

Surname

Professor

Course

Date

Title:

Question One

Solution

Shear forces

By taking the moments at A:

$$\Sigma MA = 0$$

$$20,000 * 10 + 400 * 15 * 15 / 2 + 400 * 5 * (5/2 + 15) - R_{BY} * 15 = 0$$

$$R_{BY} = 280/15 \text{ KLb}$$

$$\Sigma F_Y = 0$$

$$R_{AY} + R_{BY} = 400 * 20 + 20000$$

$$R_{AY} = 140/15 \text{ KLb}$$

$$\Sigma F_X = 0$$

$$R_{AX} = 0$$

Moments

$$M_A = -400 * 200 * 20/2 - 20,000 * 10 + 280000 * 15 / 15$$

$$= 0 \text{ Lbft}$$

$$M_C = -400 * 10 * 10/2 + 280,000 / 15 * 5$$

$$= 73333.33 \text{ Lbft}$$

$$= 73.3 \text{ KLbft}$$

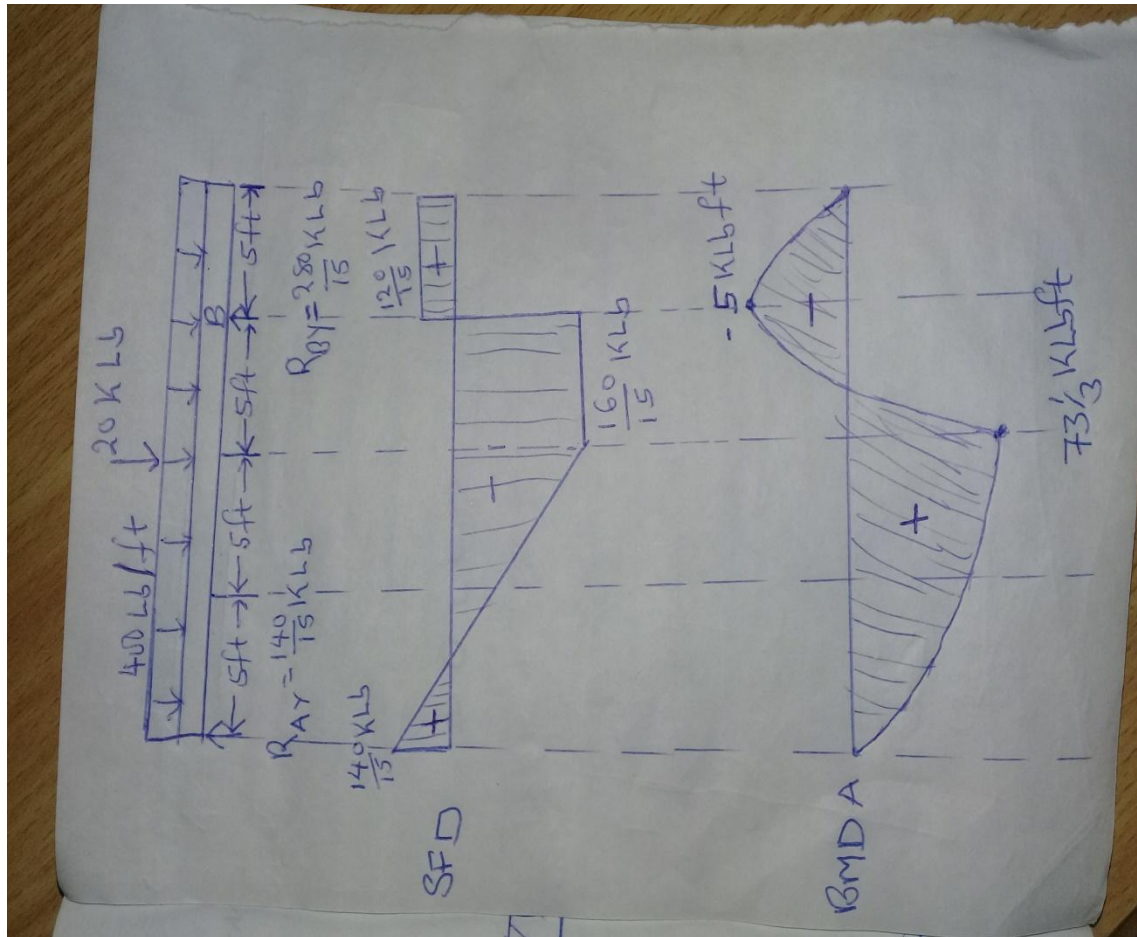
$$M_B = -400 * 5 * 5/2$$

$$= -5000 \text{ Lbft}$$

$$= -5 \text{ KLbft}$$

$$M_{MAX} = 73.33 \text{ KLbft}, M_{MIN} = -5 \text{ KLbft}$$

Shear and Moments Diagrams is as shown below



Question two**Solution****Shear Forces calculation**

By taking the moments at A:

$$\sum M_A = 0$$

$$R_{BY} * 20 - 2,000 * 15 - 400 * 10 * 10 / 2 = 0$$

$$R_{BY} = 2500 \text{ Lb}$$

$$\sum F_Y = 0$$

$$R_{BY} + R_{AY} = 400 * 10 + 2000$$

$$R_{AY} = 3500 \text{ Lb}$$

Bending Moments Calculations

$$M_A = 0 \text{ Lbft}$$

$$M_B = 0 \text{ Lbft}$$

$$M_C = 2500 * 15 - 400 * 10 * (10/2 + 5)$$

$$= 12,500 \text{ Lbft}$$

$$M_D = 2500 * 10 - 400 * 10 * 5$$

$$= 5,000 \text{ Lbft}$$

$$M_{\text{Max}} = 12,500 \text{ Lbft}, M_{\text{min}} = 5,000 \text{ Lbft}$$

Shear and bending moment's diagrams are as shown below

