F → Plex T → theory N → not mention
M → mem
S →

16-17

1 (a) → theory
(b) → Flex
2 (a) → T
(b) → F/N
3 (a) → F/N
(b) → F
4 (a) → S
5 (a) → M
(b) → M
6 (a) → M
(b) → M
7 (a) → M
(b) → S
8 (a) → S
(b) → S

S → 4
F → 4
M → 5

15-16

1 (a) → M
(b) → M
2 (a) S
(b) S
3 (a) S
(b) M
4 (a) M
(b) S
5 (a) F
(b) F
6 (a) F
(b) F
7 (a) F
(b) S
8 (a) N
(b) S

S → 5
F → 5
M → 4

14-15

1 (a) F
(b) F
2 (a) F
(b) F
3 (a) S
(b) S
4 (a) S
(b) → T
5 (a) T
(b) M
6 (a) M
(b) M
7 (a) S
(b) F
8 (a) S
(b) S

S → 6
F → 5
M → 3

13-14

1 (a) M
(b)
2 → F
3 → M
4 → F
5 → M
6 → F
7 → M
8 → S
9 → S
10 → S
11 → S
12 → S
13 → S
14 → F

S → 6
F → 4
M → 4

12-13

1 (a) M
(b) S
2 (a) M
(b) S
3 (a) S
(b) S
4 (a) S
5 (a) F
(b) F/T
6 (a) F
(b) F
7 (a) F
(b) F
8 F.

S → 4
F → 6
M → 2

11-12

1 (a) F
(b) S
2 (a) F
(b) S
3 (a) N
(b) S
4 → S
5 (a) M
(b) F
6 (a) # Score
(b) M
7 (a) M
8 (a) # Score
(b) —

S → 4
F → 3
M → 3

13 → 4

11 12
10 11
8 9

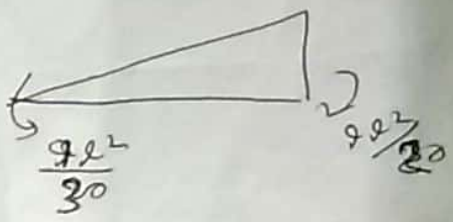
Nothing is certain.

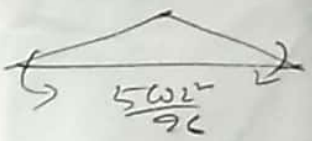
10-11

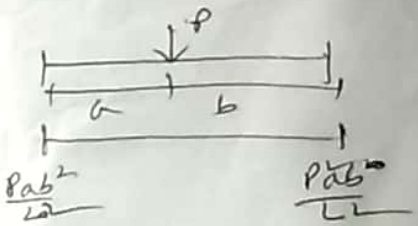
1 (a) IF
(b) M
2 (a) S
(b) M
3 (a) M
(b) IF
4 (a) M
(b) T
5 (a) F
(b) S
6 (a) S
(b) S
7 (a) S
(b) S
8 (a) S

9-10

1 (a) F/S
(b) IF
2 (a) M
(b) M
3 (a) S
(b) M
4 (a) IR
(b) M
5 (a) S
(b)
6 (a)
(b) F
7 (a) S
(b) S
8 (a) S
(b) F







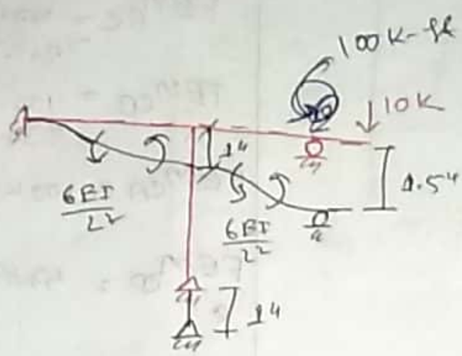
2016-17

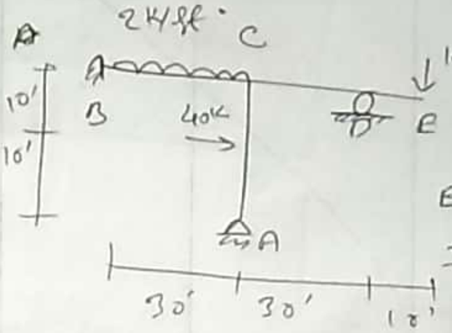
6 (a)

Frame এর solve এ হলে আমাকেও প্রথমে একটু দেখে নিবেন কিছু হলে আমাকে জানা

A ↓ 1 in

D ↓ 1.5 in.





E = 10 × 10³ k/in²

I = 3000 in⁴

$DF_{BC} = 0.$

$$DF_{CB} = \frac{I/30}{I/30 + I/30 \times 3/4 + I/20 \times 3/4} = 0.35$$

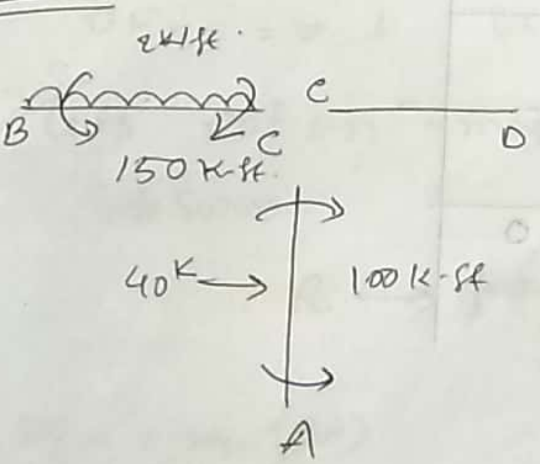
$$DF_{CD} = \frac{I/30 \times 3/4}{I/30 + I/30 \times 3/4 + I/20 \times 3/4} = 0.26$$

$DF_{CA} = 1 - 0.35 - 0.26 = 0.39$

$DF_{AC} = 1.$

$DF_{DC} = 1.$

FEM



Settlement

$$FEM_{BC} = FEM_{CB} = \frac{6EI}{L^2}\Delta$$

$$= \frac{6 \times 10000 \times 3000 \times 1}{30^2 \times 12^3}$$

$= 115.74$ k-ft

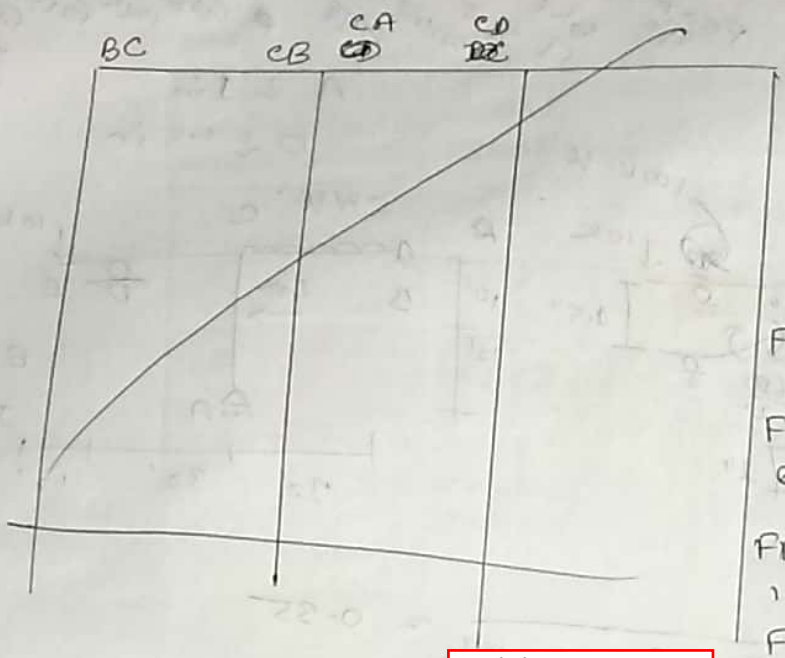
$$FEM_{CD} = FEM_{DC} = \frac{6EI}{L^2}\Delta$$

$\Delta = 1.5 - 1$

$= 0.5"$

$$= \frac{6 \times 10000 \times 3000}{30^2 \times 12^3} \times 0.5$$

$= 57.87$ k-ft.



$FEM_{BC} = 150 + 115.74 = 265.74$ (1)

$FEM_{CB} = 150 - 115.74 = 34.26$ (2)

$FEM_{CA} = 100K$ (3)

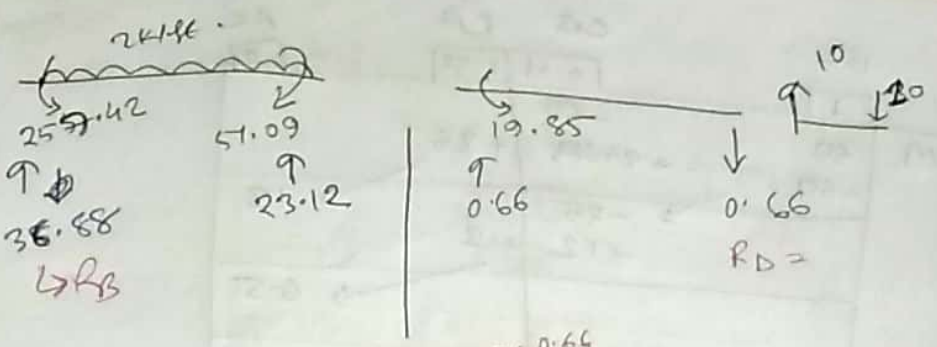
$FEM_{CD} = 57.87$ (4)

$FEM_{DC} = 57.87$ (5)

$FEM_{AC} = 100K$ (6)

-100 hobe

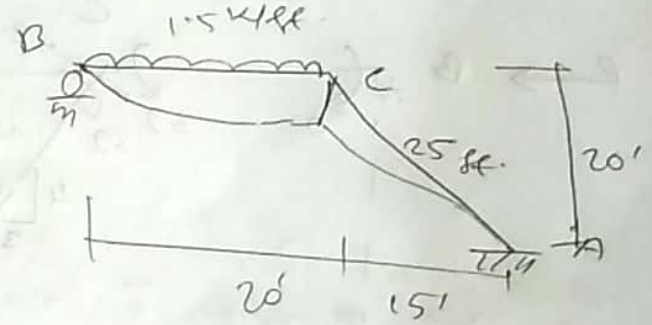
	BC	CB	CA	CD	DC	AC
DF	0	0.35	0.39	0.26	1	1
FEM	265.74	-34.26	150	57.87	57.87	100
		-43.26	-48.21	-32.14	-57.87	-100
	-21.63		-50	-28.94	-16.07	
		27.63	30.79	20.52	+16.07	
	13.82			8.04	10.26	
		-2.81	-3.14	-2.09	-10.26	
	-1.41			-5.13	-1.045	
		+1.8	2	1.33	+1.045	
	0.9			0.53		
		-0.19	-0.24	-0.14		
	257.92	-51.09	31.23	19.85	0	0



2016-17

7(a)

Not sure



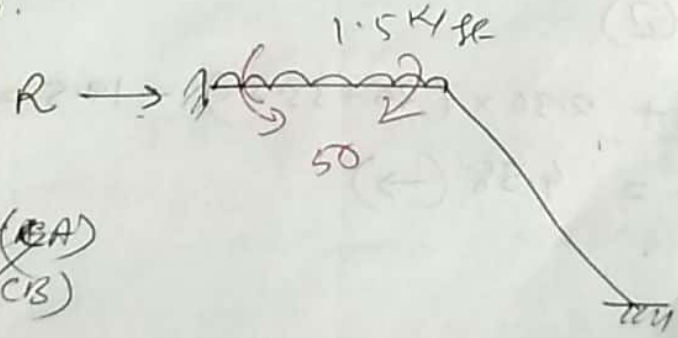
$$DF_{CB} = \frac{\frac{1}{20} \times \frac{3}{4}}{\frac{3}{4} \times \frac{1}{20} + \frac{1}{25}}$$

$$= 0.48$$

$$DF_{CA} = 1 - 0.48 = 0.52$$

$DF_{BC} = \infty$ 1 $DF_{AC} = 0$.

Case 1 Lets put an imaginary support to prevent side sway.

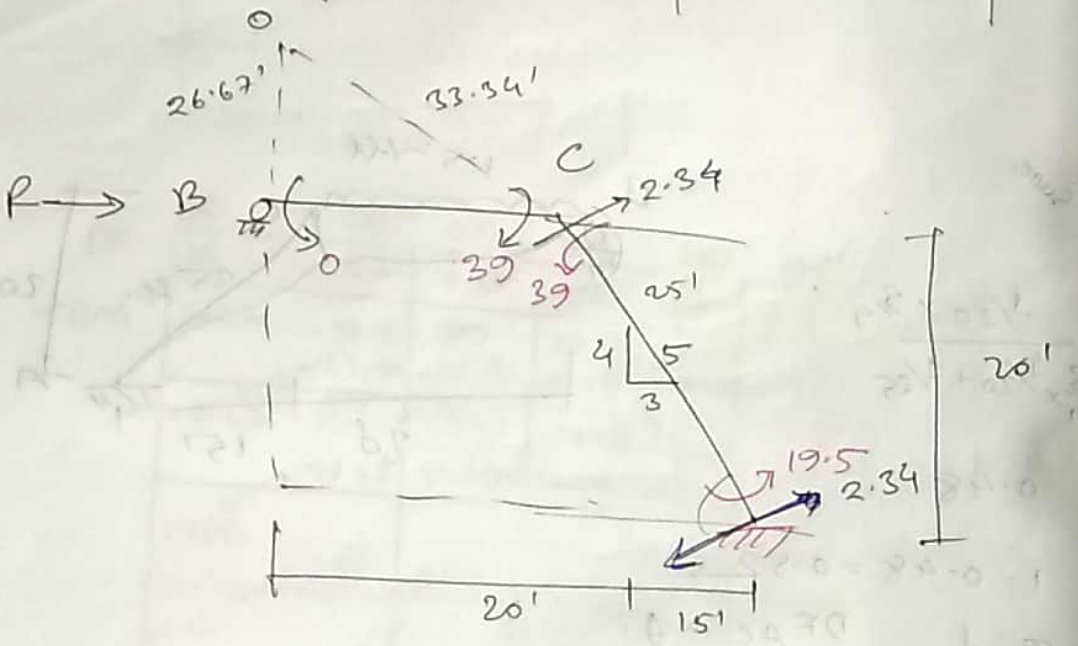


~~DF = 0.44 (BA)~~

~~DF = 0.66 (CB)~~

Side sway prevented.

	BC	CB	CA	AC
DF	1	0.48	0.52	0
FEM	50	−50		
	−50	+24	+26	
		−25		→ 13
		+12	+13	
				→ 6.5
	0	−39	39	19.5



$$\frac{OB+20}{35} = \frac{OB}{20} \Rightarrow OB = 26.67 \text{ ft.}$$

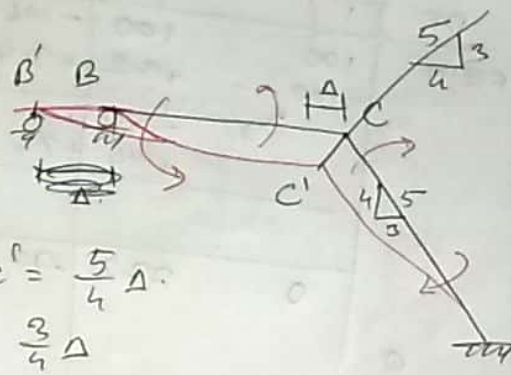
$\therefore M_O = 0 \cdot (2)$

$$-R \times 26.67 + 2.34 \times (25 + 33.34) - 19.5 = 0$$

$$\Rightarrow R = 4.88 (\rightarrow)$$

Case 2

Sway permitted.



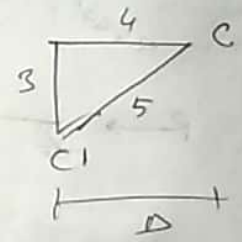
$\Delta AC = CC' = \frac{5}{4}\Delta$

$\Delta BC = \frac{3}{4}\Delta$

$FEM_{AC} = FEM_{CA} = -\frac{6EI}{L^2}\Delta$

$= -\frac{6EI}{25^2} \times \frac{5}{4}\Delta$

$= -\frac{3}{250} EI\Delta$



$FEM_{BC} = FEM_{CB} = \frac{6EI}{L^2} \times \Delta$

$= \frac{6EI}{20^2} \times \frac{3}{4}\Delta = \frac{9}{800} \times EI\Delta.$

Let

$FEM_{AC} = FEM_{CA} = -\frac{3}{250} EI\Delta = -100$ kNm

$\Rightarrow EI\Delta =$

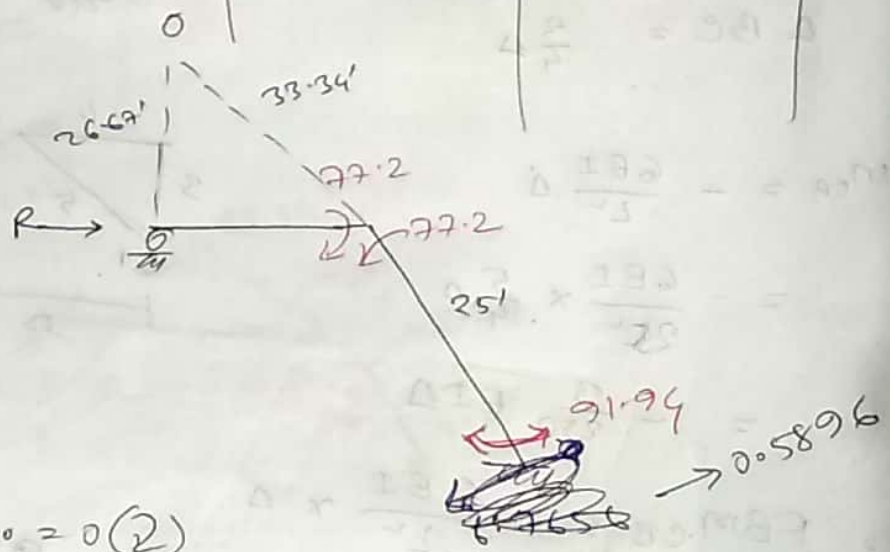
$FEM_{BC} = FEM_{CB} = \frac{9}{800} \times EI\Delta = 100$

$\Rightarrow EI\Delta = 8888.89$

$\therefore FEM_{AC} = FEM_{CA} = -\frac{3}{250} \times 8888.89$

$= -106.67$

	BC	CB	CA	AC
DF	1	0.48	0.52	0
FEM	100	100	-106.67	-106.67
	-100	+3.2	+3.47	
		-50		+1.73
		+24	+26	
				+13
	0	77.2	-77.2	-91.94



$M_0 = 0$ (2)

$\Rightarrow -R \times 26.67 + 0.5896 \times (33.34 + 25) + 91.94 = 0$

$\Rightarrow R = 2.157 (\rightarrow)$

Actual moment

$M_{BC} = 0$

$M_{CB} = -39 + \frac{4.38}{11.35} \times 77.2 = -9.2 + 117.76$

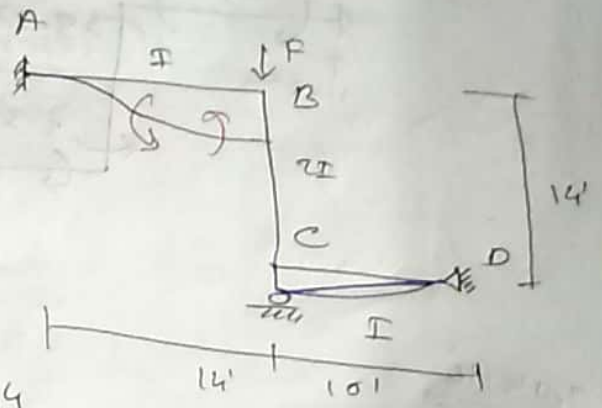
$M_{CA} = 39 + \frac{4.38}{11.35} \times (-77.2) = -9.2 - 117.76$

$M_{AC} = 19.5 + \frac{4.38}{11.35 \times 2.157} \times (-91.94)$

$= -167.19$

2015-16

1 (b)



$DF_{AB} = 0$

$DF_{BA} = \dfrac{I/14}{I/14 + 2I/14} = 0.33$

$DF_{BC} = 0.67$

$DF_{CD} = \dfrac{I/10 \times 3/4}{I/10 \times 3/4 + \frac{2I}{14} \times} = 0.34$

$DF_{CB} = 1 - 0.34 = 0.66$

$DF_{DC} = 1$

$FEM_{AB} = \dfrac{6EI}{14^2} \Delta = FEM_{BA}$

$= \dfrac{63000}{14^2} \times 0.15$

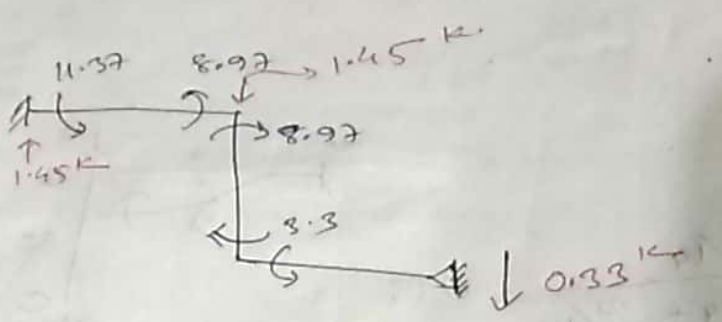
$= 13.77$ K-ft.

	AB	BA	BC	CB	CD	DC
DF	0	0.33	0.67	0.34	0.66	1
FEM	13.77	13.77				
		-4.54	-9.23			
	-2.27			-4.61		
				+1.57	3.04	
			0.79			1.52
		-0.26	-0.55			-1.52
	-0.13			-0.26	-0.26	
					+	
	11.37	8.97	-8.97	-3.3	3.3	(1)

~~1.58~~

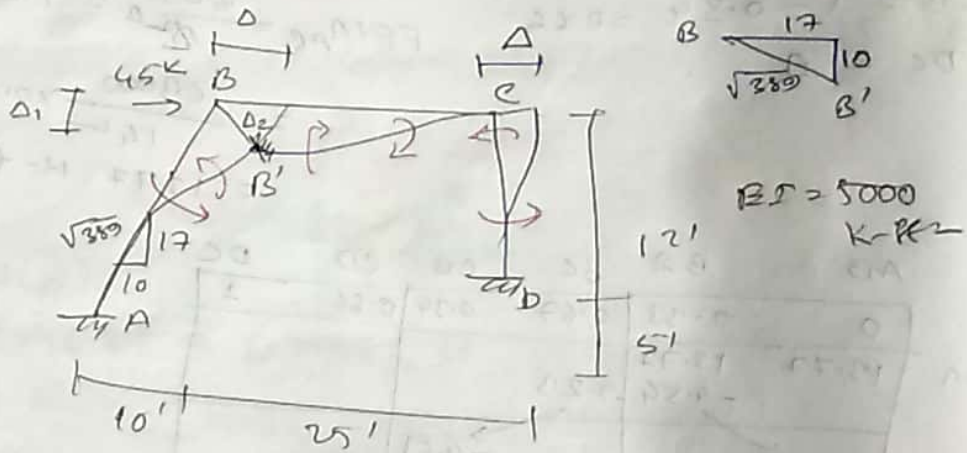
-0.26

→ 0.3



2015-16

3 (b)



$DF_{AB} = 0$

$$DF_{BA} = \frac{I/\sqrt{389}}{I/\sqrt{389} + I/25} = 0.56$$

$DF_{BC} = 1 - 0.56 = 0.44$

$$DF_{CB} = \frac{I/25}{I/25 + I/12} = 0.324$$

$DF_{CD} = 1 - 0.324 = 0.676$

$DF_{DC} = 0.$

$$\frac{\Delta}{17} = \frac{\Delta_1}{10} = \frac{\Delta_2}{\sqrt{389}}$$

$$\Rightarrow \Delta_1 = \frac{10}{17}\Delta$$

$$\Delta_2 = \frac{\sqrt{389}}{17}\Delta$$

$EI = 5000$

$$FEM_{AB} = FEM_{BA} = \frac{6EI}{L^2}\Delta_2$$

$$= \frac{6EI}{(\sqrt{389})^2} \times \frac{\sqrt{389}}{17}\Delta$$

$$= \frac{30\,000}{17}\Delta = \boxed{100\ K\text{-}ft}$$

$$\therefore \Delta = \frac{17}{300}.$$

$$FEM_{BC} = FEM_{CB} = -\frac{6EI}{L^2}\Delta_1$$

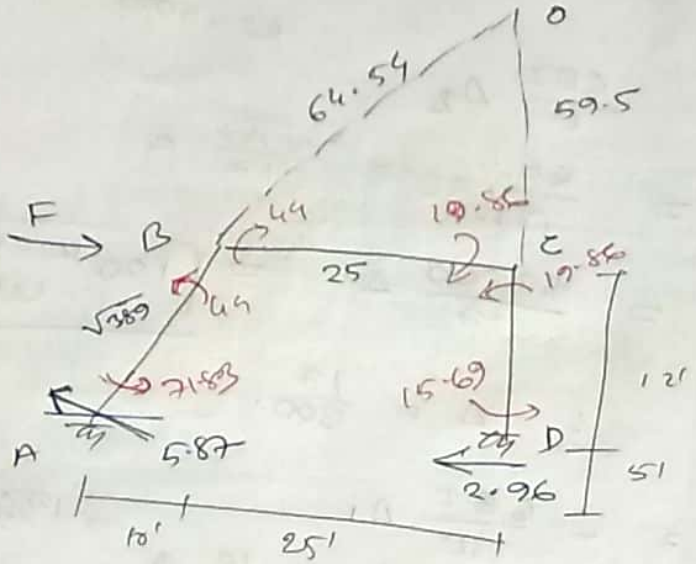
$$= -\frac{6\times5000}{25^2} \times \frac{10}{17}\Delta \quad (\Delta \to 17/300)$$

$$= -\cancel{85\ K\text{-}ft} \cdot = -1.6\ K\text{-}ft.$$

$$FEM_{CD} = FEM_{DC} = \frac{6EI}{L^2}\Delta \quad (\Delta \to 17/300)$$

$$= \frac{6\times5000}{12^2} \times \Delta = \frac{425}{36} = 11.8\ K\text{-}ft$$

	AB	BA	BC	CB	CD	DC
DF	0	0.56	0.44	0.324	0.676	0
FEM	100	100	-1.6	-1.6	11.8	11.8
		-55.27	-43.43	-3.3	-6.9	
	-27.64		-1.65	-21.72		-3.45
		0.92	0.73	+7.03	14.68	
	0.46		3.52	0.37		7.34
		-1.97	-1.55	-0.12	-0.25	
	-0.99		-0.78	-0.78		
		+0.03	0.03	0.252	0.527	
	71.83	43.71 ≈ 44	-44	-19.86	19.86	15.69



$\frac{OC+17}{35} = \frac{OC}{25}$

$\Rightarrow OC = 59.5$

$\Sigma M_O = 0$

$\Rightarrow -F \times 64.54 + 5.87(64.54 + \sqrt{389}) + 2.96 \times (59.5+12) - 71.83 - 15.69$

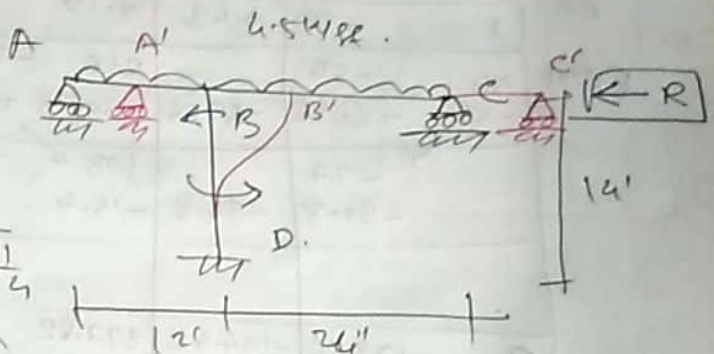
$\Rightarrow F = 9.58 \ (\rightarrow)$

$\therefore \Delta = \frac{17}{300}$ for $F = 9.58(\rightarrow)$

$\therefore \Delta = \frac{.45}{9.58} \times \frac{17}{300} = 0.26$ ft for $F = 45$ k

2015-16

4 (a)



$DF_{AB} = 1$

$DF_{BA} = \dfrac{\frac{3}{4} \times \frac{1}{12}}{\frac{3}{4} \times \frac{1}{12} + \frac{3}{4} \times \frac{1}{24} + \frac{1}{14}}$

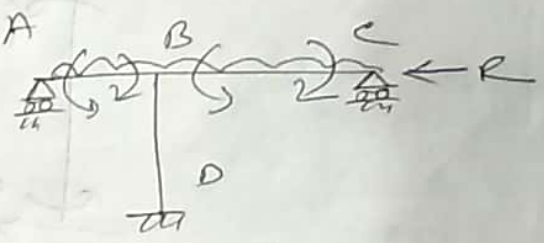
$= 0.38$

$DF_{BC} = \dfrac{\frac{3}{4} \times \frac{1}{24}}{\square} = 0.19$

$DF_{BD} = 1 - 0.38 - 0.19 = 0.43$

$DF_{CB} = 1$

$DF_{DB} = 0.$



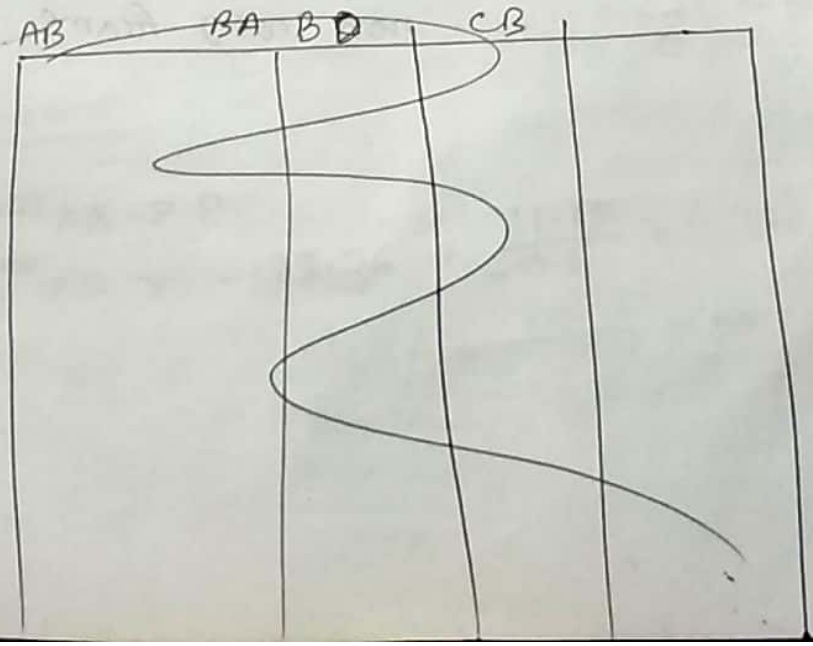
Case-1

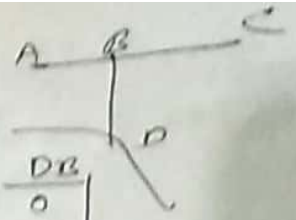
$FBM_{AB} = -FBM_{BA}$

$= \dfrac{4.5 \times 12^2}{12} = 54$ k-ft.

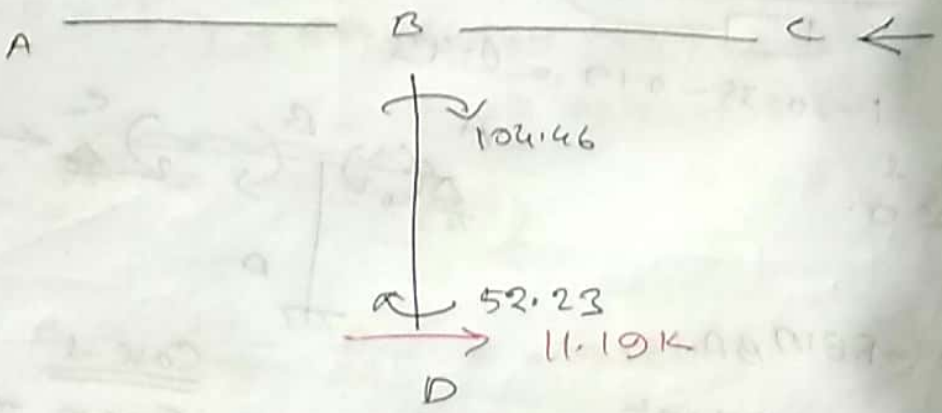
Case-1
Sway restricted.

$FBM_{BC} = -FBM_{CB} = \dfrac{4.5 \times 24^2}{12} = 216$ k-ft.





	AB	BA	BD	BC	CB	DB
DF	1	0.38	0.43	0.19	1	0
FEM	54	-54				
	-54	-61.56	-69.66	216	-216	
				-30.78	+216	
		-27		108		→ -69.66/2
		-30.8	-34.8	-15.4	-34.83	
					-17.4	
	0	-173.36	-104.46	277.82	0 -52.23	

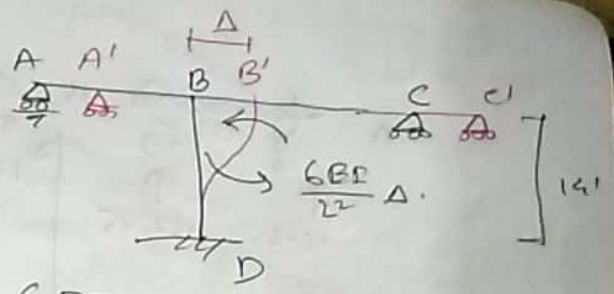


∴ R = 11.19K ←

to be applied to make it non sway frame.

Case-2

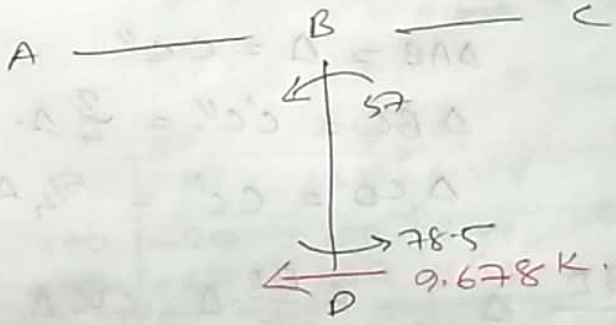
Sway permitted



$FEM_{BD} = FEM_{DB} = \frac{6EI}{L^2}\Delta. = 100K$

$\Rightarrow EI\Delta = 3266.67$

	AB	BA	BD	BC	CB	DB
DF	1	0.38	0.43	0.19	1	0
			100			100
		-38	-43	-19		
						-21.5
Σ=	0	-38	57	-19		78.5



Actual moment

$M_{AB} = 0$

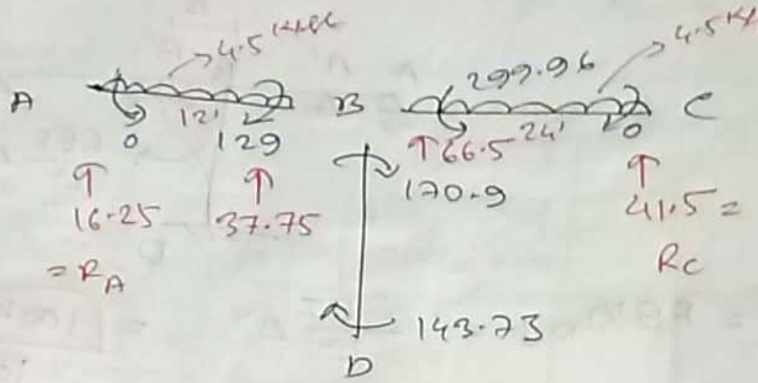
$M_{BA} = -173.36 + \frac{11.19}{-9.6} \times (-38) = -129$

$M_{BD} = -104.46 + \frac{11.19}{-9.6} \times 57 = -170.9$

$M_{BC} = 277.82 + \frac{11.19}{-9.6} \times (-19) = 299.96$

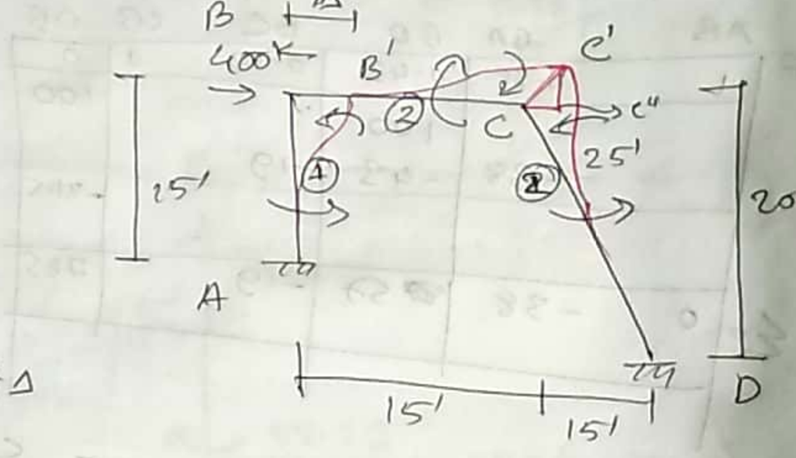
$M_{CB} = 0$

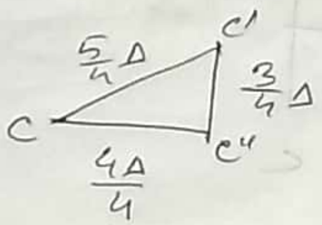
$M_{DB} = -52.23 + \frac{11.19}{-9.6} \times (78.5) = -143.73$



2014-15

6 (a)





$\Delta_{AB} = \Delta = CC''$

$\Delta_{BC} = C'C'' = \frac{3}{4}\Delta$

$\Delta_{CD} = CC' = \frac{5}{4}\Delta$

$$FEM = \frac{6EI}{L^2}\Delta = \frac{6\frac{EI}{L}\cdot\Delta}{L} = \frac{6K\Delta}{L}$$

K মিলানোর জন্য
K এর value যেহেতু
সমান EI ধরা হল

$$FEM_{AB} = FEM_{BA} = \frac{6K\Delta_{AB}}{L}$$

$$= \frac{6\times 1\times\Delta}{15} = \frac{6}{15}\Delta$$

Let $FEM_{AB} = FEM_{BA} = \frac{6}{15}\Delta = \boxed{100\ K}$

$\Rightarrow \Delta = 250$

$\therefore FEM_{BC} = FEM_{CB} = -\frac{6K\Delta}{L}$

$= -\frac{6\times 2}{15} \times 250$

$= -200\ K\text{-ft}$

$FEM_{CD} = FEM_{DC} = \frac{6K\Delta}{L} = \frac{6\times 2\times 250}{25}$

$= 120\ K\text{-ft}$

DF

$DF_{AB} = 0$

$DF_{BA} = \frac{I/15}{I/15 + 2I/15} = 0.33$ $\quad DF_{BC} = 1 - 0.33 = 0.67$

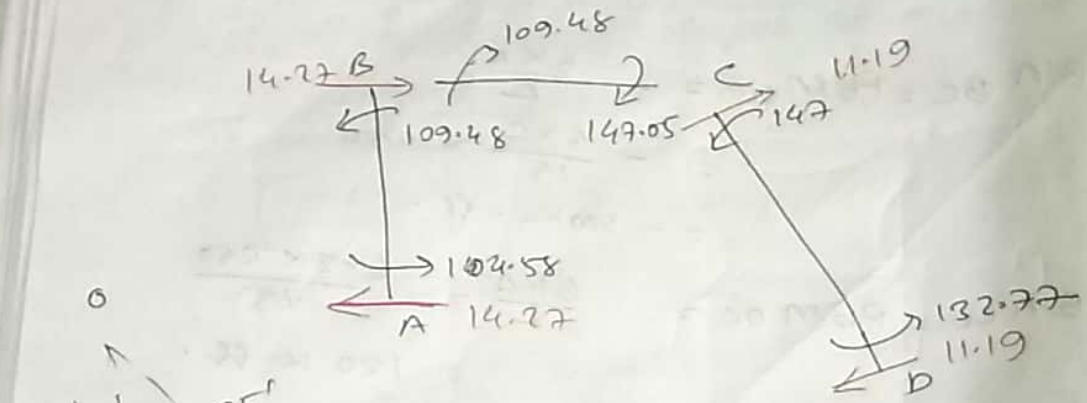
$DF_{CB} = \frac{2I/15}{2I/15 + \frac{2I}{25}} = 0.625$

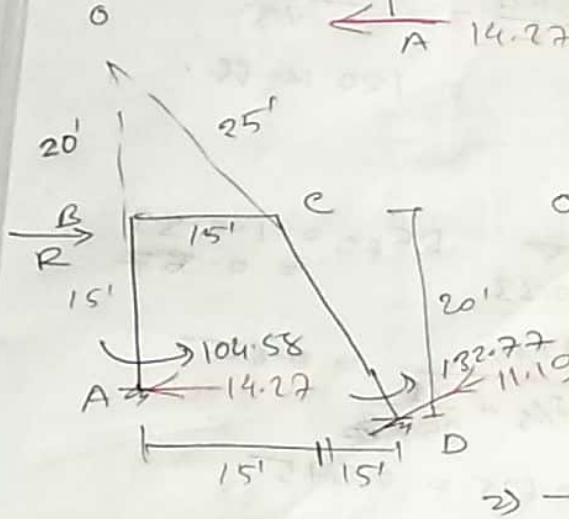
$DF_{CD} = 1 - 0.625 = 0.375$

$DF_{DC} = 0$

	AB	BA	BC	CB	CD	DC
DF	0	0.33	0.67	0.625	0.375	0
FEM	100	100	−200	−200	120	120
		+33	+67	+50	+30	
	16.5		75	33.5		15
		−24.75	−50.25	−20.94	−12.56	
	−12.375		−10.47	−25.125		−6.28
		+3.46	+7.01	+15.7	9.42	
	1.76		7.85	3.5		4.71
		−2.59	−5.26	−2.19	−1.31	
	−1.3		−1.09	−2.63		−0.66
		+0.36	0.73	+1.64	+0.99	

Σ	104.58	109.48	-109.48	-147.05	+147	132.77
	AB	BA	BC	CB	CD	DC





$$\frac{OB+15+5}{15+15} = \frac{OB}{15}$$

$$\Rightarrow OB = 20'$$

$$\Sigma M_O = 0$$

$$\Rightarrow -R\times 20 + 14.27\times(20+15) + 11.19\times(20+25) - 132.77 - 104.58$$

$$\Rightarrow R = 39.88 (\rightarrow)$$

Actual Moment

$\rightarrow 10.03$

$$M_{AB} = \frac{400}{39.88}\times 104.58 = 1048.93$$

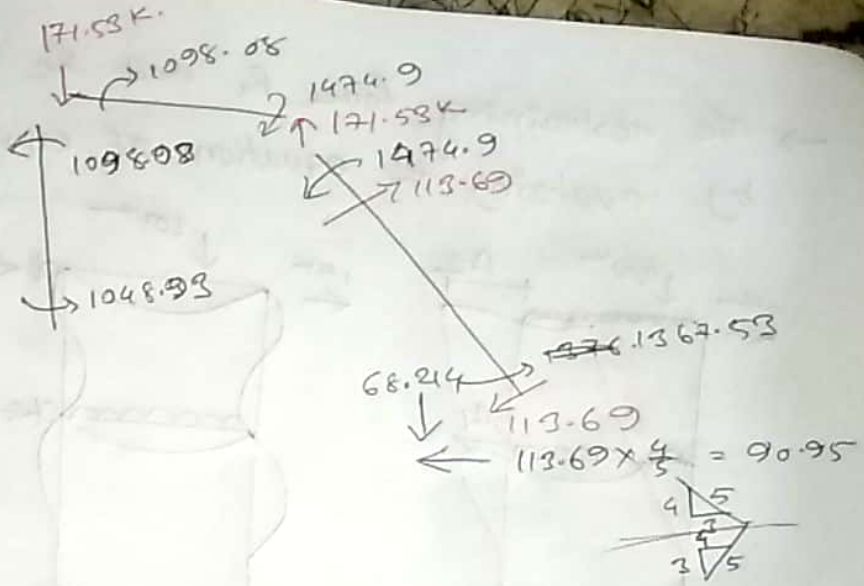
$$M_{BA} = 10.03\times 109.48 = 1098.08$$

$$M_{BC} = 10.03\times(-109.48) = -1098.08$$

$$M_{CB} = -147.05\times 10.03 = -1474.9$$

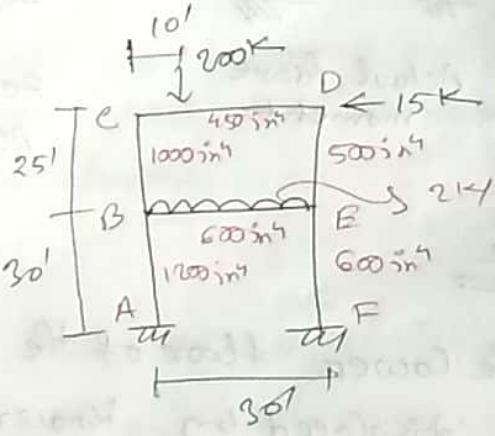
$$M_{CD} = +1474.9$$

$$M_{DC} = 132.77\times 10.3 = 1367.53$$



2014-15

6 (b)



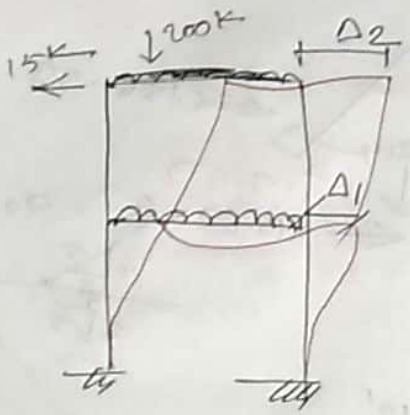
The moment distribution analysis is carried out in 3 parts.

Part-1

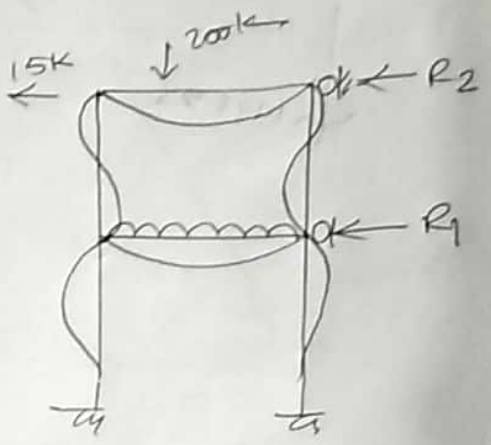
→ the side sway of both floor is prevented by imaginary roller.

→ The ~~moment~~ member end moments Mo ~~one~~ which is caused by the external load is evaluated by moment distribution process

→ The restraining force R_1 and R_2 evaluated by applying the equation of equilibrium.



Actual frame moment



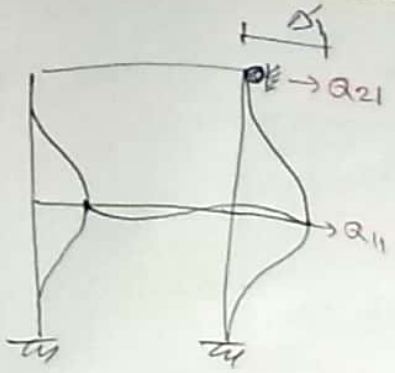
Frame with SideSway prevented.

Part-2

→ the lower floor of the frame is allowed to displaced by known displacement Δ'_1 while SideSway in upper floor is prevented.

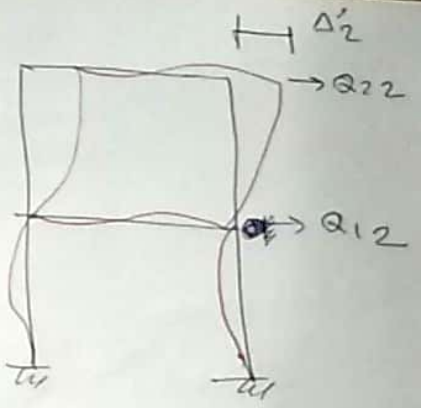
→ The FEM caused by the displacement computed and distributed to obtain the member end moments @ M_{Q1}.

→ With the member end moments known, the forces Q_{11} and Q_{21} at the locations of roller supports are determined by equilibrium equation.



Part-2

$MQ_1 - \Delta_1'$



Part-3

$MQ_2 - \Delta_2'$

Part-3

→ Upper floor is allowed to displaced by known displacement Δ_2' and MQ_2, and force Q_{22}, Q_{12} are evaluated.

The final moments

$$M = M_0 + C_1 MQ_1 + C_2 MQ_2$$

C_1 and C_2 are evaluated by

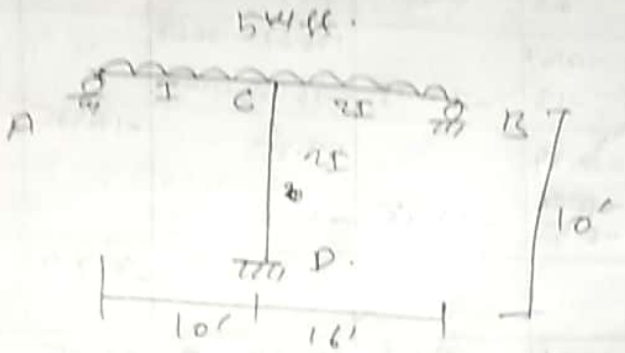
$$-R_1 + C_1 Q_{11} - C_2 Q_{12} = 0$$

$$-R_2 - C_1 Q_{21} + C_2 Q_{22} = 0.$$

Frame

2018-19

(3)

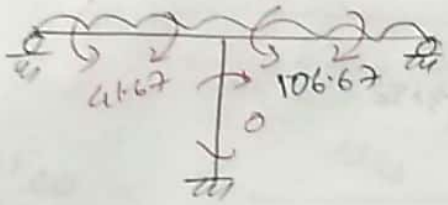


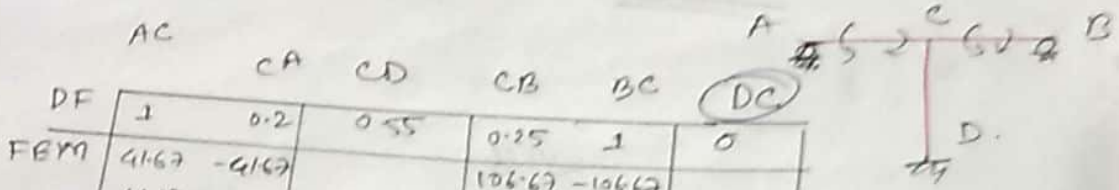
$$DF_{CA} = \frac{\frac{3}{4} \times I/10}{\frac{3}{4}\frac{I}{10} + \frac{3}{4} \times \frac{2I}{16} + \frac{2I}{10}} = 0.2$$

$$DF_{CB} = \frac{\frac{2I}{16} \times \frac{3}{4}}{\frac{3}{4}\frac{I}{10} + \frac{3}{4}\frac{2I}{16} + \frac{2I}{10}} = 0.25$$

$$DF_{CD} = 1 - 0.2 - 0.25 = 0.55$$

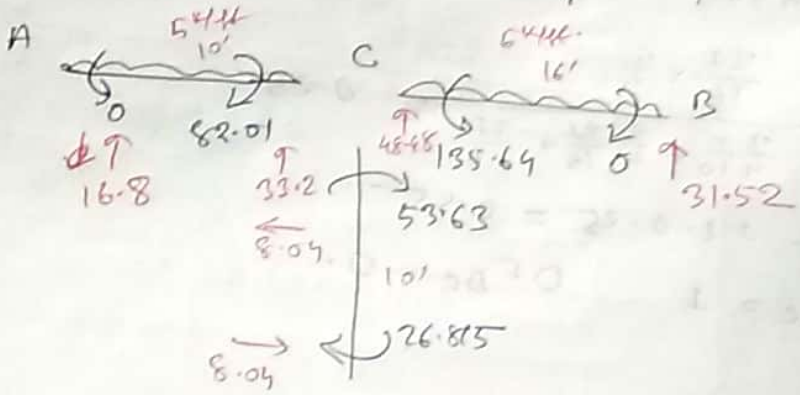
$$DF_{AC} = DF_{BC} = 1 \qquad DF_{DC} = 0.$$

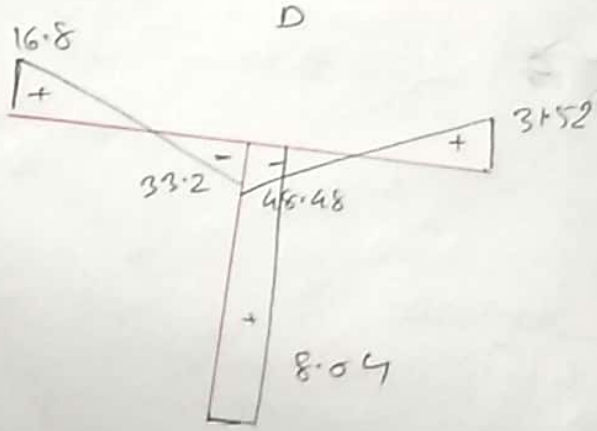


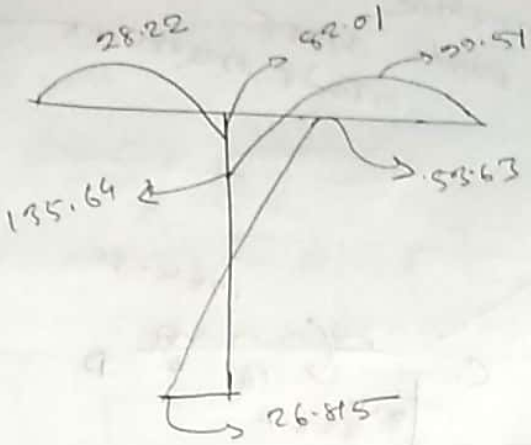


	AC	CA	CD	CB	BC	DC
DF	1	0.2	0.55	0.25	1	0
FEM	41.67	-41.67		106.67	-106.67	
	-41.67	-13	-35.75	-16.25	+106.67	
		-20.84		53.35		-17.875
		~~-10.21~~				
		-6.5	-17.88	-8.13		
						-8.94
	0	-82.01	-53.63	135.64	0	-26.815

$\geq \frac{35.75}{2}$

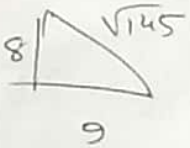


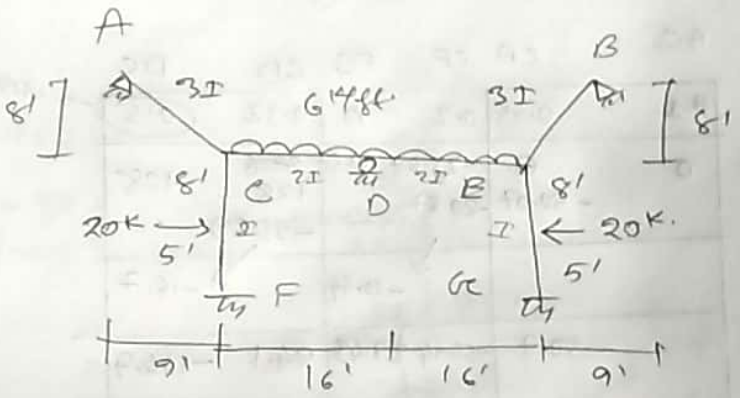




2013-14

(5)



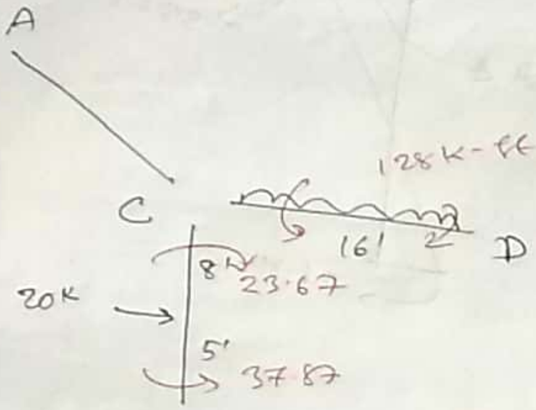


$$DF_{CA} = \frac{\frac{3I}{\sqrt{145}} \times \frac{3}{4}}{\frac{3I}{\sqrt{145}} \times \frac{3}{4} + \frac{2I}{16} + \frac{I}{13}} = 0.48$$

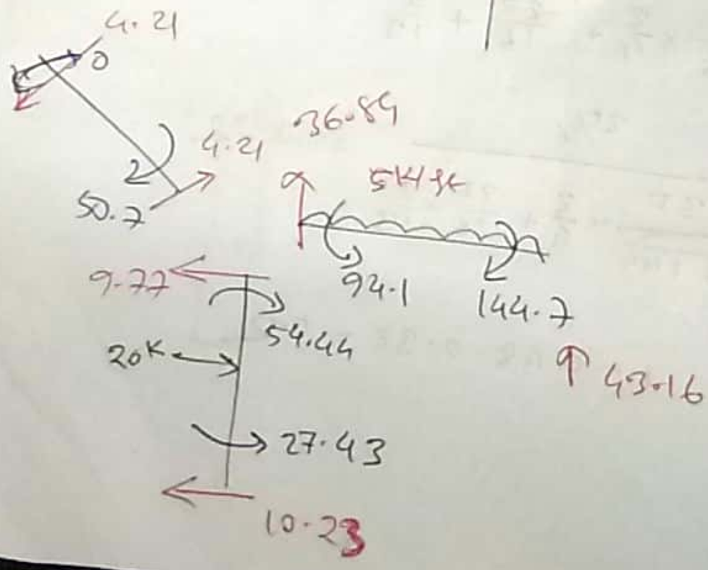
$$DF_{CD} = \frac{\frac{2I}{16}}{\frac{3I}{\sqrt{145}} \times \frac{3}{4} + \frac{2I}{16} + \frac{I}{13}} = 0.32$$

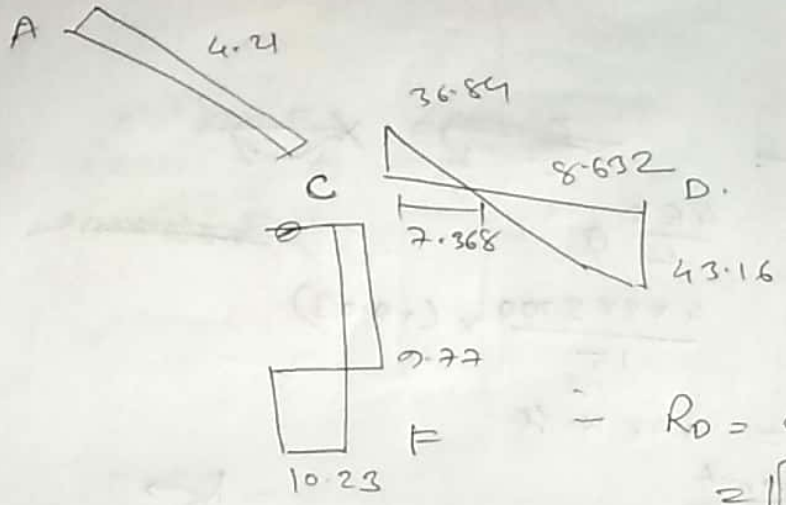
$$DF_{CF} = 1 - 0.48 - 0.32 = 0.2$$

Since it is symmetric
So, 1 [illegible] part [illegible]
[illegible]



	AC	CA	CF	FC	CD	DC
DF	1	0.48	0.2	0	0.32	0.5 → [illegible]
FEM	0	0	-23.67	37.87	~~23.6~~ 128	-128
		-50.07	-20.87		-33.39	
				-10.44		-16.7
		-50.7	-54.44	27.43	94.1	-144.7





$\therefore R_D = 43.16 \times 2$

$= \boxed{86.32^{K}}$

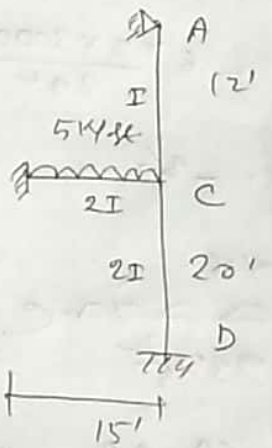
2013-14

(7)

B 20.03 cm

D → 0.4 ft.

$EI = 3000\ K\text{-}ft^2$



$$DF_{CB} = \frac{\frac{2I}{15}}{\frac{2I}{15} + \frac{2I}{20} + \frac{I}{12} \times \frac{3}{4}} = 0.45$$

$$DF_{CA} = \frac{I/12 \times 3/4}{\frac{2I}{15} + \frac{2I}{20} + \frac{I}{120} \times \frac{3}{4}} = 0.21$$

$$DF_{CD} = 1 - 0.45 - 0.21 = 0.34$$

Support B rotation

$$M_{BC} = \frac{4EI}{L}\theta$$

$$= \frac{4 \times 2 \times 3000}{15} \times (+0.03)$$

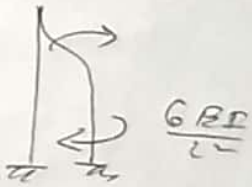
$$= +48 \text{ K-ft}.$$

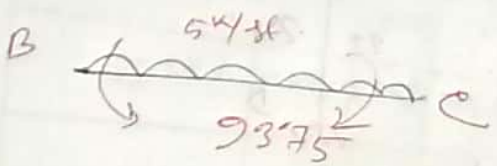
Support D movement

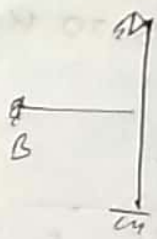
$$M_{DC} = -\frac{6EI}{L^2} \cdot \Delta$$

$$= -6 \times \frac{2 \times 3000}{20^2} \times 0.4$$

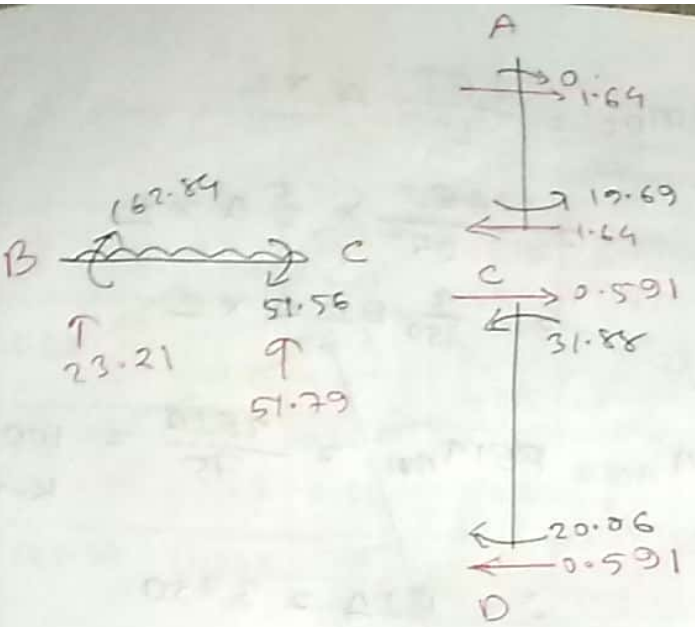
$$= -36$$





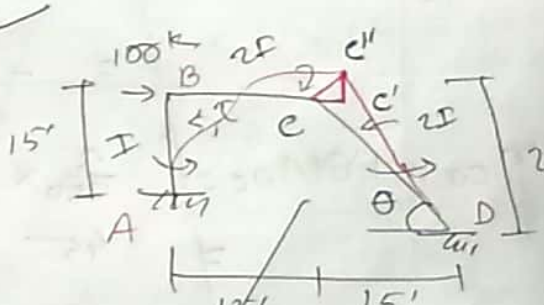


BF	AC	CA	CB	CD	DC	BC
	Δ	0.21	0.45	0.34	0	0
	0		-93.75			0
		+19.69	+42.19	31.88	-36	93.75+48
					15.94	21.09 → 42.19/2
	0	19.69	51.56	31.88	-20.06	162.84



2012-13
(1)

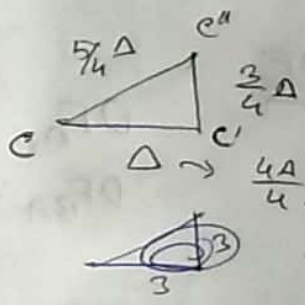
2014-15
6 (a)
Some type



$\Delta AB = \Delta = CC'$

$\Delta BC = \frac{3}{4}\Delta = C'C''$

$\Delta CD = \frac{5}{4}\Delta = CC''$



$$FEM_{AB} = FEM_{BA} = +\frac{6EI}{L^2}\Delta.$$

$$= \frac{6EI}{15^2} \times \Delta = \frac{2EI\Delta}{75}$$

$$FEM_{BC} = FEM_{CB} = -\frac{6EI}{L^2}\Delta \times 2$$

$$= -\frac{6EI}{15^2} \times \frac{3}{4}\Delta = -\frac{EI\Delta}{50} \times 2$$

$$FBM_{CD} = FBM_{DC} = \frac{6EI}{L^2}\Delta \times 2$$

$$= \frac{6EI}{25^2} \times \frac{5}{4}\Delta \times 2$$

$$= \frac{3}{250} EI\Delta \times 2$$

Let assume

$$FEM_{AB} = FBM_{BA} = \frac{2EI\Delta}{75} = 100 \text{ K-ft}$$

$$\Rightarrow EI\Delta = 3750$$

$$\therefore FBM_{BC} = FEM_{CB} = -\frac{EI\Delta}{50} \times 2$$

$$= -\frac{3750}{50} = -75 \times 2$$

$$= -150$$

$$FEM_{CD} = FEM_{DC} = \frac{3}{250} \times 3750 \times 2$$

$$= 45 \times 2 = 90.$$

DF

$$DF_{AB} = 0$$

$$DF_{BA} = \frac{I/15}{I/15 + 2I/15} = 1/3$$

$$DF_{BC} = 1 - 1/3 = 2/3$$

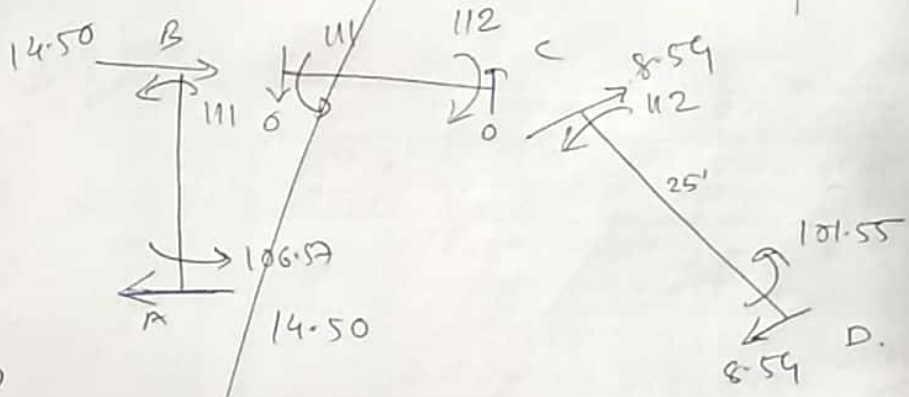
$$DF_{CB} = \frac{2I/15}{\frac{2I}{15} + \frac{2I}{25 \times 3/5}} = 1/2$$

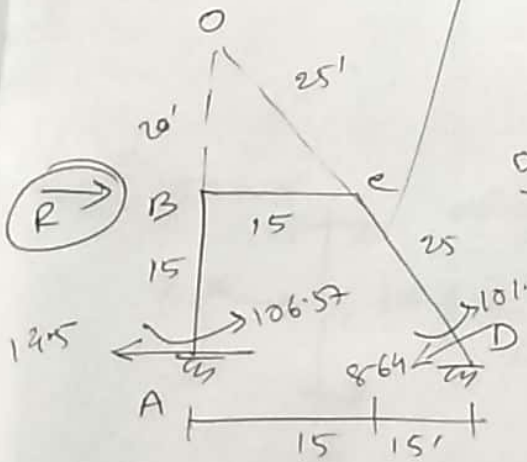
$$DF_{CD} = 1 - 1/2 = 1/2$$

$$DF_{DC} = 0.$$

	AB	BA	BC	CB	CD	DC
DF	0	0.33	0.67	0.5	0.5	0
FEM	100	100	−150	−150	90	90
		+16.5	+37.5	+30	+30	
	+8.25		+15	18.75		+15
		−4.95	−10.05	−9.4	−9.4	
	−2.48		−4.7	−5		−4.7
		1.55	3.15	+2.5	+2.5	
	0.8		1.25	1.58		1.25
		−0.41	−0.84	−0.8	−0.8	
	106.57	112.69	−109.14	−111.97	112.3	101.55
		≈ 111	−111	≈ −112	+112	

এখন 3 precisely করতে হবে





$$\frac{OB+15+5}{30} = \frac{OB}{15} \Rightarrow OB = 20.$$

$$\Sigma M_O = 0$$

$$\Rightarrow 106.57 - 101.55 + 14.5 \times 35 + 8.64 \times 50 - R \times 20 = 20$$

$$\Rightarrow R = +36.56 \ (\rightarrow)$$