-:Name:-

M. Arsalan

-:ID:-

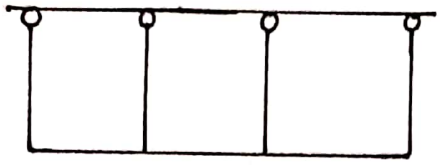
14506

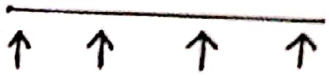
-:Subject:-

Theory of Structure

ASSIGNMENT :- 1

①





:Solution:-

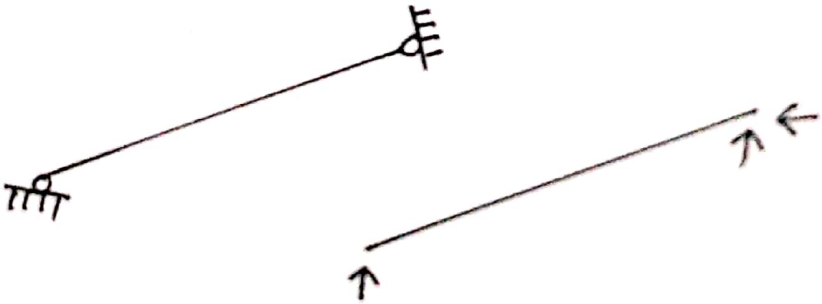
$R = 3n$

$4 = 3(1)$

$4 > 3$

indeterminate by 1°

②



:Solution:-

$R = 3n$

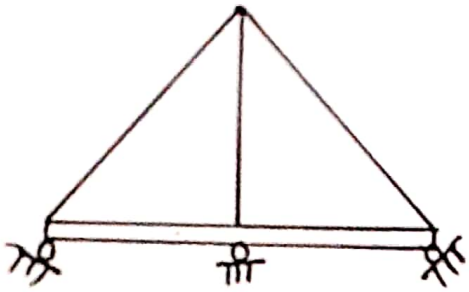
$3 = 3(1)$

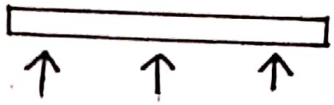
$3 = 3$

Determinate Structure

ASSIGNMENT: 2

①





:Solution:-

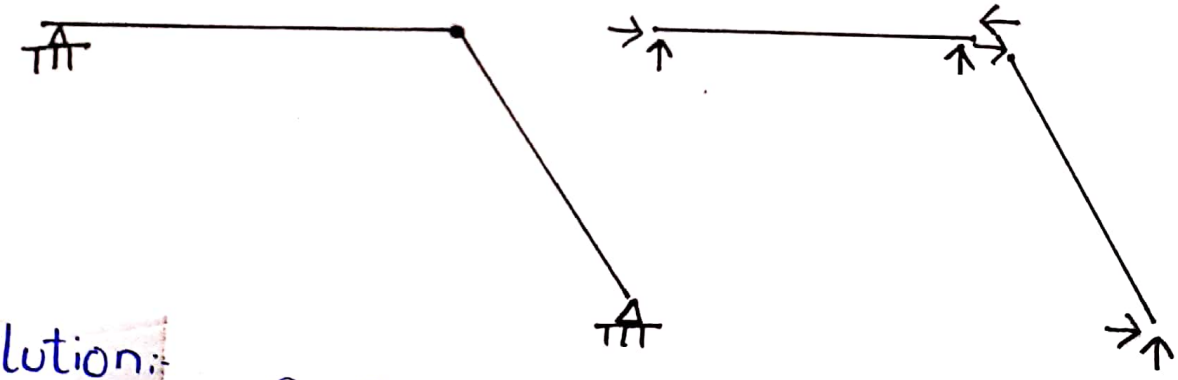
$R = 3n$

$3 = 3(1)$

$3 = 3$

Determinate Structure

②



:Solution:-

$R = 3n$

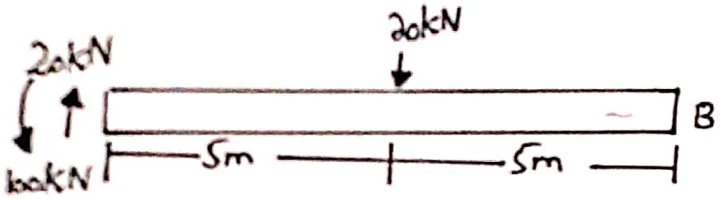
$6 = 3(2)$

$6 = 6$

Determinate Structure

ASSIGNMENT:-3

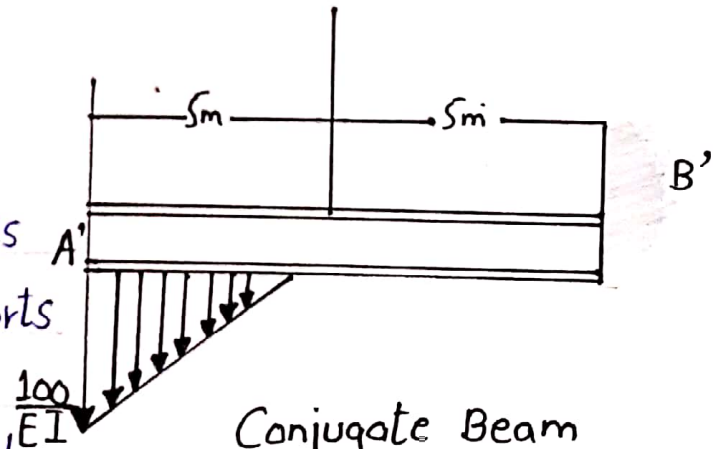
Determine the slope and deflection at point B of the steel beam shown in fig. 8-24a. The reactions have been Computed. $E = 200$ GPa, $I = 475(10^6)\,mm^4$.



-:Solution:-

Conjugate Beam:-

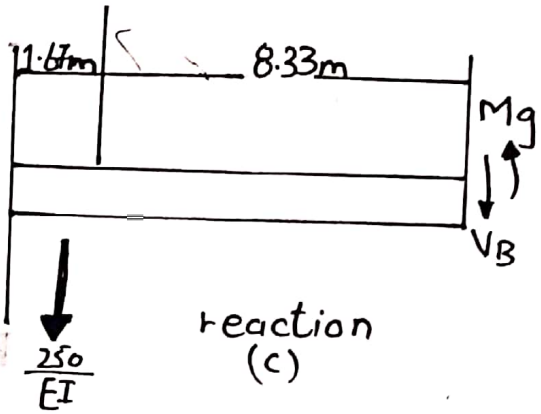
The Conjugate Beam is shown in fig. 8-24b. The Supports at A' and B' Correspond to Supports A and B on the real Beam, Table 8-2. It is important to understand why this is so. The M/EI diagram is negative, So the distributed



Conjugate Beam
(b)

load acts downwords, i.e., away from the beam.

-:Equilibrium:- Since θ_B and Δ_B are to be determined, we must Compute V_B and M_B in the Conjugate beam, Fig. 8-24c.



$$+\uparrow \Sigma F_y = 0; \quad -\frac{250\ kN\cdot m^2}{EI} - V_B = 0$$

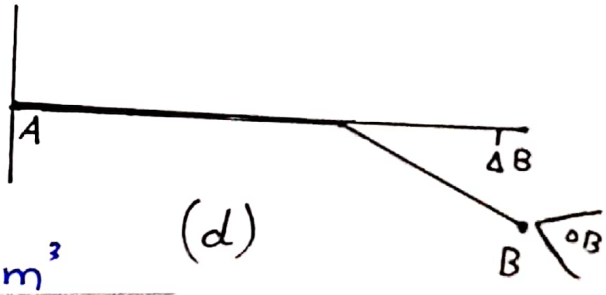
$$\theta_B = V_B = -\frac{250\ kN\cdot m^2}{EI}$$

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

$$= -0.00263\ rad \quad \text{Ans}$$

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

$$\Delta_B = M_{B'} = -\frac{2083\ kN\cdot m^3}{EI}$$



(d)

$$= \frac{-2083\ kN\cdot m^3}{[200(10^6)kN/m^2][475(10^6)(10^{-12})m^4]}$$

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

The negative signs indicate the slope of the beam is measured clockwise and the displacement is downword, Fig. 8-24d.