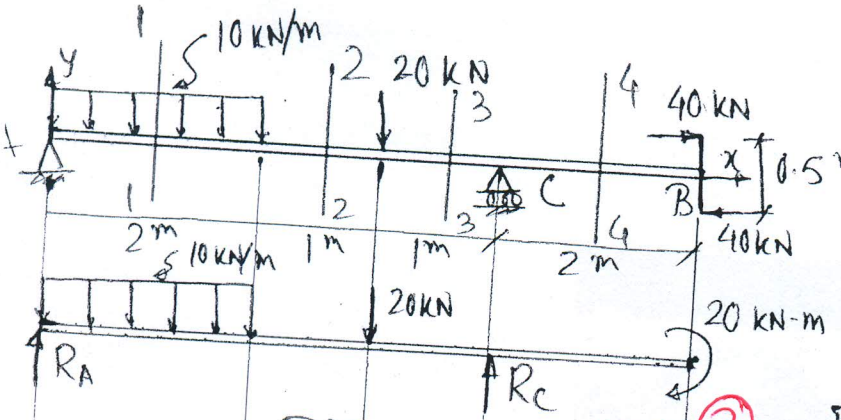
Solution of Problem #4



FBD

$\Sigma F_Y = 0$ — (1)

$R_A + R_C = 10 \times 2 + 20 = 40$ k

$\Sigma M_A = 0$ — (1)

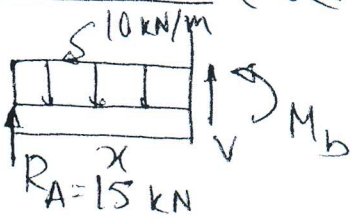
$10 \times 2 \times 1 + 20 \times 3 + 20 = R_C \times 4$

(2) $\therefore$ $R_C = 25$ KN

$R_A = 15$ KN — (2)

SFD — (3)

Sec 1-1 $(0 \le x \le 2)$ — (2.5)



$V = 10x - 15$

$M_b = 15x - \frac{10x^2}{2}$

$V|_{x=0} = -15$ KN

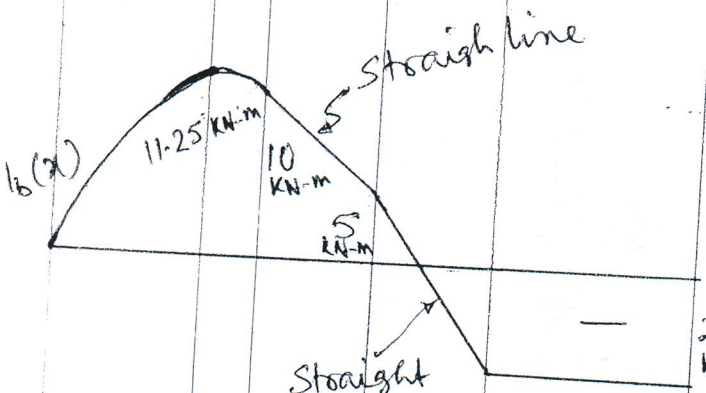
$V|_{x=2} = 5$ KN

$\therefore$ $V = 0$ at $x = 1.5$ m

$M_b|_{x=0} = 0$

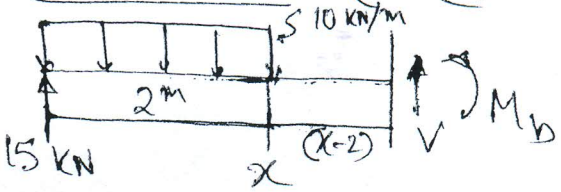
$M_b|_{x=2} = 10$ KN-m

$M_b|_{x=1.5} = 11.25$ KN-m



BMD — (3)

Sec 2-2 $(2 \le x \le 3)$ — (2)



$V = 10 \times 2 - 15 = 5$ KN

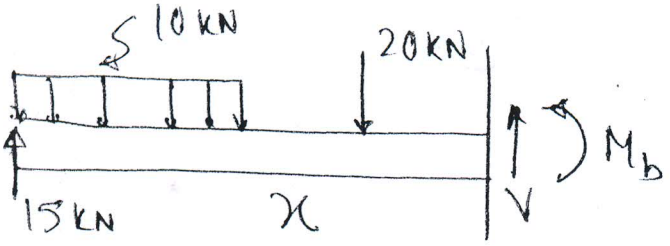
$$M_b = 15x - (10\times 2)(x-1)$$

$$= 20 - 5x$$

$$M_b\big|_{x=2} = 10 \quad kN\text{-}m$$

$$M_b\big|_{x=3} = 5 \quad kN\text{-}m$$

Sec 3-3 $(3 \le x \le 4)$ — (2)



$$V = 10\times 2 + 20 - 15 = 25 \quad kN$$

$$M_b = 15x - (20)(x-1) - 20(x-3)$$

$$= 80 - 25x$$

$$M_b\big|_{x=3} = 5 \quad kN\text{-}m$$

$$M_b\big|_{x=4} = -20 \quad kN\text{-}m$$

Sec 4-4 $(4 \le x \le 6)$ — (1.5)

$$V = 0$$

$$M_b = -20 \quad kN\text{-}m$$