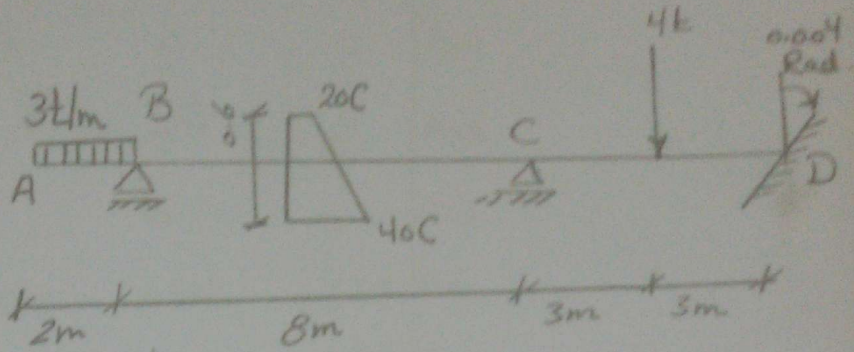
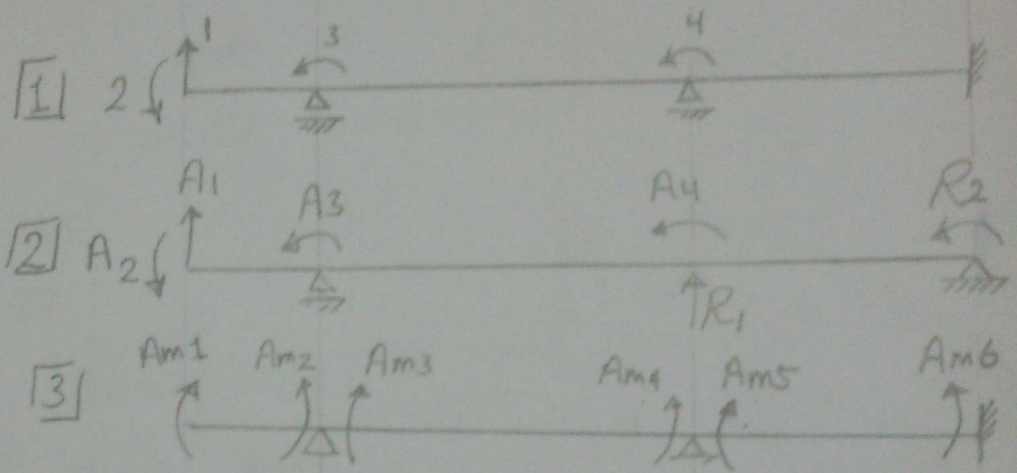
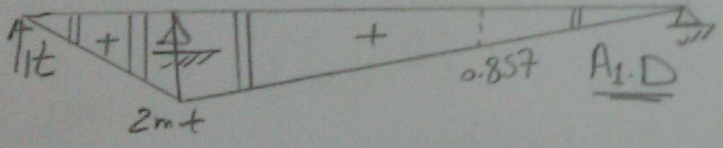
Given:- As shown

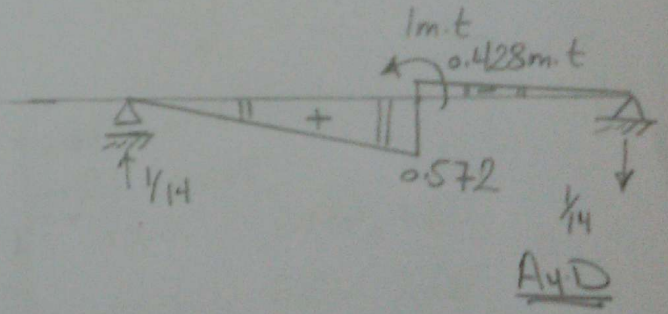
Req:- S.F.D
- B.M.D

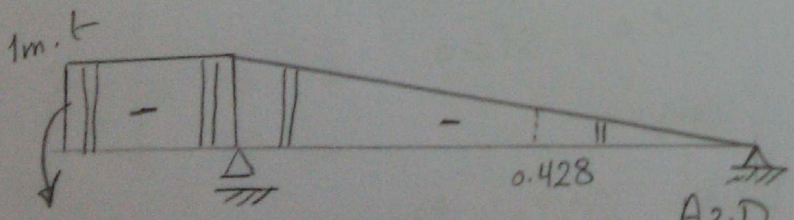


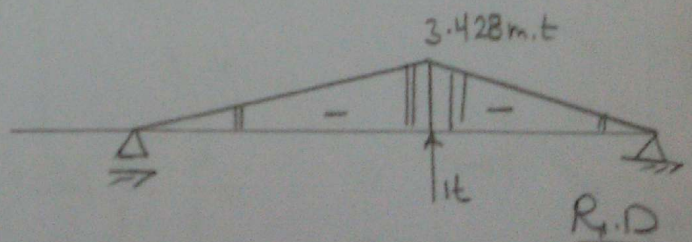


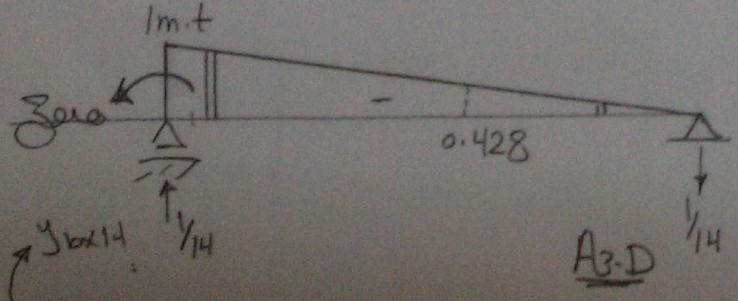
4

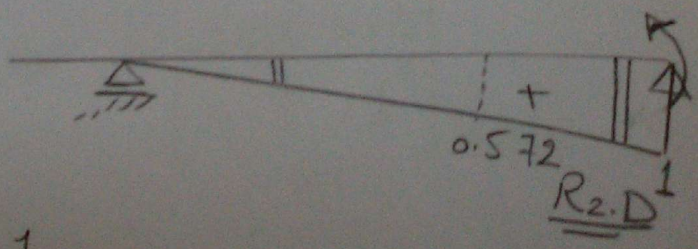












$$Am = \begin{bmatrix} 0 & -1 & 0 & 0 & 0 & 0 \\ 2 & -1 & 0 & 0 & 0 & 0 \\ 2 & 1 & 1 & 0 & 0 & 0 \\ 0.857 & -0.428 & -0.428 & 0.572 & -3.428 & 0.572 \\ 0.857 & -0.428 & -0.428 & -0.428 & -3.428 & 0.572 \\ 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix} \begin{matrix} Am_1 \\ Am_2 \\ Am_3 \\ Am_4 \\ Am_5 \\ Am_6 \end{matrix}$$

E | a

5

$$f_m = \frac{1}{EI} \begin{bmatrix} 0.667 & 0.333 & & & & \\ 0.333 & 0.667 & & & & \\ & & 2.667 & 1.333 & & \\ & & 1.333 & 2.667 & & \\ & & & & 2 & 1 \\ & & & & 1 & 2 \end{bmatrix}$$

6 $f_{xx} = [a]^T [f_m] [a]$

$$\frac{1}{EI} \begin{bmatrix} 0 & 0 & 0 & -3.428 & -3.428 & 0 \\ 0 & 0 & 0 & 0.572 & 0.572 & 1 \end{bmatrix}_{(2\times6)} \times \begin{bmatrix} 0.667 & 0.333 & 0 & 0 & 0 \\ 0.333 & 0.667 & & & \\ 0 & & 2.667 & 1.333 & 0 \\ & & 1.333 & 2.667 & \\ 0 & & & & 2 \quad 1 \\ & & 0 & & 1 \quad 2 \end{bmatrix}$$

$$\frac{1}{EI} \begin{bmatrix} 0 & 0 & -4.569 & -9.142 & -6.856 & -3.428 \\ 0 & 0 & 0.762 & 1.525 & 3.144 & 2.572 \end{bmatrix}_{(2\times6)} \times \begin{bmatrix} 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ -3.428 & 0.572 \\ -3.428 & 0.572 \\ 0 & 1 \end{bmatrix}_{(6\times2)}$$

$$f_{xx} = \frac{1}{EI} \begin{bmatrix} 54.843 & -4.736 \\ -16 & 6.186 \end{bmatrix}$$

[7]

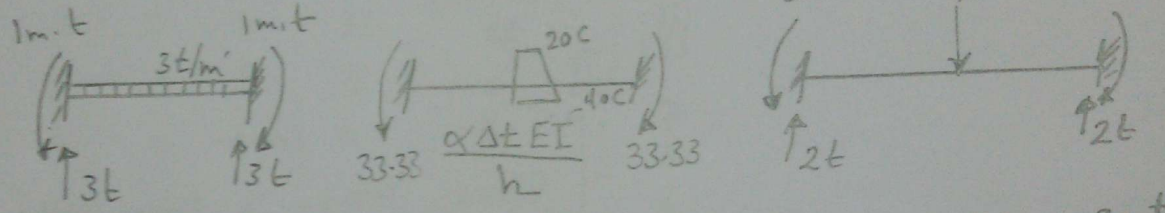
$$f_{xj} = [a^T][f_m][E]$$

$$= \frac{1}{EI}\begin{bmatrix} 0 & 0 & -4.569 & -9.142 & -6.856 & -3.428 \\ 0 & 0 & 0.762 & 1.525 & 3.144 & 2.572 \end{bmatrix} \times \begin{bmatrix} 0 & -1 & 0 & 0 \\ 2 & -1 & 0 & 0 \\ 2 & 1 & 1 & 0 \\ 0.857 & -0.428 & -0.428 & 0.572 \\ 0.857 & -0.428 & -0.428 & -0.428 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

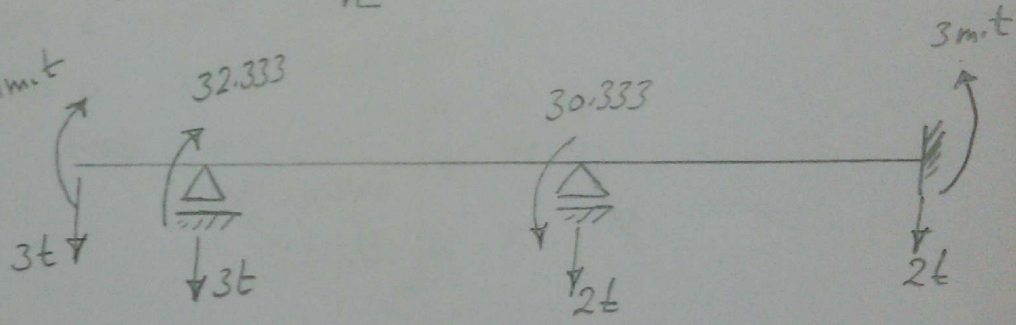
(2x6) (4x6)

$$f_{xj} = \frac{1}{EI}\begin{bmatrix} -22.85 & 2.278 & 2.258 & -2.29 \\ 5.53 & -1.236 & 2.76 & -0.473 \end{bmatrix}$$

[8] F.E.M



Eq-Load



$$A_s = \begin{bmatrix} -3 \\ -1 \\ -32.333 \\ 30.333 \\ (R_1 - 2) \\ (R_2 + 3) \end{bmatrix} \quad A_j = \begin{bmatrix} -3 \\ -1 \\ -32.333 \\ 30.333 \end{bmatrix} \quad R = \begin{bmatrix} (R_1 - 2) \\ (R_2 + 3) \end{bmatrix}$$

$$A_{fm}^T = \begin{bmatrix} -1 & -1 & -33.333 & -33.333 & -3 & -3 \end{bmatrix}$$