Answer on Question #46424, Physics, Other

Question:

if a force 80N extends a spring of natural length 8m by 0.4m what will be the length of the spring when the applied force is 100N

Answer:

Hooke's law:

$$F = k\Delta l$$

where k is constant factor characteristic of the spring, , Δl is extension of the spring.

In first case:

$$F_1 = k\Delta l_1$$

Similarly, for second:

$$F_2 = k\Delta l_2$$

Therefore:

$$\frac{F_2}{F_1} = \frac{\Delta l_2}{\Delta l_1}$$

$$\Delta l_2 = \frac{F_2}{F_1}\Delta l_1 = \frac{100}{80}0.4\ m = 0.5\ m$$

Length of the spring equals:

$$l = l_0 + \Delta l_2 = 8\ m + 0.5\ m = 8.5\ m$$

Answer: 8.5 m