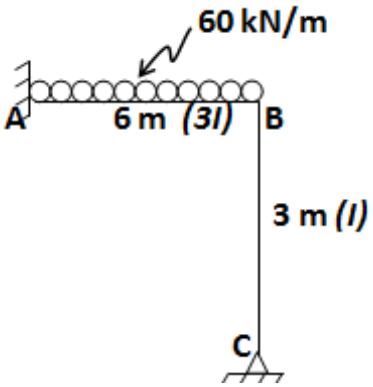


**Fig. 8**

8. Briefly explain various attempts made to reduce memory requirement in storing stiffness matrix **(6)**

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