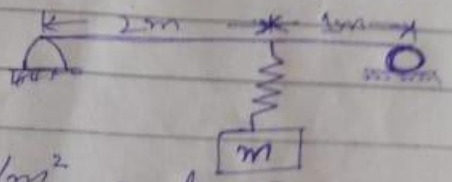
NAME	**MUHAMMAD ADNAN**
ID #	**6954**
ASSIGNMENT #	**03**
SUBMITTED TO	**Engr. KHURSHID ALAM**
SUBJECT	**EARTHQUAKE**
DATE	**19-06-2020**

Assignment # 03 Date 18-06-2020

Question # 01 :- Determine the Equivalent Stiffness of system Shown in figure

Give data:



$E = 210 \times 10^9 \ N/m^2$, $l = 3m$

$I = 5 \times 10^{-4} \ m^4$, $a = 2m$

$K = 1 \times 10^8 \ N/m$, $b = 1m$

Required data:

$K_{eq} = ?$

Solution:- According to support of the system one Pinned and other are roller.

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

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

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

$= \frac{945,000,000}{4}$

$K_2 = 236,250,000 \ N/m$

Now $K_{eq} = \frac{(1 \times 10^8) \times (236250000)}{(1 \times 10^8) + (236250000)}$

$$K_{eq} = \frac{2.36 \times 10^{16}}{336250000}$$

$$\boxed{K_{eq} = 7.03 \times 10^{7}}$$ Ans