INTRODUCTION

Name : Nouman Haider.

Student ID : 13727.

Program : B.Tech (civil).

Subject : Introduction to Earth Quake.

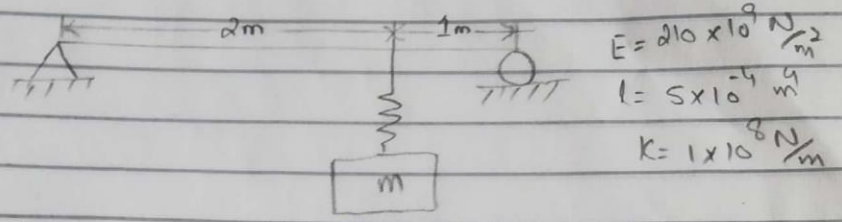
Semester : 06.

Assignment : 03.

Submitted To : Engr. Khurshid alam.

Name: Nouman Haider – Student ID # 13727
Program: B.tech (civil) – Semester # 06.
Assignment: "03"

Q NO: (01) Determine the equivalent stiffness of system shown in figure.



Given Data:
$E = 210 \times 10^9 \ N/m^2$
$I = 5 \times 10^{-4} \ m^4$
$k_1 = 1 \times 10^8 \ N/m$
length = 3m
$a = 2m$, $b = 1m$.

Required Data:
$K_{eq} = ?$

Sol:- According to the support of the system. one support is pinned and second one is roller supp
So then the formula of $K_2 = \frac{3EIl}{a^2 b^2}$
and the formula of equivalent stiffness $= K_{eq} = \frac{K_1 \times K_2}{K_1 + K_2}$

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

$$K_2 = \frac{945000000}{4}$$

$$K_2 = 236,250000$$

$$K_2 = 23625 \times 10^4$$

$$K_{eq} = \frac{(1 \times 10^8) \times (23625 \times 10^4)}{(1 \times 10^8) + (23625 \times 10^4)}$$

$$K_{eq} = \frac{2.3625 \times 10^{16}}{336250000}$$

$$K_{eq} = 70260223.05 \Rightarrow \boxed{K_{eq} = 7.03 \times 10^7 \ N/m}$$

Ans