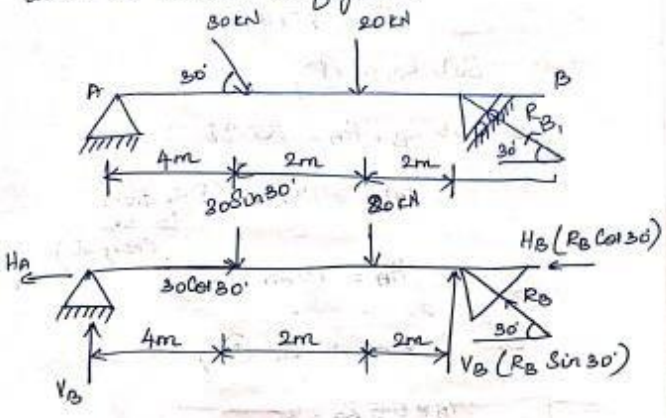
3. Determine the Support reactions of the beam as shown in figure.



* $\Sigma H = 0 \ (\rightarrow +)$

$30 \cos 30^\circ - H_A - H_B = 0$

$30 \cos 30^\circ - H_A - R_B \cos 30^\circ = 0$

$0.866 R_B + H_A = 25.98$ — (1)

* $\Sigma V = 0 \ (\uparrow +)$

$V_A + V_B - 30 \sin 30^\circ - 20 = 0$

$V_A + R_B \sin 30^\circ - 30 \sin 30^\circ - 20 = 0$

$V_A + 0.5 R_B = 35$ — (2)

* $\Sigma M_A = 0 \ (\circlearrowleft +)$

$(30 \sin 30^\circ \times 4) + 20 \times 6 - V_B \times 8 = 0$

$(30 \sin 30^\circ \times 4) + 120 - R_B \sin 30^\circ \times 8 = 0$

$R_B \sin 30° \times 8 = 180$

$R_B = 45\,KN.$

Sub R_B in (1),

$0.866\,R_B + H_A = 25.98$

$H_A = -13\,KN$ (Direction to be changed)

$H_A = 13\,KN\ (\rightarrow)$

Sub $R_B = 45\,KN$ in (2),

$V_A + 0.5\,R_B = 35$

$V_A = 12.5\,KN$

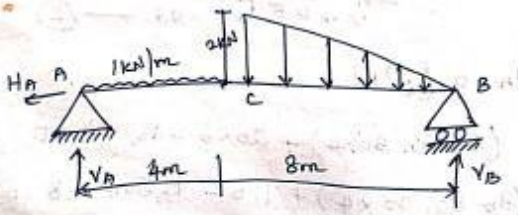
Result:

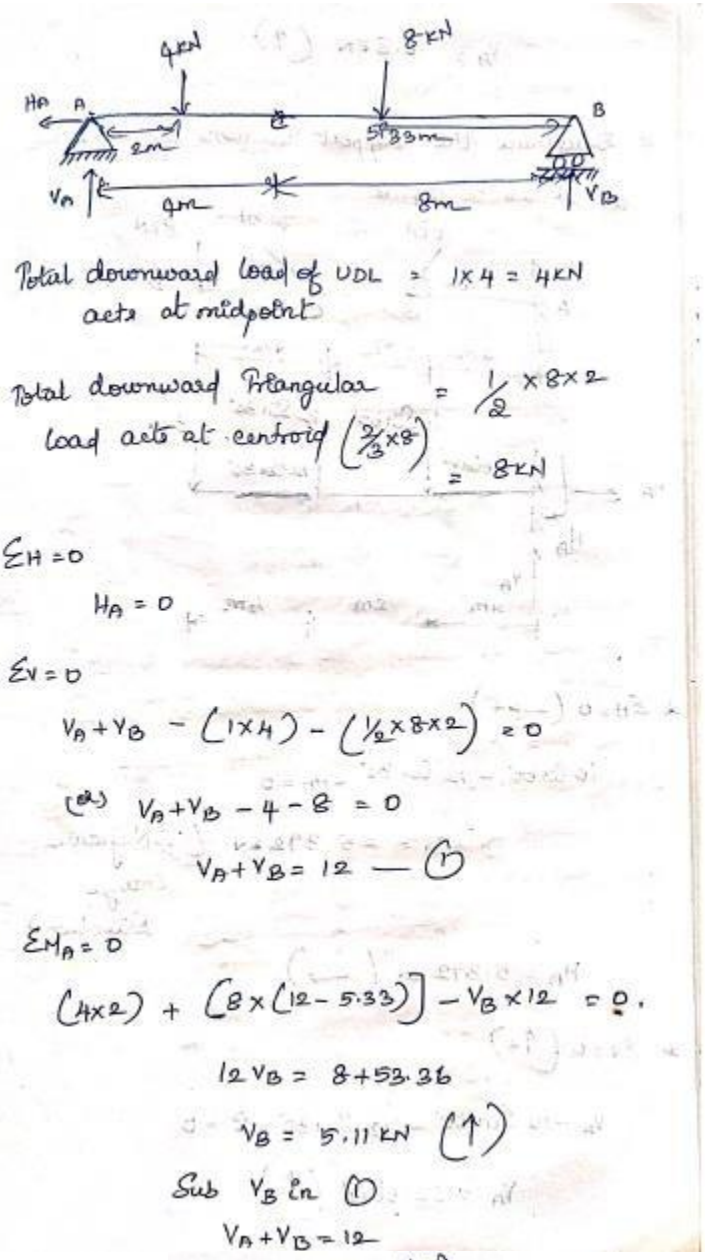
$H_A = 13\,KN\ (\rightarrow)$

$V_A = 12.5\,KN\ (\uparrow)$

$R_B = 45\,KN$

4. Calculate the Support Reactions of a CSB beam shown in figure.





Total downward load of UDL = $1 \times 4 = 4KN$
acts at midpoint

Total downward Triangular load = $\frac{1}{2} \times 8 \times 2$
load acts at centroid $\left(\frac{2}{3} \times 8\right)$ = 8KN

* $\Sigma H = 0$

$H_A = 0$

* $\Sigma V = 0$

$V_A + V_B - (1 \times 4) - \left(\frac{1}{2} \times 8 \times 2\right) = 0$

(or) $V_A + V_B - 4 - 8 = 0$

$V_A + V_B = 12$ — (1)

* $\Sigma M_A = 0$

$(4 \times 2) + [8 \times (12 - 5.33)] - V_B \times 12 = 0.$

$12 V_B = 8 + 53.36$

$V_B = 5.11 KN$ (↑)

Sub V_B in (1)

$V_A + V_B = 12$

$V_A = 6.8 KN$ (↑)