Two forces (P and $3P$) and a torque ($T = 3PR$) are applied to the structure shown below. The structural member has a circular cross-section with a radius of r, where $R = 10r$. It is desired to know the state of stress at points "a" and "b" at location B on the structure. To this end:

a) Using the FBD of section BOC provided below, determine the internal resultants (B_x, B_y, M_{Bx} and M_{Bz}) acting at location B.

b) Using the figure below showing the internal resultant components on section BH (present all work on the attached worksheet):

   i.   Show the stress distributions acting on section BH.

   ii. Fill in the table quantifying the stress components corresponding to the indicated resultants. Leave your answers in terms of, at most: P and r.

   iii. Label the stress element with the stress components found in ii. above.

FBD of BOC

internal resultants at B
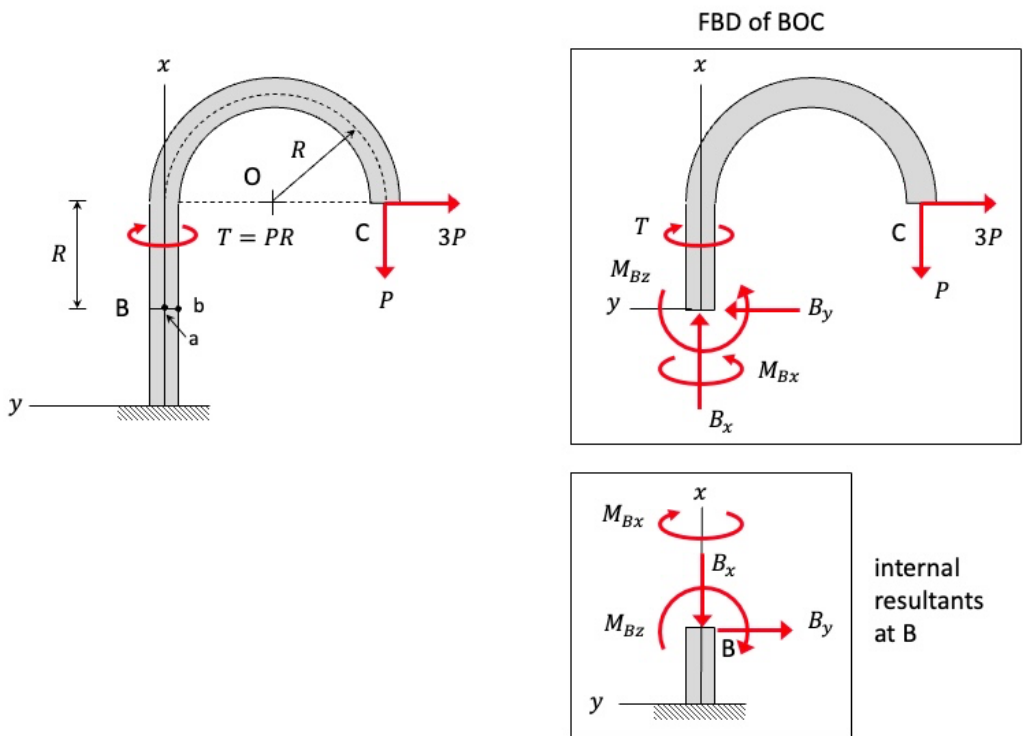
Stress distributions at location B

front views

side views

top view
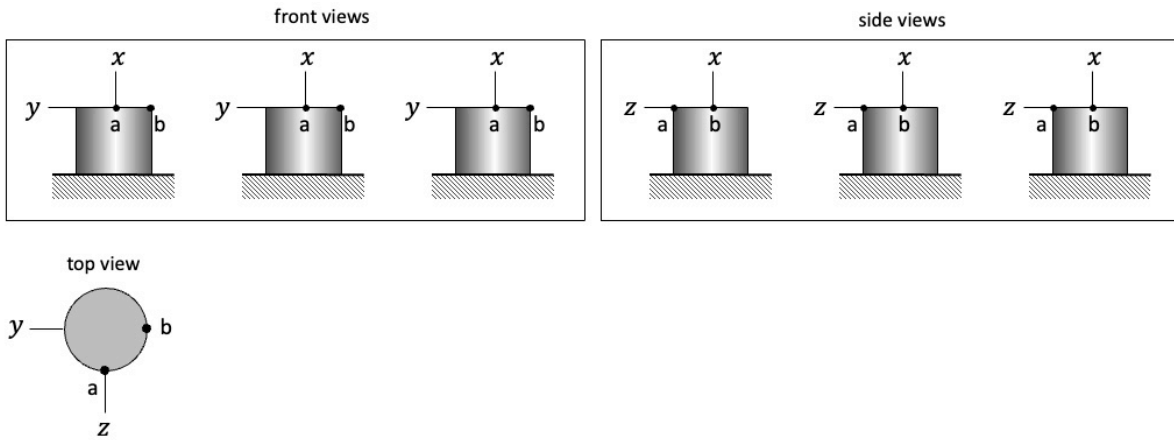
Stress components at location B

internal resultant	stress @ point "a"	stress @ point "b"

Stress elements at location B

point "a"

point "b"