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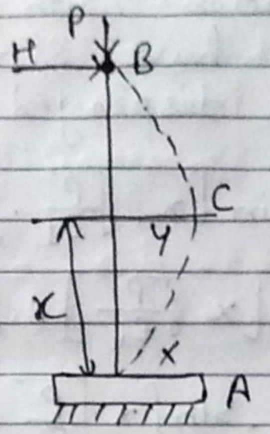
## Section-4

Ans-2




As we know that for long column, when one end of the column is fixed end other ~~and~~ end is hinged, we will have following and condition as mentioned here.

At fixed and A of the Column, i.e at $x=0$ Deflection $y$ will be zero and slope $dy/dx$ will also i.e $y=0$ and $dy/dx=0$

At hinged and B of the column i.e at $x=L$
Deflection $x$ will be zero.

Let us use the first and condition i.e at $x=0$ deflection $y=0$, in above lateral deflection equation for column and use will have value of constant of integration i.e $C_1$ and it will be as mentioned here $C_1 = (H.L/P)$

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Now, we will differentiate at the lateral deflection equation with respect to x and we will have slop for column AB it will be displayed by dy/dx

$$\frac{dy}{dx} = -C_1 \cdot \sin\left[x, \sqrt{\frac{P}{EI}}\right] \cdot \sqrt{\frac{P}{E_1}} + C_2 \cdot$$

$$\cos\left[x\sqrt{\frac{P}{E_1}}\right] \cdot \sqrt{\frac{P}{E_1}} - H/P$$

$$\frac{dy}{dx} = -C_1\sqrt{\frac{P}{E_1}} \cdot \sin\left[x\sqrt{\frac{P}{E_1}}\right] \cos\left[x \cdot \sqrt{\frac{P}{E_1}}\right] - H/P$$

As we have already discussed that at $x=0$ slope will be zero or $dy/dx = 0$ and therefor now, we will use this end condition in above slope equation in order to secure the value of $C_2$

After using the value of $x=0$ and $dy/dx = 0$ in above slope eq., we will have value of $C_2$.

$$C_2 = CH/P\sqrt{E.I/P}$$

Now it's time to analyze the lateral deflection eq. after considering and implementing the value of both constant i.e $C_1$ & $C_2$

$$\frac{dy}{dx} = -C\sqrt{\frac{P}{E_1}} \cdot \sin\left[x\sqrt{\frac{P}{E_1}}\right] + C_2 \cdot \sqrt{\frac{P}{E_1}}\cos\left[x\sqrt{\frac{P}{E_1}}\right] - HP$$