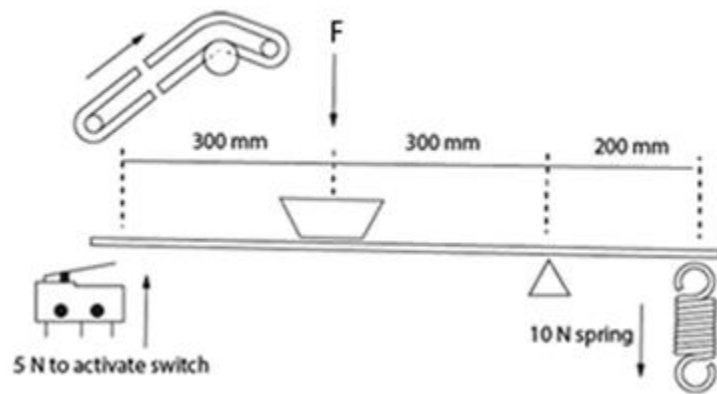


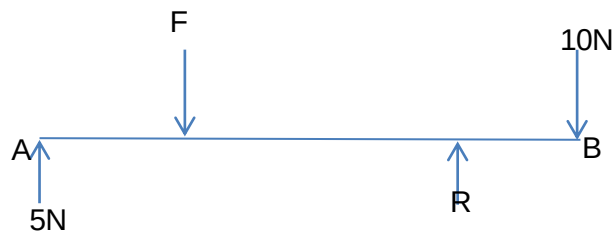
Q.14) Read the scenario in the picture below, then calculate the force (F) in Newtons (N) that will just unbalance the beam. Round your answer to two decimal places.

A scale consists of a microswitch that switch off the onveyor when activated by a 5 newton load. The opposite end is held by a spring with a force of 10 newtons. What force at point f is required to unbalance the beam and activate the microswitch?



SOLUTION

Sum of clockwise force = Anti-clockwise force



Taking moment at point A = 0

1. sum of forces in the x-direction = 0 (no component)
2. sum of forces in the y-direction = 0 = 5 + R - F - 10
3. sum of moments at point A = 0 = 5 X 0 - F x 300 + Rx600 - 10 x 800

$$F = R - 5 \dots\dots\dots 1$$

$$0 - 300F + 600R - 8000 = 0$$

$$300F = 600R - 8000$$

$$3F = 6R - 80 \dots\dots\dots 2$$

Solving equation 1 and 2 simultaneously

$$R - 5 = 6R - 80$$

$$80-5=6R-9$$

$$75=5R$$

$$R=15N$$

$$F = R-5 = 15-5 = 10N$$