Register No.: ..... Name: .....

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SIXTH SEMESTER B.TECH DEGREE EXAMINATION (R), MAY 2023
CIVIL ENGINEERING
(2020 SCHEME)

Course Code : **20CET302**

Course Name: **Structural Analysis – II**

Max. Marks : **100** **Duration: 3 Hours**

PART A

(Answer all questions. Each question carries 3 marks)

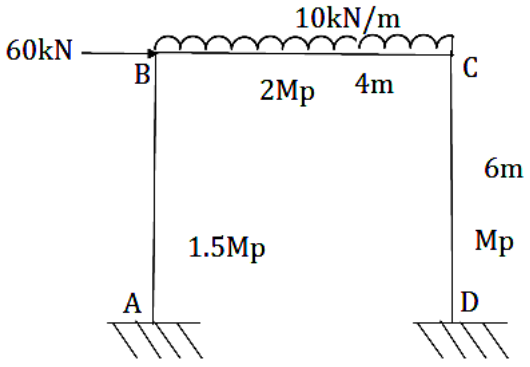
1. Derive the shape factor for a rectangular cross section.
2. Determine the collapse load in a simply supported beam with a point load at the midspan, if M_p is the plastic moment capacity of the beam.
3. Explain the assumptions in Portal method of analysis and Cantilever method of analysis.
4. Derive the relationship between stiffness and flexibility matrices.
5. Find the element stiffness matrix for an inclined truss element with two degree of freedom per node.
6. What is stiffness influence coefficient?
7. Compare the elements used in a truss and flexural frame in planar structures.
8. Explain how to formulate global coordinates of stiffness matrix of an element from element coordinates.
9. What is logarithmic decrement?
10. What is meant by damping of a structure?

PART B

(Answer one full question from each module, each question carries 14 marks)

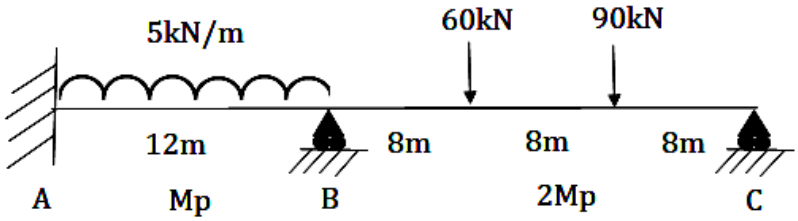
MODULE I

11. Find the plastic moment capacity of the given frame (14)



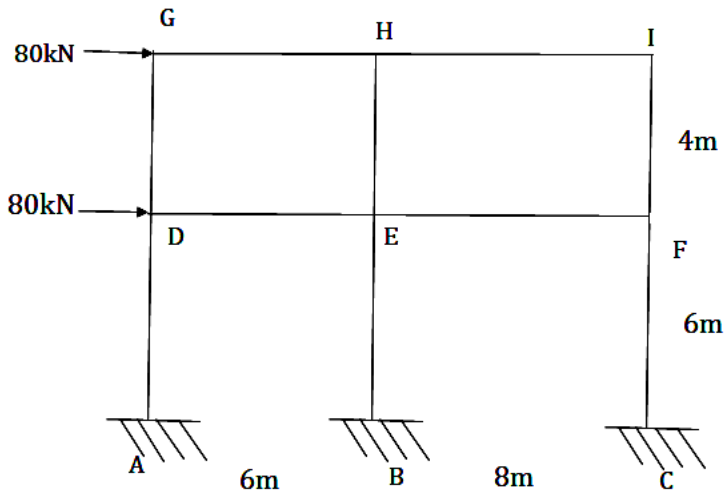
OR

12. A continuous beam ABC is loaded as shown in figure. Determine the plastic moment capacity if load factor is 1.2. (14)



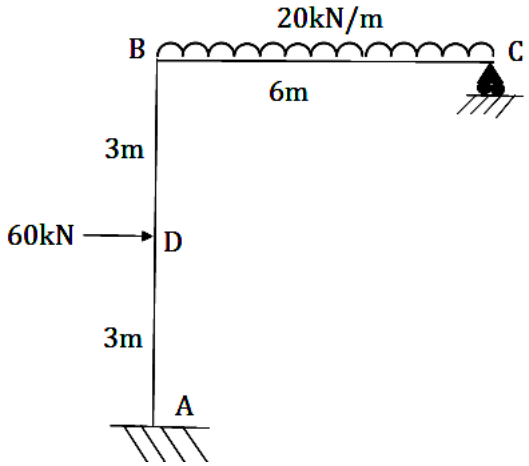
MODULE II

13. Analyse the given building frame using portal frame method. (14)



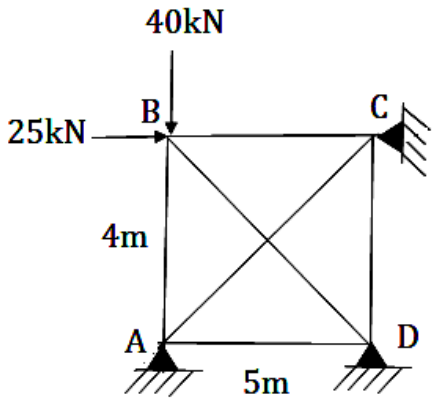
OR

14. Analyse the given frame by flexibility matrix method. (14)



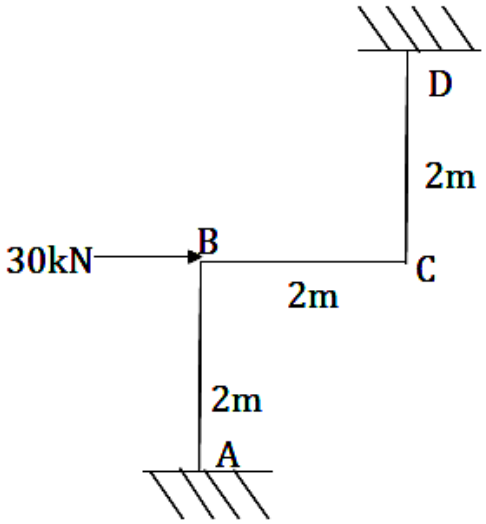
MODULE III

15. Analyse the given truss by matrix stiffness method. (14)



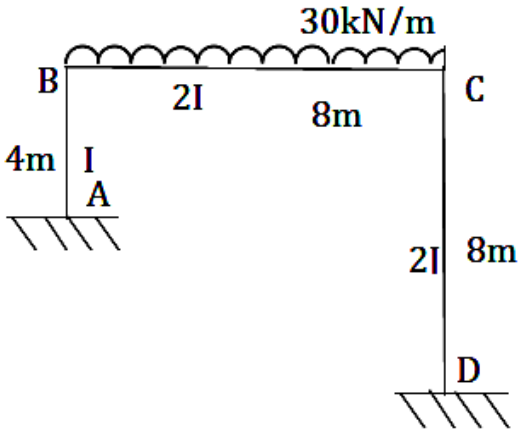
OR

16. Analyse the given frame using displacement transformation matrix (14)



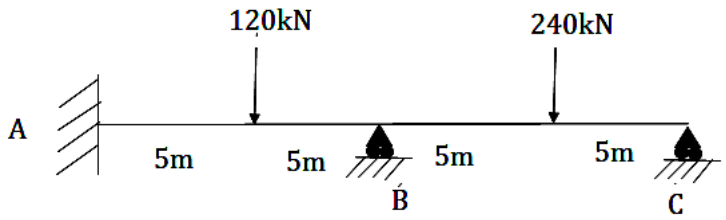
MODULE IV

17. Analyse the given frame using stiffness matrix method. (14)



OR

18. Analyse the given beam using stiffness matrix method. Assume constant EI. (14)



MODULE V

19. a) State and explain D'Alemberts principle. (4)
    b) Derive the equation of motion and expression for x(t) for the free undamped vibration of SDOF system. (10)

OR

20. a) A mass of one kg is suspended by a spring having a stiffness of 1N/mm. Find the natural frequency of the system and static deflection of the system. (7)
    b) Explain overdamped, underdamped and critically damped systems. (7)

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