



**SNS COLLEGE OF TECHNOLOGY**



# **16ME207- STRENGTH OF MATERIALS**

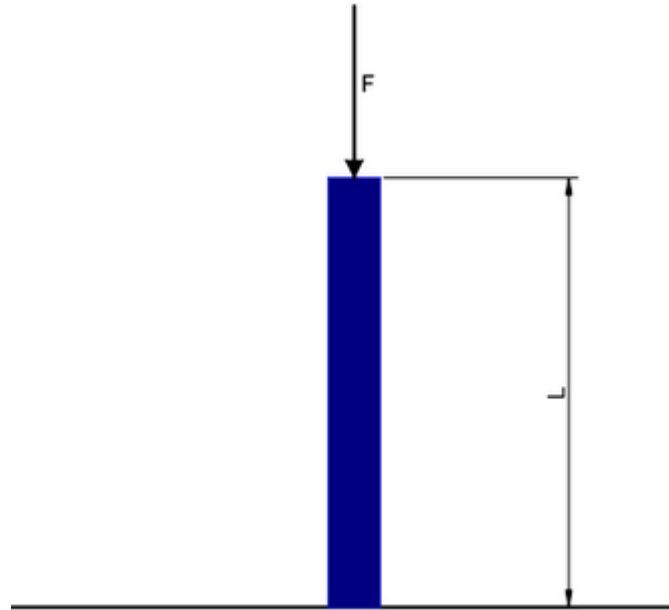
## **UNIT- IV DEFLECTION OF BEAMS AND BUCKLING OF COLUMNS**

### **Columns - End conditions**



## COLUMNS

***Structural speaking a column is the vertical member of a broader construction that has the function of transferring the load it supports downwards or as a load transfer structure, in the same direction.***



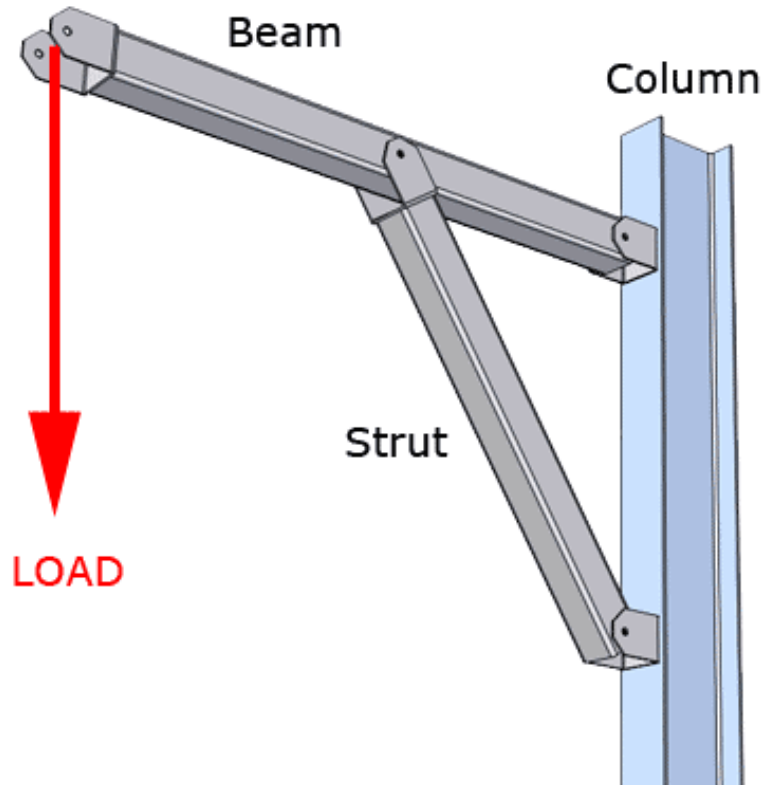


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## STRUT



***A strut can be thought of as a long, inclined column. Column is a thick compression member within a structure, and it fails due to compression rather than buckling.***



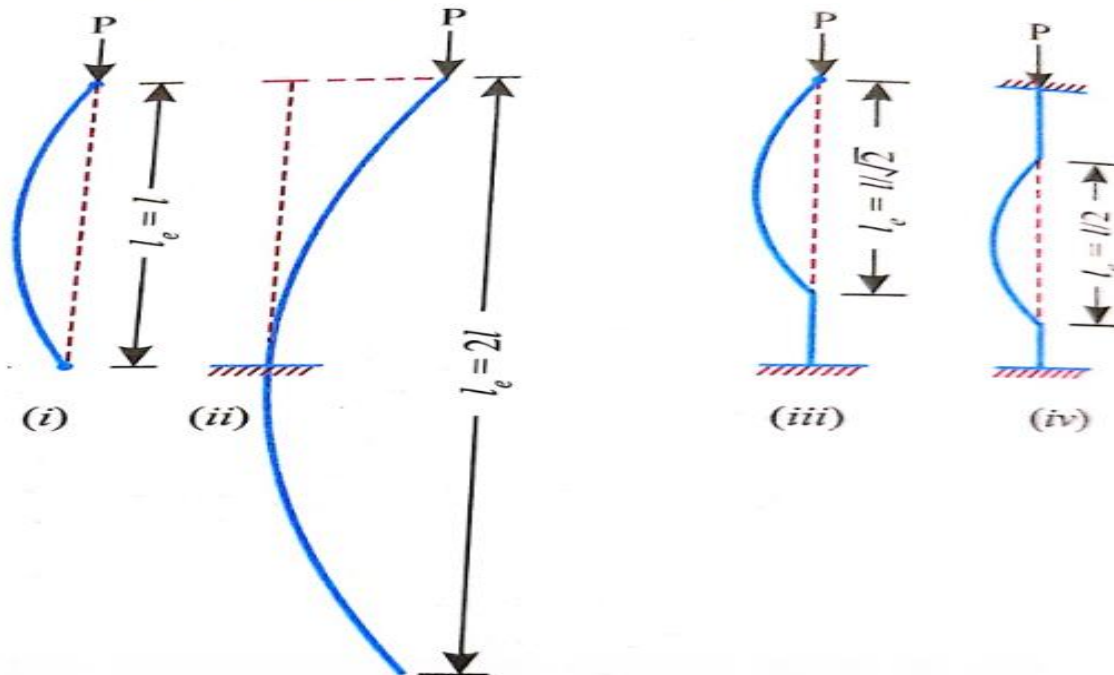


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## Equivalent length ( $l_e$ ).

- i) Both ends pin joined (or) hinged (or) rounded (or) free.
- ii) One end fixed and other end free.
- iii) One end fixed and the other pin joined.
- iv) Both ends fixed.





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## End conditions



i) Both ends hinged

Equivalent length = Actual length.

$$l_e = l$$

ii) One end fixed and other end free.

$l_e = 2l$ , the free end will sway sideways and the curvature in the length  $l$  will be similar to that of the upper half of the simple column.

iii) One end fixed and other pin jointed.

$l_e = \frac{l}{\sqrt{2}}$ , between the top of the column

and inflexion point.

iv) Both ends fixed.

$l_e = \frac{l}{2}$ , the distance between the two inflexion points