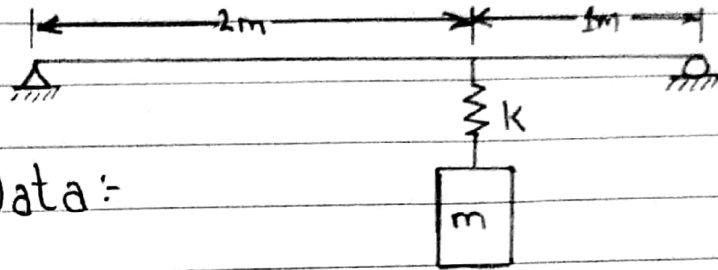


Q Determine the equivalent stiffness of system



Given Data:

$$E = 210 \times 10^9 \text{ N/m}^2$$

$$l = 3 \text{ m}$$

$$I = 5 \times 10^{-4} \text{ m}^4$$

$$a = 2 \text{ m}$$

$$K = 1 \times 10^8 \text{ N/m}$$

$$b = 1 \text{ m}$$

Solution:-

According to support of the system one pinned and other are roller.

$$\therefore K_2 = \frac{3EI}{a^2 b^2}$$

$$\therefore K_{eq} = \frac{K_1 \times K_2}{K_1 + K_2}$$

$$K_2 = \frac{3 \times (210 \times 10^9) \times (5 \times 10^{-4}) \times 3}{(2)^2 \times (1)^2}$$
$$= \frac{945,000,000}{4}$$

$$K_2 = 236,250,000 \text{ N/m}$$

$$K_{eq} = \frac{(1 \times 10^8) \times 236,250,000}{(1 \times 10^8) + 236,250,000}$$

$$K_{eq} = 7.03 \times 10^7 \text{ N/m}$$