

Date: _____

Name:-

Naqeeb ullah

ID :-

14668

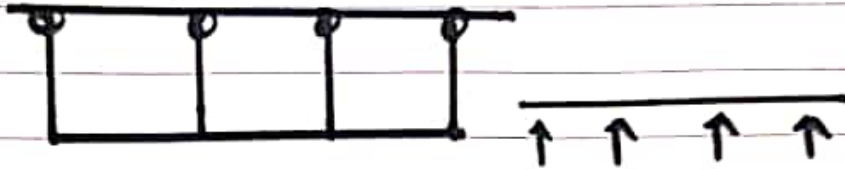
Subject:- Theory of structures.



Date: _____

ASSIGNMENT :- 1

①



Solution:-

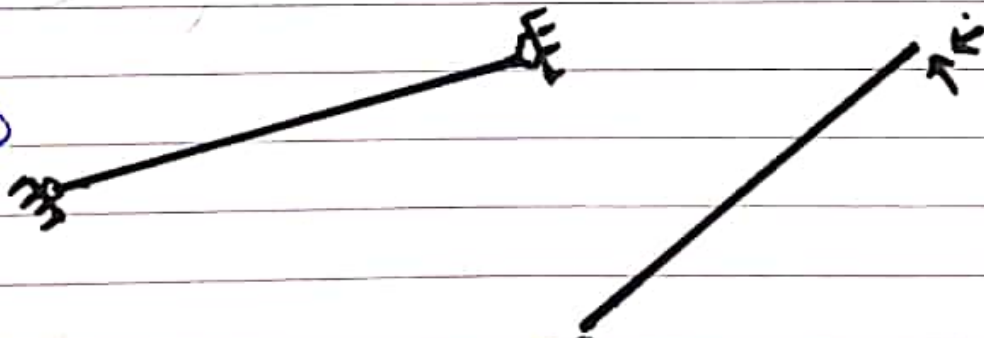
$$R = 3n$$

$$4 = 3(1)$$

$$4 > 3$$

Indeterminate by '1'

②



Solution:-

$$R = 3n$$

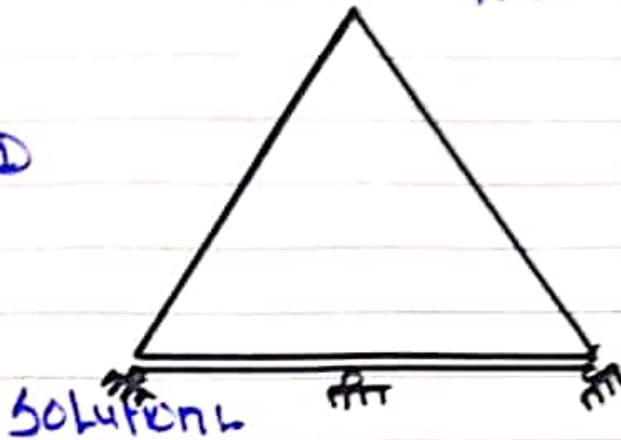
$$3 = 3(1)$$

$$3 = 3$$

Determinate structure!

ASSIGNMENT :- 2

①



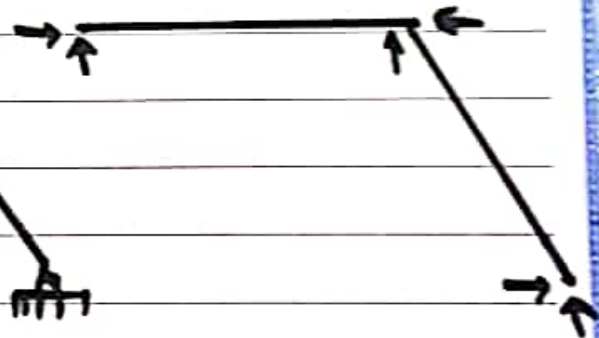
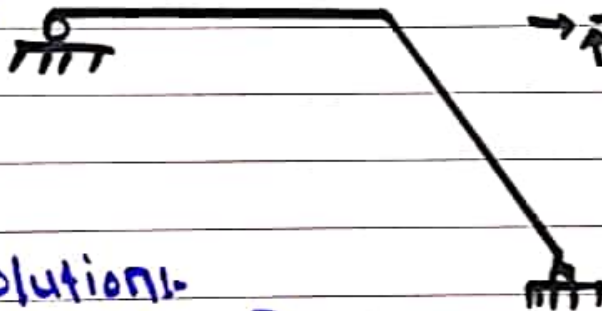
$$R = 3n$$

$$3 = 3(1)$$

$$3 = 3$$

Determinate structures

②



Solutions-

$$R = 3n$$

$$6 = 3(2)$$

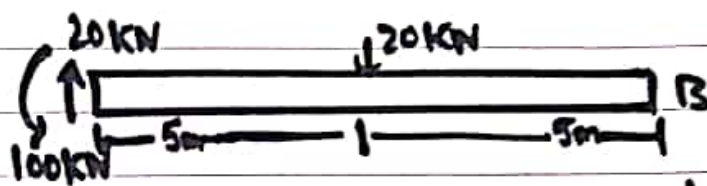
$$6 = 6$$

Determinate structures

Date: _____

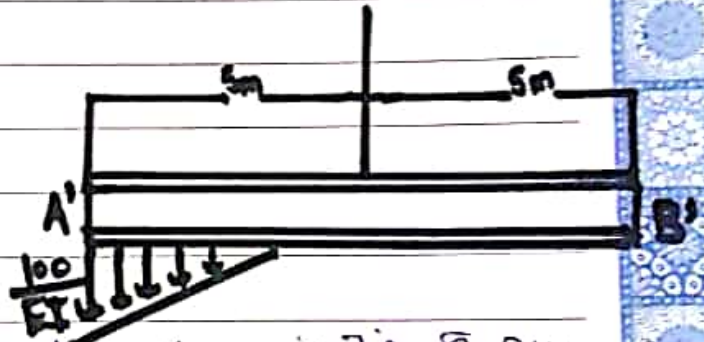
ASSIGNMENT :- 3

Determine the slope and deflection at point B of the steel beam in Fig. 8.240. The reactions have been computed. $E = 200 \text{ GPa}$, $I = 475 (10^6) \text{ mm}^4$.

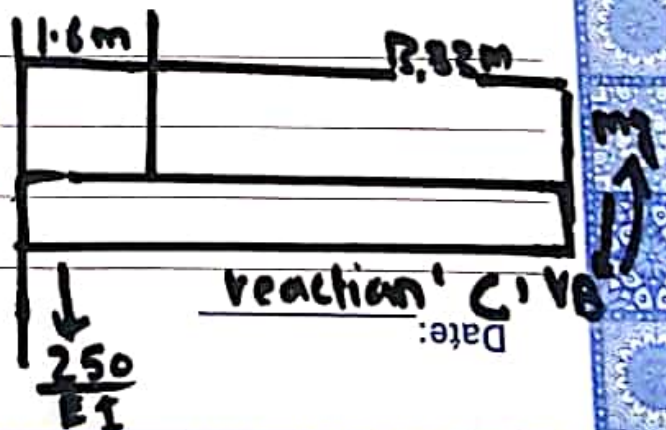


Solutions

Conjugate Beam.



The Conjugate Beam A' is show in Fig 8-24b. The supports at A' and B correspond to ~~the~~ support A and B on the real beam. Table B-2 It is important to understand why this is so, the M/EI diagram is negative, so the distributed load act downwards, i.e way from the beam.



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Equilibrium

Since θ_A and Δ_B are to be determined we must compute V_B and M_B in the conjugate beam.

Fig. 8-24c.

$$\frac{-250 \text{ kN}\cdot\text{m}^2 - V_B = 0}{EI}$$

$$+\uparrow \sum F_y = 0;$$

$$\theta_B = V_B = \frac{250 \text{ kN}\cdot\text{m}^2}{EI}$$

$$= \frac{-250 \text{ kN}\cdot\text{m}^2}{(200(10^6) \text{ kN/m}^2)(475(10^6)(10^{-12}) \text{ m}^4)}$$

$$= -0.00263 \text{ rad Arch}$$

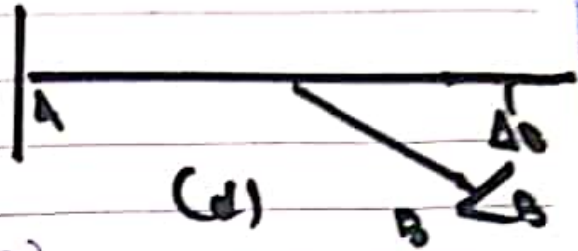
$$\downarrow + \sum M_{B'} = 0;$$

$$\frac{250 \text{ kN}\cdot\text{m}^2}{EI} (8.33 \text{ m}) + M_{B'} = 0$$



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$$\Delta_B = M_B = \frac{2083 \text{ kN} \cdot \text{m}^2}{EI}$$



$$= \frac{-2083 \text{ kN} \cdot \text{m}^2}{[200 (10^9 \text{ kN/m}^2) (475 (10^4) (10^{-12}) \text{ m}^4)]}$$

$$= -0.0219 \text{ m} = 21.9 \text{ mm Ans.}$$

The negative sign indicates the slope of the beam measured clockwise and the displacement downward fig B-24d.

