

ADEPOJU MARY ABIMBOLA

17/ENG03/004

CIVIL ENGINEERING

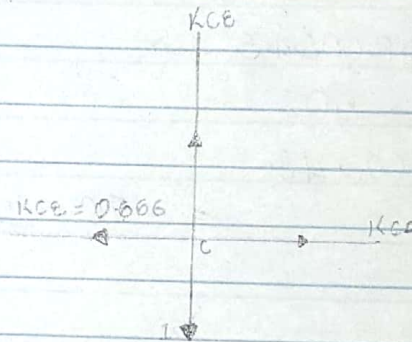
CVE 304

STRUCTURAL MECHANICS

ASSIGNMENT ONE

D)

Joint C



Resolving Horizontally

$$BC = 50\text{kN}$$

$$\therefore -BC + AC = 0$$

$$-50 + AC = 0$$

$$AC = 50\text{kN (Tension)}$$

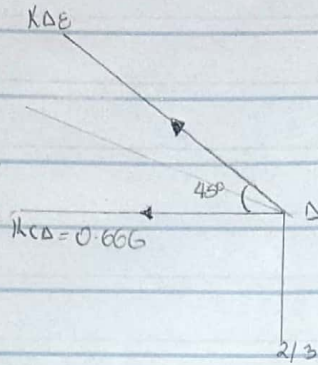
Resolving Vertically

$$-BC + FC = 0$$

$$-50 + FC = 0$$

$$FC = 50\text{kN (Tension)}$$

Joint D



Resolving horizontally

$$-BC - \Delta E \cos 45 = 0$$

$$-50 - \Delta E \cos 45 = 0$$

$$-50 = \Delta E \cos 45$$

$$\Delta E = \frac{-50}{\cos 45}$$

$$\cos 45$$

$$= -70.71 \text{ kN (COMPRESSION)}$$

2)

Member	l (m)	P (kN)	a (m ²)	P = P/a (kN/m ²)	u	PuL
AF	4.24	-70.71	0.0004	-176775	-0.471	353026.75
AB	3	50	0.0004	125000	0.333	12487.5
BC	3	50	0.0004	125000	0.666	24975.0
BF	3	50	0.0004	125000	0.333	12487.5
FE	3	50	0.0004	125000	-0.333	-12487.5
BE	4.24	0	0.0004	125000	-0.471	0
EC	3	50	0.0004	125000	1.000	37500
EA	4.24	-70.71	0.0004	-176775	-0.942	706053.5
CA	3	50	0.0004	125000	0.666	24975.0

$$\Sigma PuL = 1608567.5$$

$$\delta V = \frac{\Sigma PuL}{E} = \frac{1608567.5}{200000}$$

$$= 8.043 \text{ mm}$$