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Question Paper Code	11593
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**B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV/DEC 2022**

Fifth Semester

**Civil Engineering**

**20CEPC504 - STRUCTURAL ANALYSIS I**

(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

**PART - A (10 × 2 = 20 Marks)**

Answer ALL Questions

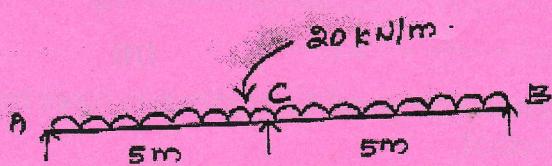
- | 1.  | Define degree of redundancy.                              | <i>Marks,<br/>K-Level, CO</i> |
|-----|---|-------------------------------|
| 2.  | Classify statically redundant structures.                 | 2,K1,CO1                      |
| 3.  | What are the assumptions made in slope-deflection method? | 2,K1,CO2                      |
| 4.  | Explain the use of slope deflection method.               | 2,K1,CO2                      |
| 5.  | Explain the relative stiffness factor.                    | 2,K1,CO3                      |
| 6.  | Explain carry over factor with a sketch.                  | 2,K2,CO3                      |
| 7.  | What is a primary structure in matrix flexibility method? | 2,K1,CO4                      |
| 8.  | Write the element flexibility matrix for a beam member.   | 2,K1,CO4                      |
| 9.  | Give the methods of matrix analysis.                      | 2,K1,CO5                      |
| 10. | Suggest a primary structure for the following beam        | 2,K2,CO5                      |



**PART - B (5 × 13 = 65 Marks)**

Answer ALL Questions

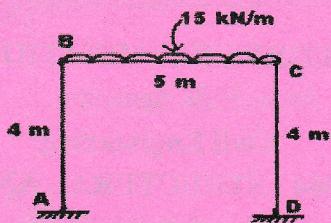
11. a) Solve using Strain energy Method and Draw the SF and BM diagram. 13,K3,CO1



**OR**

b) Solve using strain energy method

13,K3,CO1



12. a) Analyze the continuous beam ABC shown in figure by slope deflection method. Draw also the bending moment diagram. Take EI = constant.

13,K3,CO2

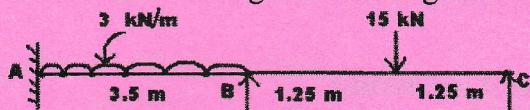
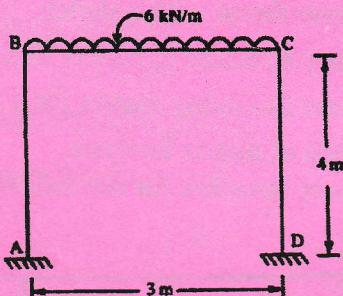


Fig.

OR

- b) Solve using Slope Deflection Method and Draw the BM diagram.

13,K3,CO2



13. a) Analyse the beam shown in figure by moment distribution method and draw the SFD and BMD. Take EI = constant.

13,K3,CO3

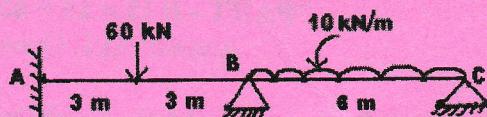
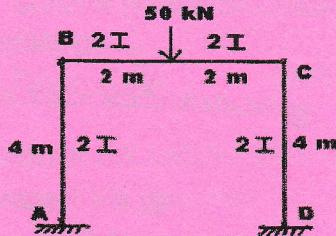


Fig.

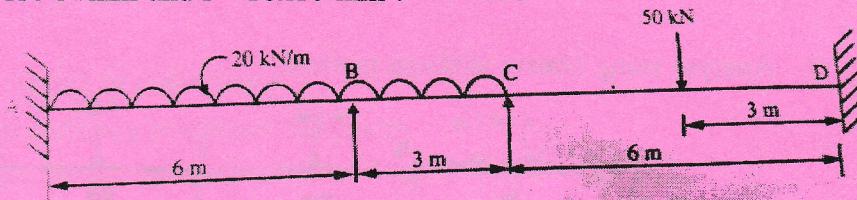
OR

- b) Analyse the portal frame shown in figure by moment distribution method.

13,K3,CO3

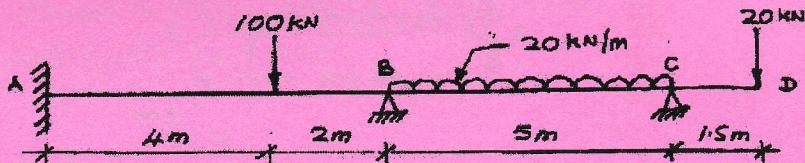


14. a) Analyse the continuous beam ABCD shown in figure by slope deflection method. The support B sinks by 10mm. Take  $E = 2 \times 10^5 \text{ N/mm}^2$  and  $I = 16 \times 10^7 \text{ mm}^4$ . 13,K3,CO4

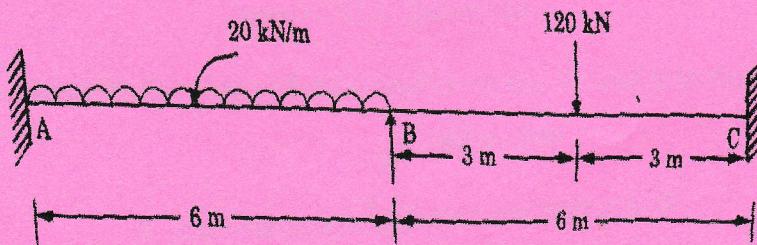


**OR**

- b) Analyse the continuous beam ABCD shown in figure by slope deflection method. The support B sinks by 15mm. Take  $E = 200 \times 10^5 \text{ kN/m}^2$  and  $I = 120 \times 10^6 \text{ m}^4$ . 13,K3,CO4



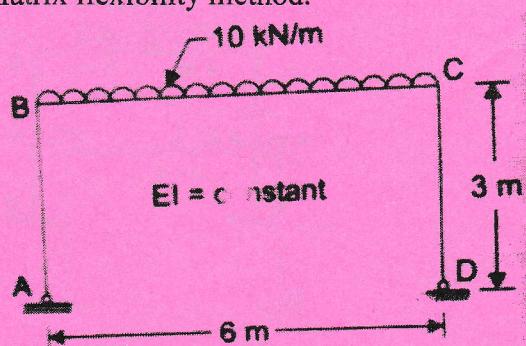
15. a) Analyse using Matrix flexibility method. 13,K3,CO5



**OR**

b) Analyse using Matrix flexibility method.

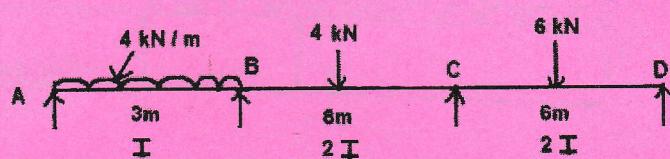
13,K3,CO5



**PART - C (1 × 15 = 15 Marks)**

16. a) Analyse using Matrix stiffness method.

15,K3,CO6



**OR**

b) Analyse using Matrix stiffness method.

15,K3,CO6

