



K. K. Wagh Institute of Engineering Education & Research, Nashik
(An Autonomous Institute From A.Y. 2022-23)

InSem Examination-II Summer 2025	
Exam Seat No.:	
Academic Year: 2024-2025	Semester: VI
Class: TY	Program: B.Tech
Branch Code: CIV	Pattern: 2022
Name of Course: Theory of Structures	Course Code: CIV223021
Max. Marks: 30	Duration: 1 Hrs 15 Min.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains two pages.
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome.

Marks CO

Question No. 1

- 1 a) A cantilever of length 2m carries a point load of 20 kN at the free end and another load of 20 kN at its centre. If $E = 1 \times 10^5 \text{ N/mm}^2$ and $I = 1 \times 10^8 \text{ mm}^4$, then determine the slope and deflection at the free end by moment area method. (7) CO1

Question No. 2

- 2 a) Find the slope at the free end of a cantilever beam as shown in figure 2 a. Take $I = 1 \times 10^8 \text{ mm}^4$ and $E = 2 \times 10^8 \text{ kN/m}^2$ (8) CO1

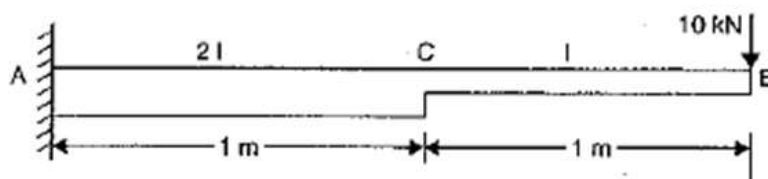


Figure 2 a

OR

- 2 b) Explain the concept of Conjugate beam and how to apply it to find the slope and deflection in beams. (8) CO1

Question No. 3

- 3 a) A thin cylinder of internal diameter 1.25 m contains a fluid at an internal pressure of 2 N/mm^2 . Determine the maximum thickness of the cylinder if (7) CO2
- i) the longitudinal stress is not to exceed 30 N/mm^2 .
 - ii) the circumferential stress is not to exceed 45 N/mm^2 .

Question No. 4

- 4 a) Determine the maximum and minimum hoop stress across the section of a pipe of 400 mm internal diameter and 100 mm thick, when pipe contains a fluid at a pressure of 8 N/mm². (8) CO2

OR

- 4 b) Derive an expression for longitudinal and circumferential stresses for a thin cylinder subjected to internal pressure. (8) CO2

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