

# ANURAG Engineering College

(An Autonomous Institution)

III B.Tech I Semester Regular Examinations, December – 2024

## STRUCTURAL ANALYSIS – II

(CIVIL ENGINEERING)

Time: 3 Hours

Max. Marks: 60

### Section – A (Short Answer type questions)

(10 Marks)

Answer All Questions

1. What is carry over factor?
2. What makes a curve elastic?
3. What are the reasons for sway in portal frames.
4. Differentiate suspension bridge and regular bridge.
5. Why are pin joints used?
6. What are the advantages of continuous beams over simply supported beams.
7. Is it possible to develop the stiffness matrix for an unstable structure?
8. What is the degree of indeterminacy of a beam?
9. Which principle is used in qualitative analysis of ILD for indeterminate structure?
10. Sketch the ILD for vertical reaction at right end of a continuous beam of span 'L'.

Course Outcome	B.T Level	Marks
CO1	L1	1M
CO1	L2	1M
CO2	L1	1M
CO2	L2	1M
CO3	L2	1M
CO3	L1	1M
CO4	L1	1M
CO4	L1	1M
CO5	L1	1M
CO5	L2	1M

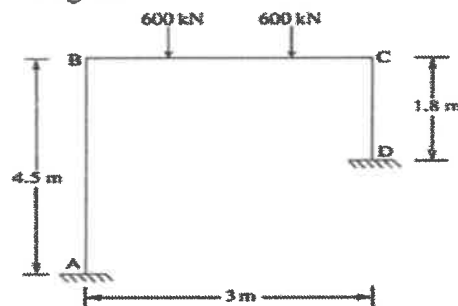
### Section B (Essay Questions)

Answer all questions, each question carries equal marks.

(5 X 10M = 50M)

11. A) Analyze the frame by moment distribution method and draw bending moment diagram.

CO1 L3 10M



OR

- B) A two hinged parabolic arch at span  $l$  and rise  $h$  carries a uniformly distributed load of  $w$  per unit run over the left half of span. The moment of inertia of the arch rib varies as the secant of the slope of the rib axis. Obtain the expression for the horizontal thrust  $H$  at the supports. If  $L = 25$  m and  $h = 5$  m and  $w = 25$  kN/m, calculate i)  $H$  at the supports and ii) B.M at the quarter span point on the right half of the arch.

CO1 L3 10M

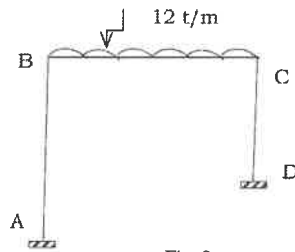
12. A) The cable carries a uniformly distributed load of 16 N/m and has its lowest point 10 m below the lower support. The ends of the cable are attached to saddles on rollers at top of piers. The backstays which may be assumed straight are inclined at  $60^\circ$  to the vertical. Determine: i) The maximum tension of the cable. ii) The thrust on each pier.

CO2 L3 10M

OR

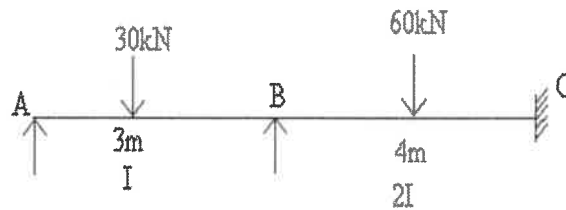
B) - A portal frame ABCD has lengths AB= 6m, BC=8m and CD=3m as shown in Fig. Analyze the portal frame using Kani's method. Sketch the bending moment diagram.

CO2      L3      10M



13. A) Analyse the beam shown in fig. by flexibility method. Also draw BMD.

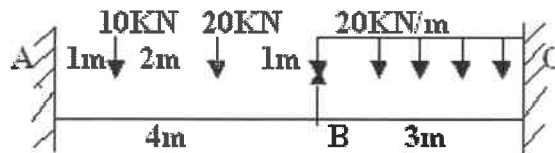
CO3      L3      10M



OR

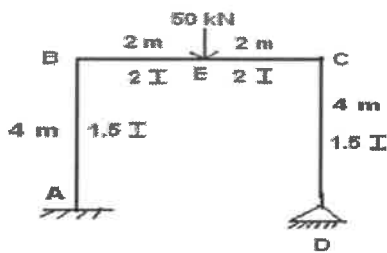
B) Analyze the Continuous beam shown in figure using flexibility method. Find the bending moments at A and B. EI is constant

CO3      L3      10M



14. A) Analyze the portal frame ABCD shown in Fig below by stiffness method and also estimate the bending moment.

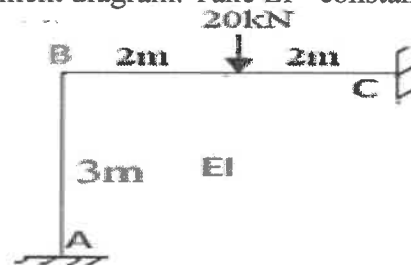
CO4      L3      10M



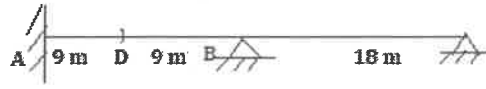
OR

B) Analyze the frame shown in figure by stiffness matrix method and draw bending moment diagram. Take EI =constant.

CO4      L3      10M



15. A) Draw the influence lines for i) Vertical reaction at D ii) Moment at D. CO5 L3 10M



OR

- B) A continuous beam ABC of span 6 m is supported at A, B and C. Also support B is at the centre of A & C. Plot ILD for reaction at A, B and C. CO5 L3 10M

