



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

InSem Examination-I Winter2024	
Exam Seat No.:	
Academic Year:2024-2025	Semester:III
Class: SY	Program: B.Tech
Branch Code: CIV	Pattern:2023
Name of Course: Mechanics of Structures	Course Code:2304202
Max. Marks:30	Duration: 1hr. 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 2 page(s).
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.

**Question No. 1 Attempt following Question**

- 1 a) A hollow circular mild steel column of external diameter 300 mm and internal diameter 250 mm carries an axial load of 1500 kN. Determine the compressive stress and corresponding strain in the column. If the initial length of column is 3.75m. Find the decrease in length of column. Take  $E = 2 \times 10^5 \text{ N/mm}^2$ . (7) CO1

**Question No. 2 Attempt following Question**

- 2 a) A steel rod 20 m long is at temperature of  $20^\circ\text{C}$  Find the free expansion of rod when temperature raised to  $65^\circ\text{C}$ . Find the temperature stress produced when (8) CO1
- i) The expansion of rod is prevented
- ii) When the rod is permitted to expands by 6.2 mm. Take  $\alpha = 12 \times 10^{-6}/^\circ\text{C}$  and  $E = 2 \times 10^5 \text{ N/mm}^2$ .

**OR**

- 2 b) A concrete column of 350 mm diameter contain is reinforced with four bars of 25 mm diameter. Find the stress in steel when concrete is subjected to a stress of 4.5 MPa. Also find the safe load the column can carry. Take  $E_s/E_c = 18$ . (8) CO1

**Question No. 3 Attempt following Question**

- 3 a) Draw SFD and BMD for given simply supported beam as shown in Fig.3a. (7) CO2

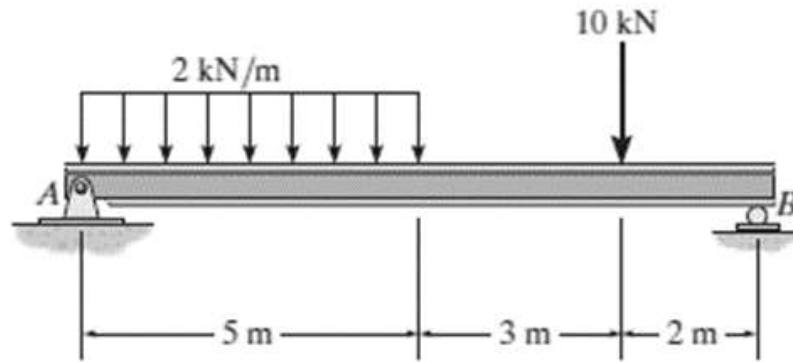


Fig.3a

**Question No. 4 Attempt following Question**

- 4 a) An overhang beam ABCDE is supported at A and D (Fig.4a). DE = 1 m overhang BC = CD = 1 m, AB = 2 m. Position AB is subjected to UDL 16 kN/m. At C a point load of 20 kN is acting. At E a point load 8 kN is acting. Draw SFD and BMD. Locate point of contraflexure. Calculate maximum Bending moment. (8) CO2

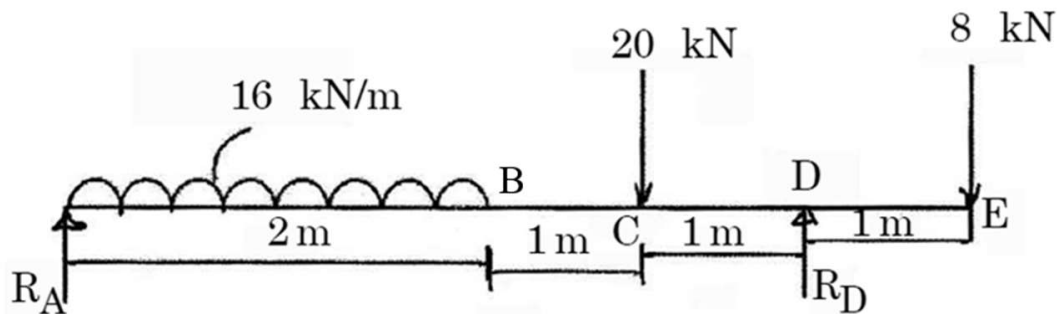


Fig.4a

**OR**

- 4 b) Draw the loading diagram & bending moment diagram from a given shear force diagram of beam as shown in Fig.4b. (8) CO2

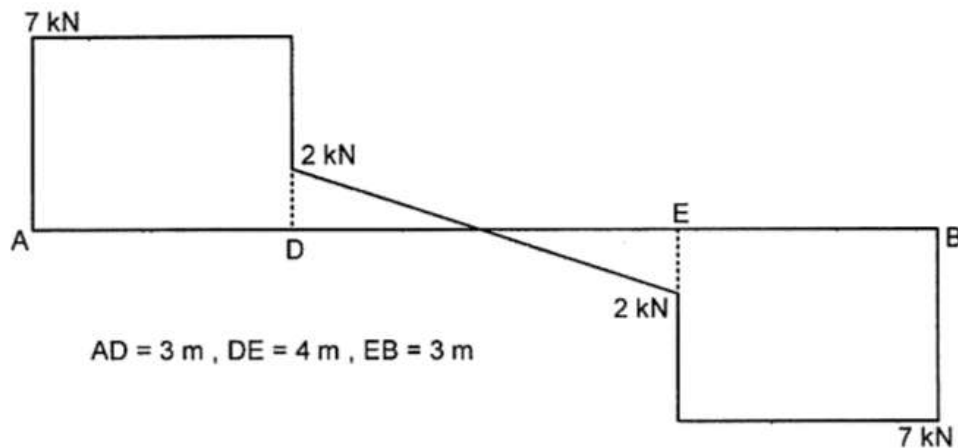


Fig.4b