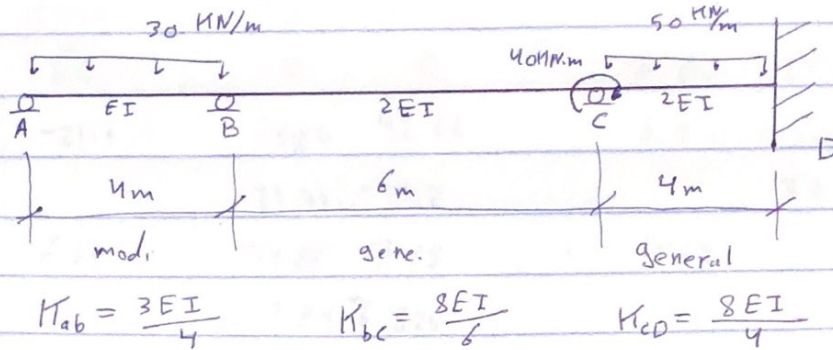


- Assignment : Moment distribution method:

Q.1

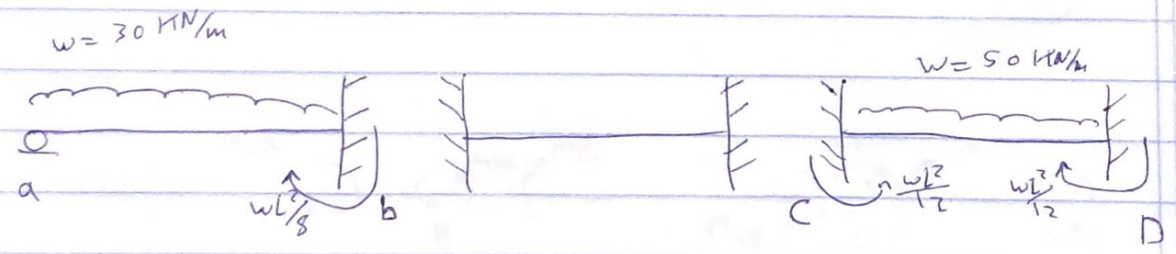


$$K_{ab} = \frac{3EI}{4} \quad K_{bc} = \frac{8EI}{6} \quad K_{cd} = \frac{8EI}{4}$$

Distribution Factors :

at a $\Rightarrow DF_{ab} = 1$	at D $\Rightarrow DF_{Dc} = 0$
at b $\left[\begin{array}{l} DF_{ba} = \frac{K_{ab}}{K_{ab} + K_{bc}} = 0.36 \\ DF_{bc} = 0.64 \end{array} \right.$	at C $\left[\begin{array}{l} DF_{cb} = 0.4 \\ DF_{cd} = 0.6 \end{array} \right.$

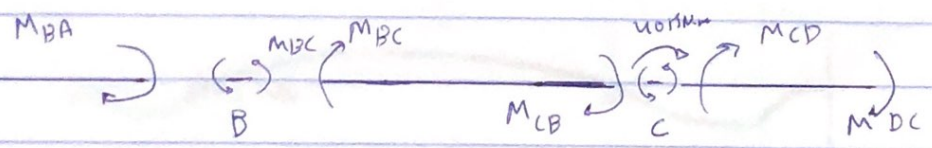
Fixed END Moments : *no settlement.



$$FEM_{ba} = 60 \text{ kNm} \quad FEM_{bc} = 0 \text{ kNm} \quad FEM_{cd} = -66.67 \text{ kNm}$$

$$FEM_{cb} = 0 \text{ kNm} \quad FEM_{dc} = 66.67 \text{ kNm}$$

	A	B		C		D
	AB	BA	BC	CB	CD	DC
DF	1.	0.36	0.64	0.4	0.6	0
FEM	0	60	0	0	-66.67	66.67
Dist.		-21.6	-38.4	42.66	64	
Co.			21.33	-19.2		32
Dist.		-7.68	-13.65	7.68	11.52	
Co.			3.84	-6.826		5.76
Dist.		-1.38	-2.46	2.73	4.096	
Co.			1.385	-1.23		2.048
Dist.		-0.5	-0.874	0.492	0.738	
Co.			0.246	-0.437		0.369
Dist.		-0.08856	-0.15744	0.175	0.2622	
Co.			0.0875	-0.07872		0.1311
Dist.	0	-0.0315	-0.056	0.0315	0.047	
	$M_{AB} = 0$	$M_{BA} = 28.72$ KN.m	$M_{BC} = -28.72$ KN.m	$M_{CB} = 26$ KN.m	$M_{CD} = 14$ KN.m	$M_{DC} = 107$ KN.m

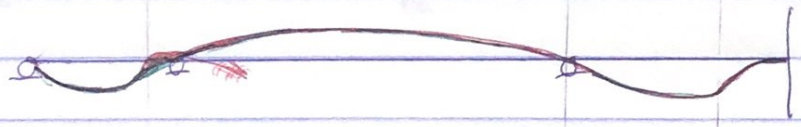
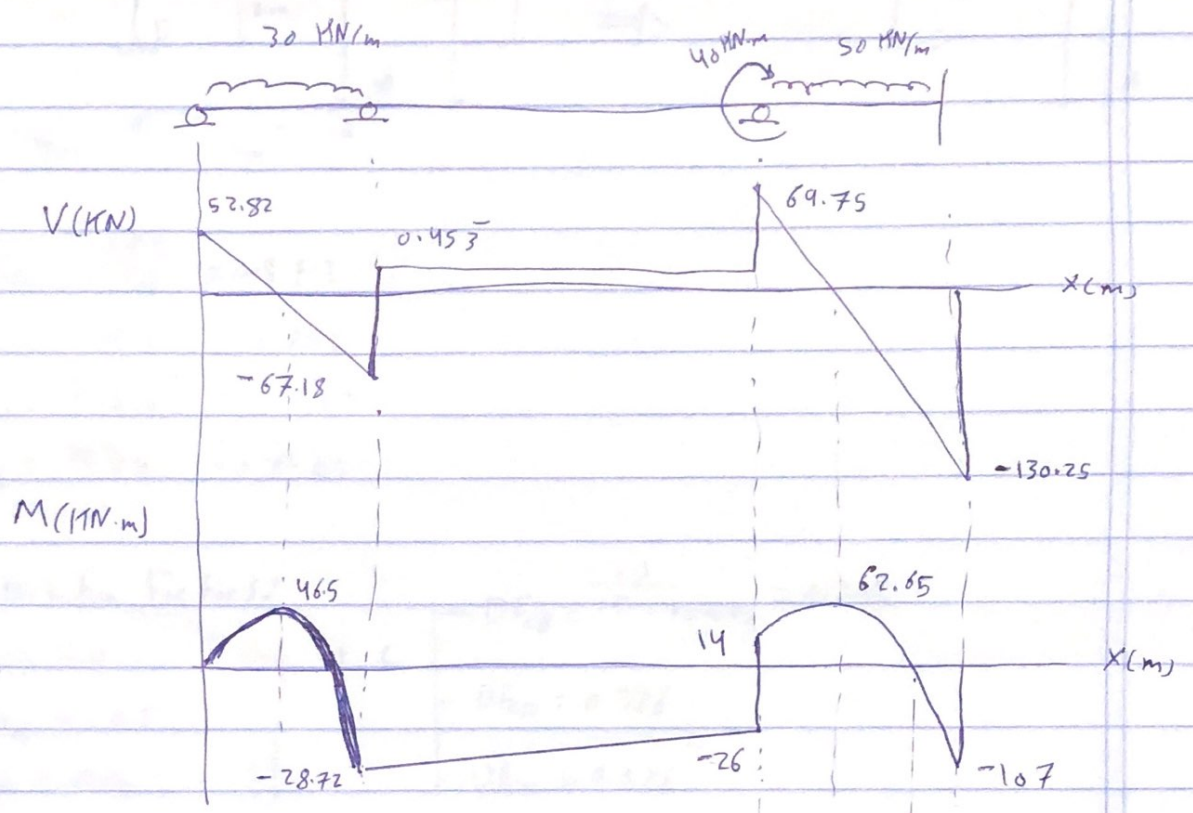
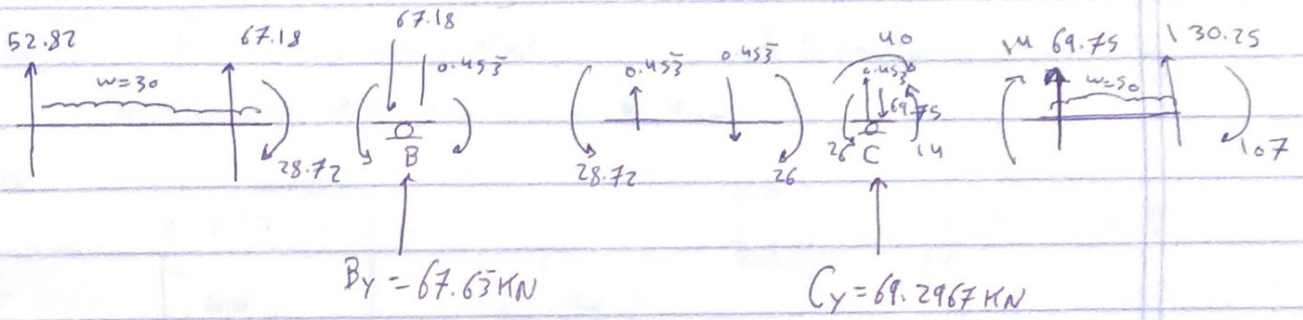


at B:

$$M_{BC} + M_{BA} = 0$$

at C:

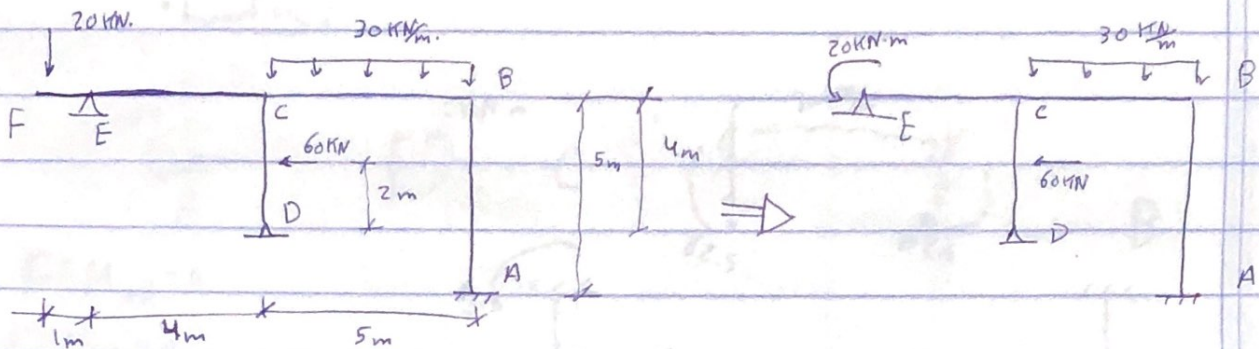
$$M_{CD} + M_{CB} = 40 \text{ KN.m.}$$



- Q 2: $EI = 100\,000 \text{ kN}\cdot\text{m}^2$

* Non-Sway System

Settlements: $A \downarrow 6 \text{ mm}$, $D \downarrow 4 \text{ mm}$.



$$K_{AB} = \frac{4EI}{5} = 0.8 EI$$

$$K_{BC} = \frac{4EI}{5} = 0.8 EI$$

$$\text{moddy. } \left\{ \begin{array}{l} K_{CD} = \frac{3EI}{4} = 0.75 EI \\ K_{CE} = \frac{3EI}{4} = 0.75 EI \end{array} \right.$$

Distribution Factors:

at A: $D_{AB} = 0$

at B: $D_{BA} = 0.5$

$D_{BC} = 0.5$

at C

$$D_{CB} = \frac{0.8}{0.8 + 0.75 + 0.75} = 0.348$$

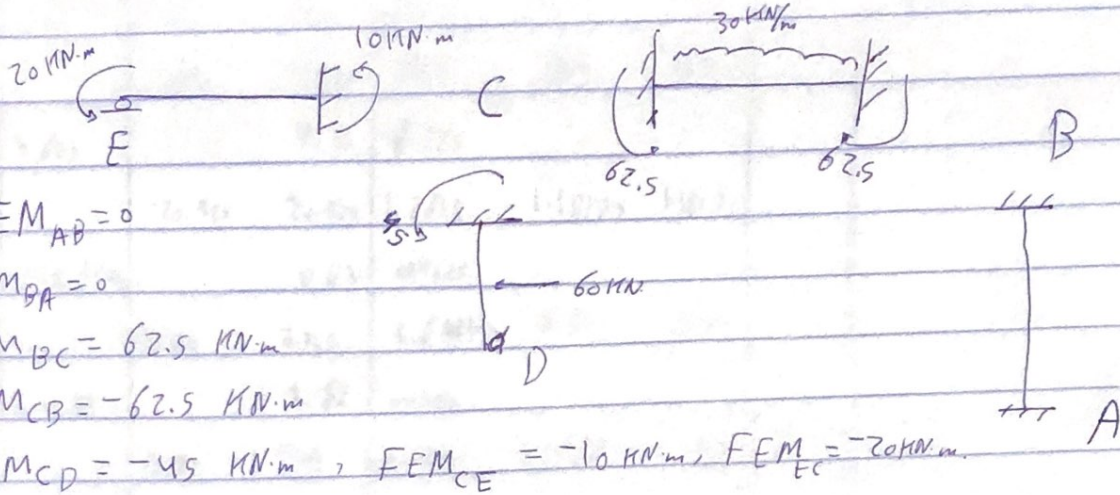
$$D_{CD} = 0.326$$

$$D_{CE} = 0.326$$

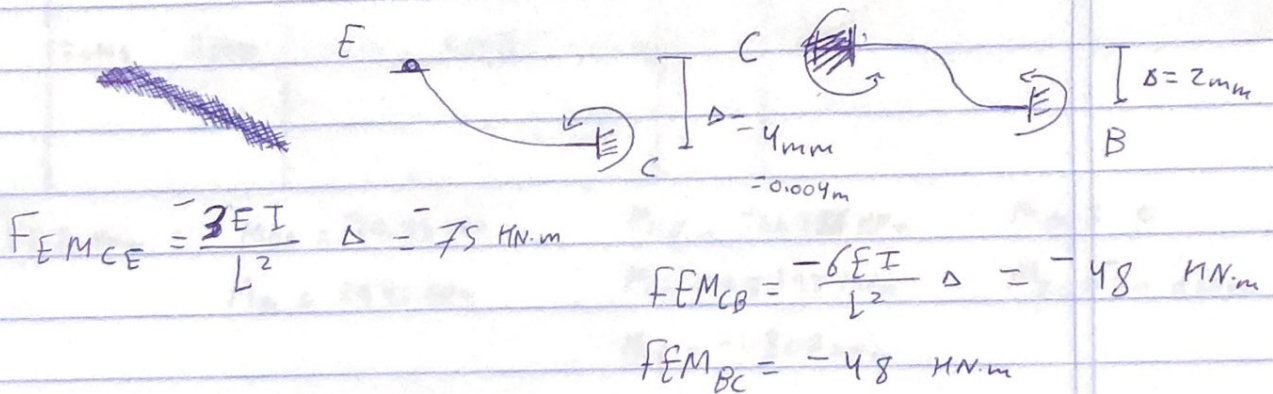
at D: $D_{DC} = 1$, $D_{DE} = 1$

- Fixed END Moments δ (from applied loading + settlement)

• Loading:



• Settlement:



• $FEM = FEM_{load} + FEM_s$

$$FEM_{AB} = 0, \quad FEM_{BA} = 0, \quad FEM_{BC} = 62.5 - 48 = 14.5 \text{ kN}\cdot\text{m}$$

$$FEM_{CB} = -62.5 - 48 = -110.5 \text{ kN}\cdot\text{m}$$

$$FEM_{CD} = -45 \text{ kN}\cdot\text{m}, \quad FEM_{CE} = -85 \text{ kN}\cdot\text{m}$$

$$FEM_{EC} = -20 \text{ kN}\cdot\text{m}$$

	A	B		C			D	E	at B ^o $M_{BA} + M_{BC} = 0$
	AB	BA	BC	CB	CD	CE	DC	EC	at C ^o $M_{CB} + M_{CD} + M_{CE} = 0$
DF	0	0.5	0.5	0.348	0.326	0.326	1	1	
FEM	0	0	14.5	-110.5	-45	-85	0	-20	
Dist.		-7.25	-7.25	83.7	78.4	78.4			
Co.	3.625		41.85	3.625					
Dist.		-20.925	-20.925	1.2815	1.18175	1.18175			
Co.	-10.4625		0.63	-10.4625					
Dist.		-0.315	-0.315	3.641	3.41	3.41			
Co.	-0.1575		1.82	-0.1575					
Dist.		-0.91	-0.91	0.055	0.051345	0.051345			
Co.	-0.455		0.0275	-0.455					
Dist.		-0.01375	-0.01375	0.158	0.148	0.148			
Co.	-0.006875		0.079	-0.006875					
Dist.		-0.0395	-0.0395	0.0024	0.00224	0.00224			
Co.									
Dist.									

$$M_{AB} = 14.7 \text{ kNm}$$

$$M_{BA} = 29.45 \text{ kNm}$$

$$M_{CB} = -36.386 \text{ kNm}$$

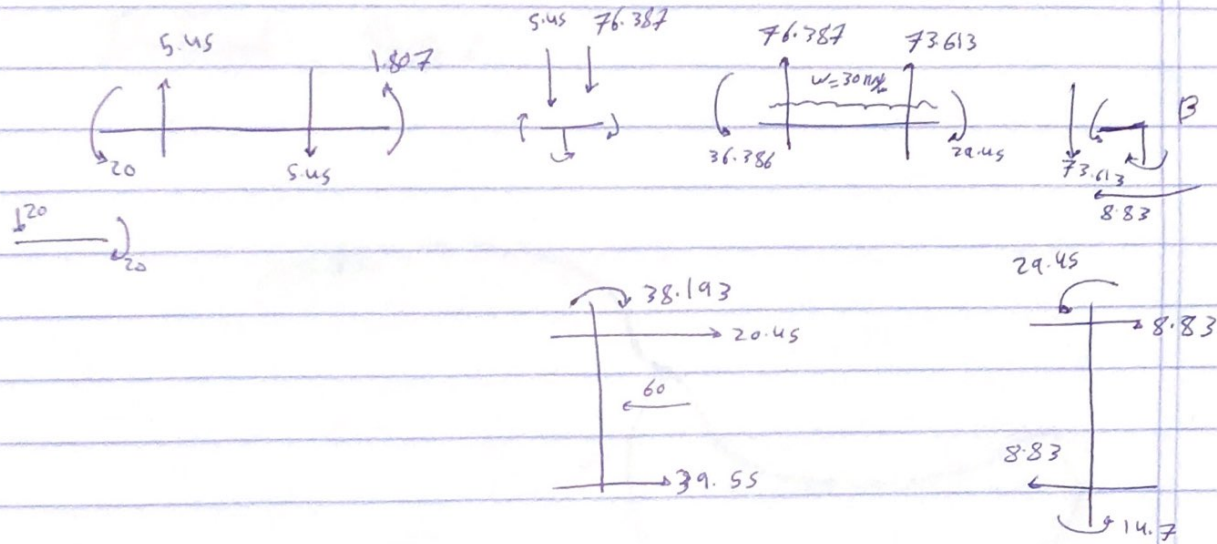
$$M_{DC} = 0$$

$$M_{BC} = 29.45 \text{ kNm}$$

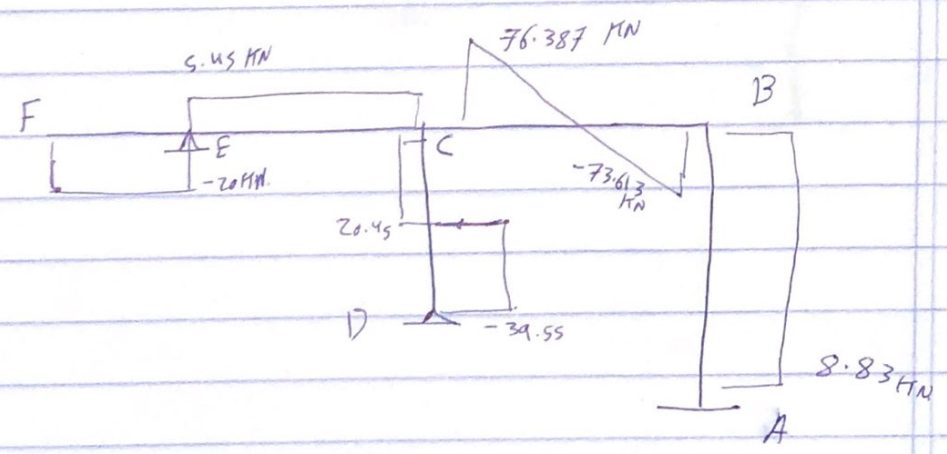
$$M_{CD} = 38.193 \text{ kNm}$$

$$M_{EC} = -20 \text{ kNm}$$

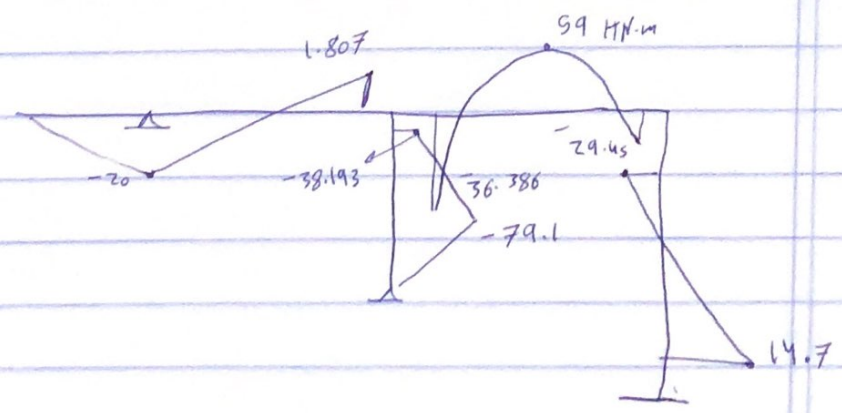
$$M_{CE} = -1.807 \text{ kNm}$$



Shear \circ
Diagram



Bending Moment \circ
Diagram



Deformed Shape of

