Code No: 20CE4T02 **R20**

II B. TECH II SEMESTER REGULAR EXAMINATIONS, JUNE - 2022
STRUCTURAL ANALYSIS
(CIVIL ENGINEERING)

Time: 3 hours Max. Marks: 70

Note: Answer **ONE** question from each unit **(5 × 14 = 70 Marks)**

UNIT-I

1. a) A cantilever of 6m length carries an U.D.L of 12 kN/m over the full span. If the free end is supported by a prop, find the reaction at the prop and also draw the S.F. and B.M. diagrams. [8M]
   b) Distinguish between statically determinate and indeterminate beams. [6M]

(OR)

2. A fixed beam of span 6 m carries two-point loads of 30 kN and 50 kN at a distance of 2m and 4m from the right end respectively. Analyse the beam and draw SFD and BMD. [14M]

UNIT-II

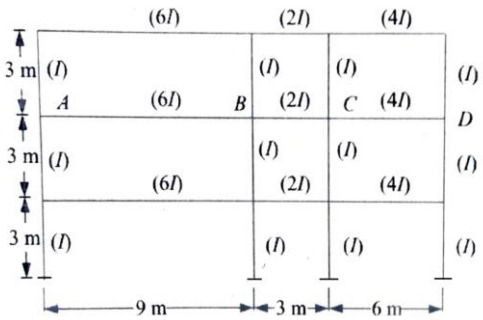
3. a) Derive slope deflection equation. [7M]
   b) A simply supported beam ABC is continuous over two pans AB and BC of 6m and 5m respectively. The span AB is carrying a uniformly distributed load of 20kN/m and span BC is carrying a point load of 50kN at a distance of 2m from B. Find the support moment at B. Also draw the bending moment diagram. Use slope deflection method. [7M]

(OR)

4. a) Explain the step-by-step procedure for analysing continuous beams by moment distribution method. [6M]
   b) A simply supported beam ABC is continuous over two spans AB and BC of 4m and 6m respectively. Span AB is carrying a uniformly distributed load of 3kN/m and span BC carries a point load of 10kN at a distance of 3m from B. Find the support moment at B if EI of the beam is constant. Use moment distribution method. [8M]

UNIT-III

5. Considering floor ABCD, analyze by use of 'Substitute Frame' Method for the case of Maximum '– ve' bending moment at joint A. [14M]

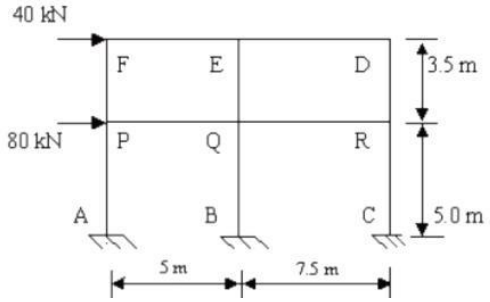


DL on floor = 4 kN m^2; LL on floor = 3 kN/m^2; Spacing of frames = 3.6 m

Self-weight of beams = 5 kN/m @ 9m span beam
= 4 kN/m @ 6m span beam
= 3 kN/m @ 3m span beam

(OR)

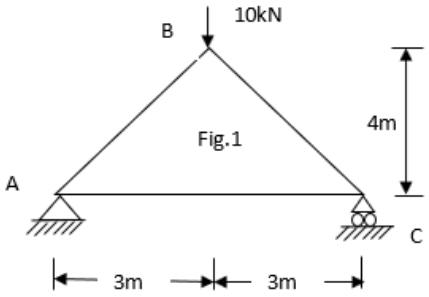
6. Analyse the frame shown in figure by Portal method. Draw the B.M.D [14M]



UNIT-IV

7. a) Derive the expression of strain energy due to shear force. [7M]

   b) Determine the vertical and horizontal displacements at point C of the pin jointed frame shown in Fig. The cross sectional area of AB is 100 mm^2 and of AC and BC150 mm^2 each. Take E = 2.5 x 10^5 N/mm^2. [7M]



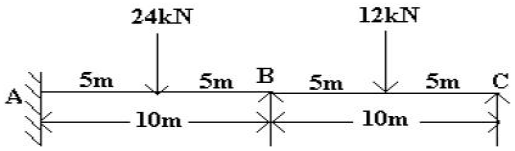
(OR)

8 a) Define influence line for shear force and bending moment. [6M]

   b) A simply supported beam has a span of 12 m is subjected to a UDL (live load) of 6 kN/m (longer than the span) travelling from left to right. Draw the ILD for shear force and bending moment at a section 3m from the left end. Use these diagrams to determine the maximum shear force and bending moment at this section. [8M]

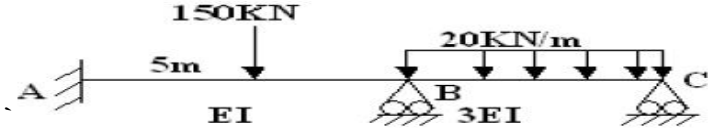
UNIT-V

9. Analyze the beam shown in figure. If the downward settlements of supports B and C are 200/EI and 100/EI respectively (in kN-m units). Use Flexibility method. [14M]



(OR)

10. Analyze continuous beam shown in figure using the stiffness method. Draw BMD. Given AB=BC=10m. [14M]



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