QZ wk-03 | 02.05.2019 | End Conditions / Forces & Moments
For each of the following: answer the question or circle the most correct answer.

1. In 2D space a roller end condition restrains how many degrees of freedom?
   a. 1
   b. 2
   c. 3
   d. 6

2. According to the reading, which one of the following is NOT a source of loading on buildings?
   a. The weight of the building itself.
   b. The occupants
   c. Corrosion
   d. Earthquakes

3. (True or False) On a 10-foot long cantilevering beam, a vertical point load applied 5 feet from the end will cause identical vertical reactions at both ends.

4. According to the reading, a force applied at the centroid of a body tends to cause it to . . .?
   a. Translate
   b. Rotate
   c. Stabilize
   d. Flip

5. (True or False) A cast-in-place concrete joint with reinforcing bars continuing from the beam into the column can be considered a fixed restraint.

6. Find the reactions (all possible) at A and B for the beam below. Write out the three equations of equilibrium indicating which direction is assumed positive and redraw the final answer. Assume the beam weighs nothing.

   \[ \sum F_x = 0: \quad R_{xa} = 0 \]
   \[ \sum M_a = 0: \]
   \[ -50 \text{ lbs (3')} + \text{Rya (0')} -150 \text{ lbs (4')} + \text{Ryb (14')} = 0 \]
   \[ \text{Ryb (14')} = 750 \text{ lb-ft} \]
   \[ \text{Ryb} = 53.6 \text{ lbs} \]
   Result is positive. Therefore direction of Ryb shown on F.B.D. is correct.

   \[ \sum F_y = 0: \]
   \[ 50 \text{ lbs + Rya -150 lbs + Ryb} = 0 \]
   \[ 50 \text{ lbs + Rya -150 lbs + 53.6 lbs} = 0 \]
   \[ \text{Rya} = 46.4 \text{ lbs} \]
   Result is positive. Therefore direction of Rya shown on F.B.D. is correct.