A **281B2** **Total pages: 3**

Register No: …… Name: .....

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SIXTH SEMESTER B.TECH. DEGREE EXAMINATION(R,S), MAY 2024

B.Tech. 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)

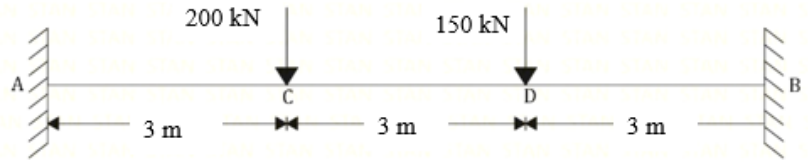
1. Find the shape factor of a beam with rectangular cross section.
2. Explain the concept of load redistribution in plastic analysis and its implications for structural design.
3. Define flexibility coefficient and stiffness coefficient.
4. Explain the general procedure followed in flexibility method of analysis.
5. Differentiate between bar element and beam element.
6. Discuss the properties of stiffness matrix.
7. Describe the basic governing equation in direct stiffness matrix method.
8. Differentiate between local coordinates and global coordinates.
9. Describe D'Alembert's principle.
10. Differentiate between (a) free and forced vibration, (b) damped and undamped system.

PART B

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

MODULE I

11. Find the plastic moment capacity of the beam shown below, at collapse loading condition. 14



OR

12. Analyse the frame of a multistorey building as shown below: 14

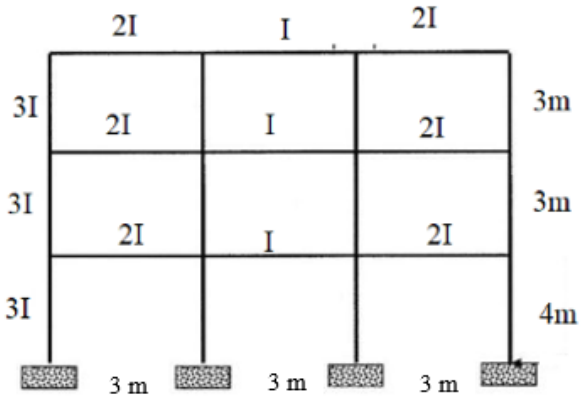
    Spacing of frames = 3 m

    DL on the floors = 4 kN/m^2

    LL on the floors = 3.5 kN/m^2

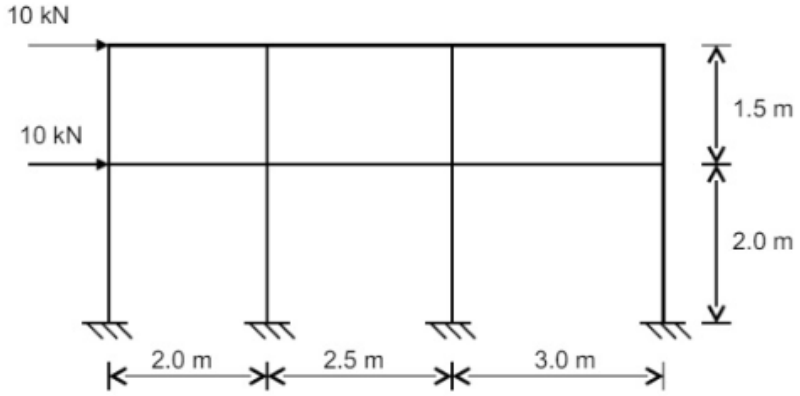
    Selfweight of beams = 3 kN/m for 3 m span

    Assume all columns have equal cross sections.



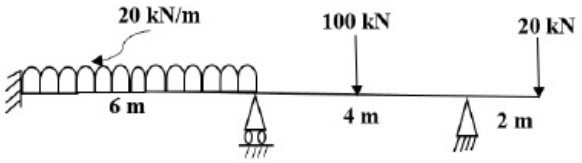
MODULE II

13. Analyse the laterally loaded steel building shown in figure using cantilever method. 14



OR

14. Analyse the continuous beam shown in figure, using flexibility matrix method. 14

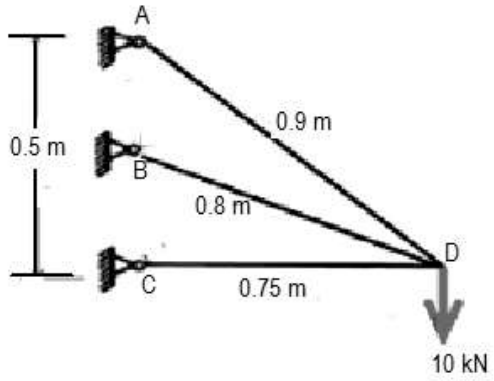


MODULE III

15. Explain the procedure of stiffness matrix analysis, considering temperature and support displacement effects. 14

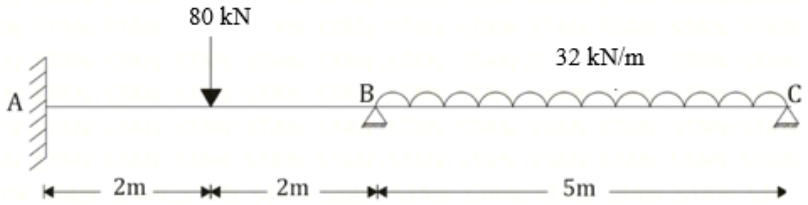
OR

16. Analyse the given truss using stiffness matrix method. Take AE as constant for all members. 14



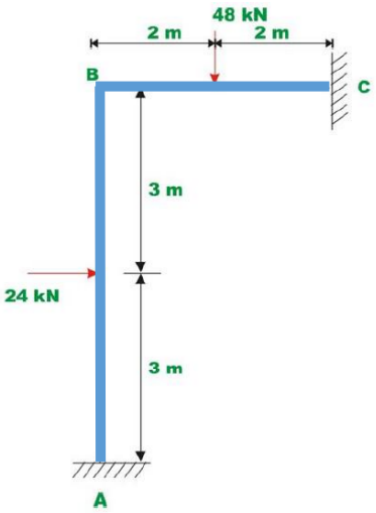
MODULE IV

17. Analyse the given beam using direct stiffness matrix method. 14



OR

18. Analyse the given frame using direct stiffness matrix method. 14



MODULE V

19. (a) Define logarithmic decrement. 4
(b) A damped free vibration test is conducted to determine the dynamic properties of one storey building. The mass of the building is 10,000 kg. Initial displacement of the building is 0.702 cm. Maximum displacement on the first cycle is 0.53 cm and the period of this displacement cycle is 1.7 s. Determine the undamped frequency, logarithmic decrement, damping ratio, damping coefficient, damped frequency and the amplitude after 6 cycles. 10

OR

20. Derive the expression for steady state and transient response for an undamped SDOF with harmonic excitation. 14

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