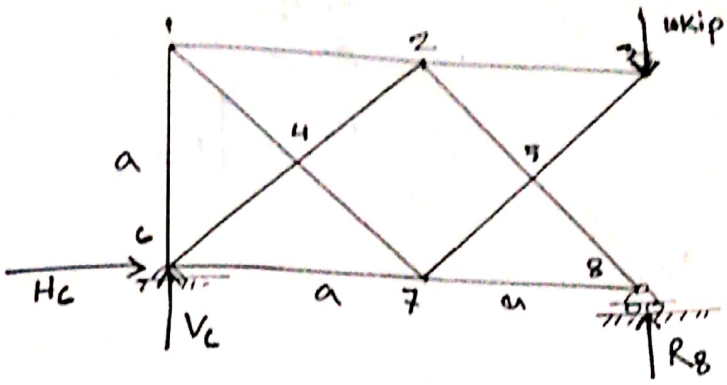
#66



$\Sigma M_C = 0$

$-R_8 \times 2a + 10 \times 2a = 0$

$R_8 = 10$

$\Sigma F_x = 0$

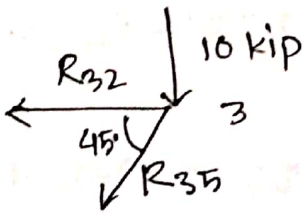
$H_C = 0$

$\Sigma F_y = 0$

$V_6 + R_8 - 10 = 0$

$V_L = 0$

At point-03



$\Sigma F_y = 0$

$10 + R_{35} \sin 45^\circ = 0$

$R_{35} = -10\sqrt{2}$ kips

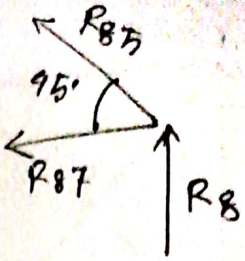
$R_{35} = 10\sqrt{2}$ kips (C) Ans.

$\Sigma F_x = 0$

$R_{35} \cos 45^\circ + R_{32} = 0$

$\Rightarrow -10\sqrt{2} \cos 45^\circ + R_{32} = 0$

$\Rightarrow R_{32} = 10$ kips (T) Ans.



At point 8

$\Sigma F_y = 0$

$R_8 + R_{85} \sin 45° = 0$

$R_{85} = -10\sqrt{2}$ kips

$R_{85} = 10\sqrt{2}$ kips (C) Ans.

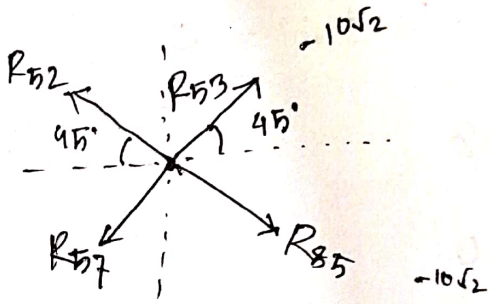
$\Sigma F_x = 0$

$R_{87} + R_{85} \cos 45° = 0$

$R_{87} - 10\sqrt{2} \cos 45° = 0$

$R_{87} = 10$ kips (T) Ans.

At point 5



$\Sigma F_y = 0$

$R_{53} \sin 45° + R_{52} \sin 45°$

$- R_{57} \sin 45° - R_{85} \sin 45° = 0$

$R_{52} - R_{57} - 10\sqrt{2} + 10\sqrt{2} = 0$

$\Rightarrow R_{52} - R_{57} = 0$ ------ (1)

$\Sigma F_x = 0$

$R_{53} \cos 45° + R_{85} \cos 45° - R_{52} \cos 45° - R_{57} \cos 45° = 0$

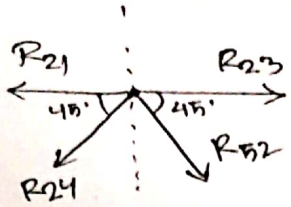
$-10\sqrt{2} - 10\sqrt{2} - R_{52} - R_{57} = 0$

$R_{52} + R_{57} = -20\sqrt{2}$ ----- (11)

$R_{52} = -10\sqrt{2}$ $\quad R_{52} = 10\sqrt{2}$ kips (C)

$R_{57} = -10\sqrt{2}$ $\quad R_{57} = 10\sqrt{2}$ kips (C) } Ans.

At point 2



$R_{52} = -10\sqrt{2}$ kips

$R_{23} = 10$ kips

$\Sigma F_x = 0$

~~$R_{23} - R_{21} = 0$~~ $\Rightarrow R_{23} + R_{52}\cos 45^\circ - R_{21} - R_{24}\cos 45^\circ = 0$

~~$R_{21} = 10$ kips Arr.~~ $\Rightarrow 10 - 10\sqrt{2}\cos 45^\circ - R_{21} - R_{24} \times \frac{1}{\sqrt{2}} = 0$

$\Rightarrow R_{21} + R_{24} \times \frac{1}{\sqrt{2}} = 0$ ..... (1)

$\Sigma F_y = 0$

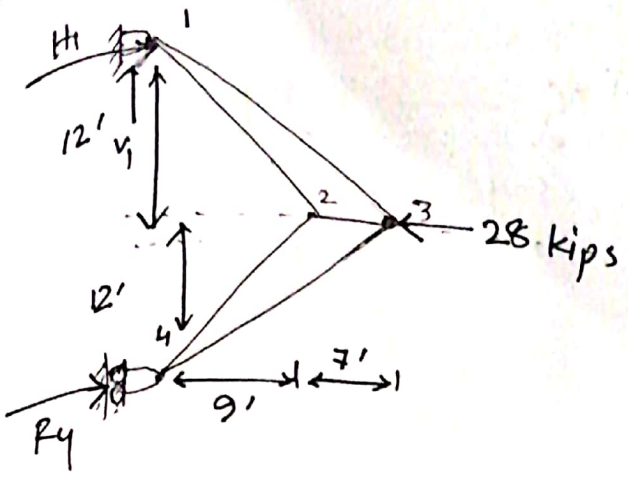
$R_{24}\sin 45^\circ + R_{52}\sin 45^\circ = 0$

$R_{24} = 10\sqrt{2}$ kinps (T) Arr.

$\therefore R_{21} = -10$ kips

$\therefore R_{21} = 10$ kips (C) Arr.

4.67



$\Sigma M_1 = 0$

$-R_4 \times 24 + 28 \times 12 = 0$

$R_4 = 14$ kips

$\Sigma F_x = 0$

$H_1 + R_4 - 28 = 0$

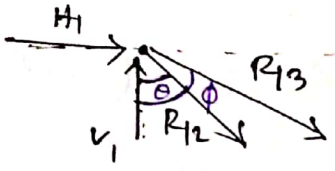
$H_1 = 14$ kips

$\Sigma F_y = 0$

$V_1 = 0$

At joint 1

$\Sigma F_y = 0$



$V_1 - R_{13}\cos 53.13° - R_{12}\cos 36.86° = 0$

$R_{13}\cos 53.13° + R_{12}\cos 36.86° = 0$ ——(I)

$\theta = \tan^{-1}\frac{9}{12} = 36.86°$

$\phi = \tan^{-1}\frac{16}{12} = 53.13°$

$\Sigma F_x = 0$

$H_1 + R_{13}\sin 53.13° + R_{12}\sin 36.86° = 0$

$R_{13}\sin 53.13° + R_{12}\sin 36.86° = -14$ ——(II)

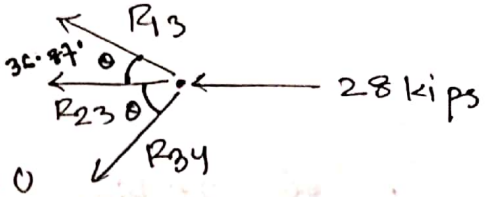
$R_{13} = -40$ kips

$R_{12} = 30$ kips

$R_{13} = 40$ kips (C)

$R_{12} = 30$ kips (T) } Ans.

At joint 3



$\Sigma F_y = 0$

$R_{13} \sin 36.87° - R_{34} \sin 36.87° = 0$

$-40 \sin 36.87 - R_{34} \sin 36.87° = 0$

$R_{34} = -40$ kips

$\therefore R_{34} = 40$ kips (C) Ans.

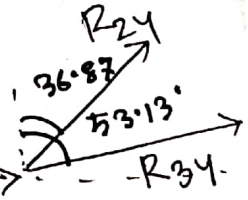
$\Sigma F_x = 0$

$R_{13} \cos 36.87° + R_{34} \cos 36.87° + R_{23} + 28 = 0$

$\Rightarrow R_{23} - 40 \cos 36.87 + 28 - 40 \cos 36.87° = 0$

$\Rightarrow R_{23} = 36$ kips (T) Ans.

At point 4

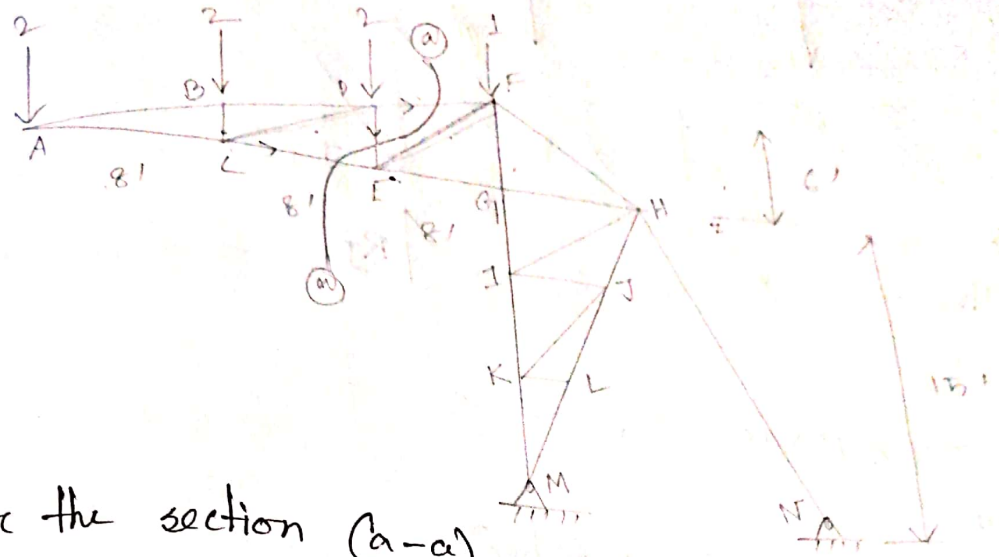


$\Sigma F_x = 0$

$14 + R_{34} \sin 53.13° + R_{24} \sin 36.86° = 0$

$\Rightarrow 14 - 40 \sin 53.13° + R_{24} \sin 36.86° = 0$

$\Rightarrow R_{24} = 30$ (T) Ans.



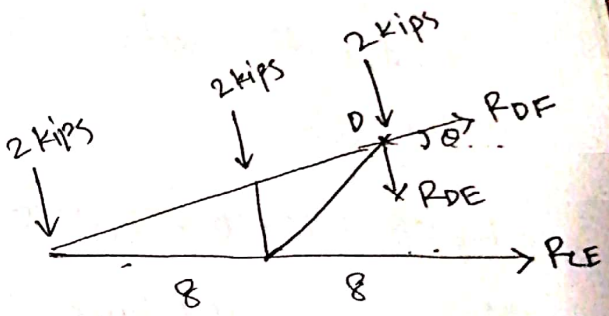
Consider the section (a-a)

$\Sigma M_D = 0$

$-2\times 8 - 2\times 16 - R_{CE}\times 4 = 0$

$\Rightarrow R_{CE} = -12$ kips

$\therefore R_{CE} = 12$ kips (c) Ans.



$\theta = \tan^{-1}\frac{2}{8}$

$= 14°$

$\Sigma F_x = 0$

$R_{CE} + R_{DE}\cos 14° = 0$

$R_{DF} = 12.36$ kips (T) Ans.

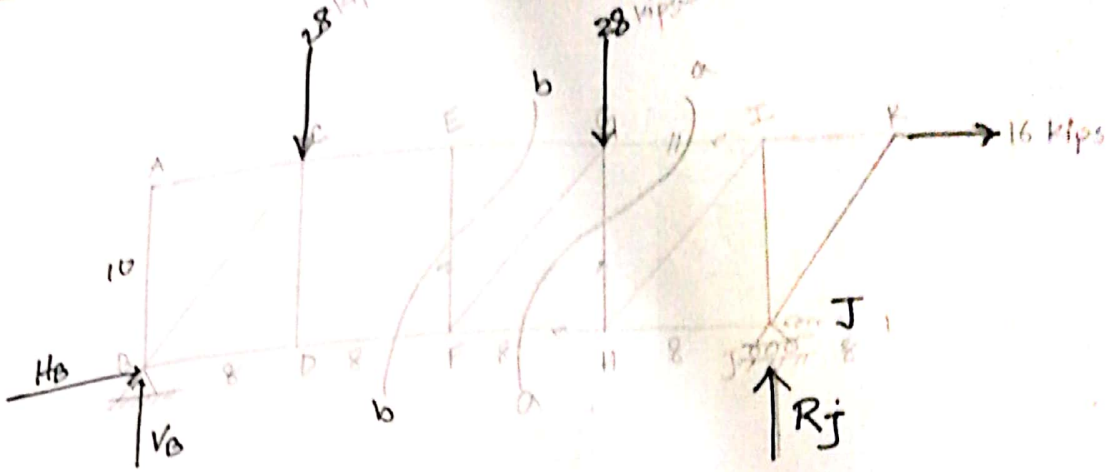
$\Sigma F_y = 0$

$-R_{DF}\sin 14° + 2 + 2 + 2 + R_{DE} = 0$

$R_{DE} = -3$ kips

$\therefore R_{DE} = 3$ kips (C) Ans.

77.



$\Sigma M_D = 0$

$28 \times 8 + 28 \times 24 + 16 \times 10 - R_j \times 32 = 0$

$R_j = 33$ kips

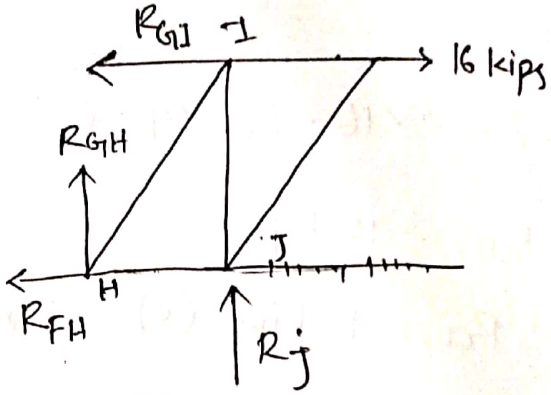
Consider the section (a-a) (right portion)

$\Sigma M_H = 0$

$-R_j \times 8 + 16 \times 10 - R_{GI} \times 10 = 0$

$R_{GI} = -10.4$ kips

$R_{GI} = 10.4$ kips (c) Ans.



Consider the right portion (b-b)

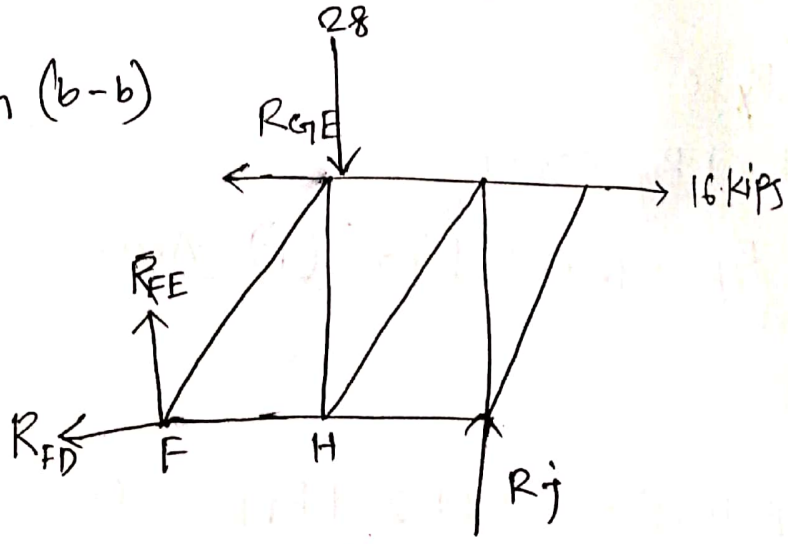
$\Sigma F_y = 0$

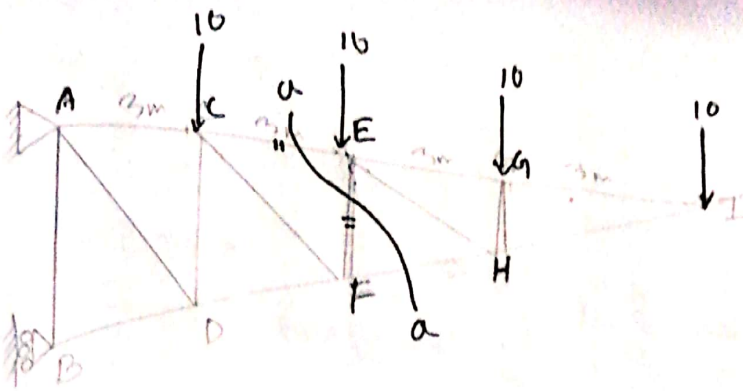
$R_{EF} + R_j - 28 = 0$

$R_{EF} = 28 - 33$

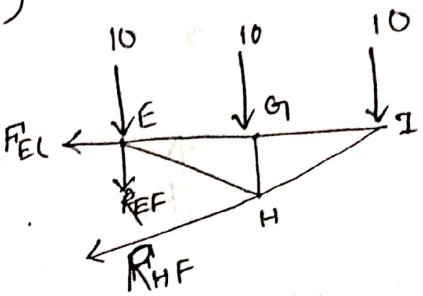
$= -5$ kips

$R_{EF} = 5$ kips (c) Ans.





Consider the right portion of section (a-a)



$\Sigma M_I = 0$

$-10 \times 3 - 10 \times 6 - R_{EF} \times 6 = 0$

$\Rightarrow R_{EF} = -15$ KN

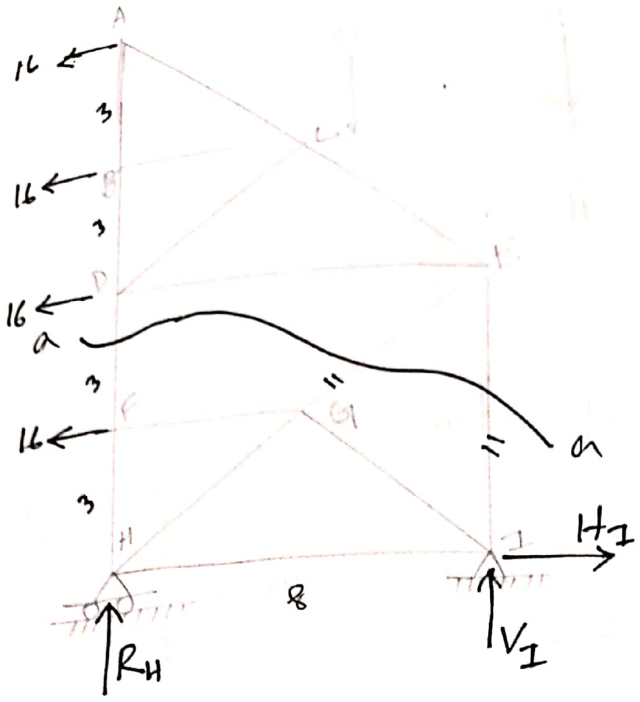
$\therefore R_{EF} = 15$ KN (C) Ans.

$\Sigma M_H = 0$

$10 \times 3 - 10 \times 3 - R_{EF} \times 3 - F_{EL} \times 1.25 = 0$

$F_{CE} = 36$ KN (T) Ans.

580)



$\sum M_I = 0$

$R_H \times 8 - 16\times 3 - 16\times 6 - 16\times 9 - 16\times 12 = 0$

$R_H = 60\ KN$ ---(i)

$\sum F_y = 0$

$V_I = -60\ KN$

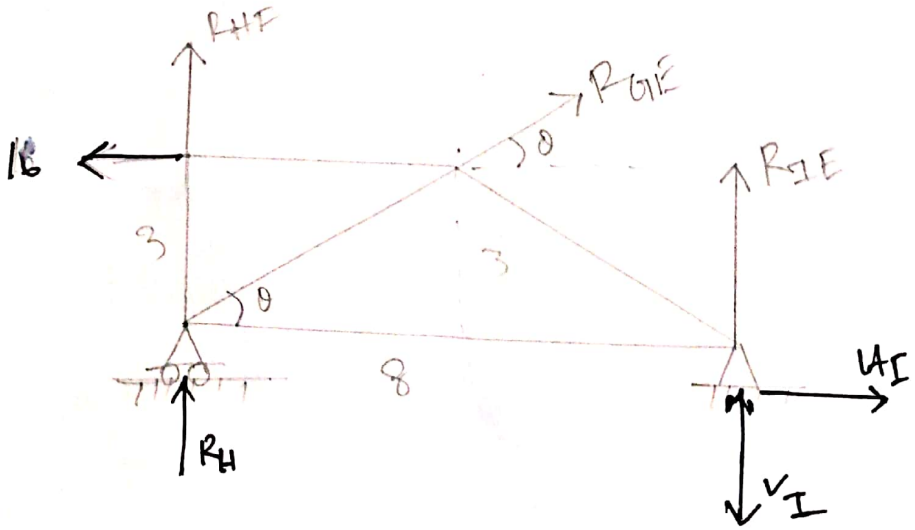
$\therefore V_I = 60\ KN\ (\downarrow)$ ---(ii)

$\sum F_x = 0$

$H_I - 16 - 16 - 16 - 16 = 0$

$H_I = 64\ KN$ ---(iii)

Consider the lower ~~sectio~~ portion of section (A-A)



$\theta = \tan^{-1}\frac{3}{4}$

$= 36.87$

$\Sigma M_H = 0$

$-16 + F_{EG} \cos 36.87° = 0$

$64 - 16 + R_{EG} \cos 36.87° = 0$

$\Rightarrow R_{EG} = -60\,KN$

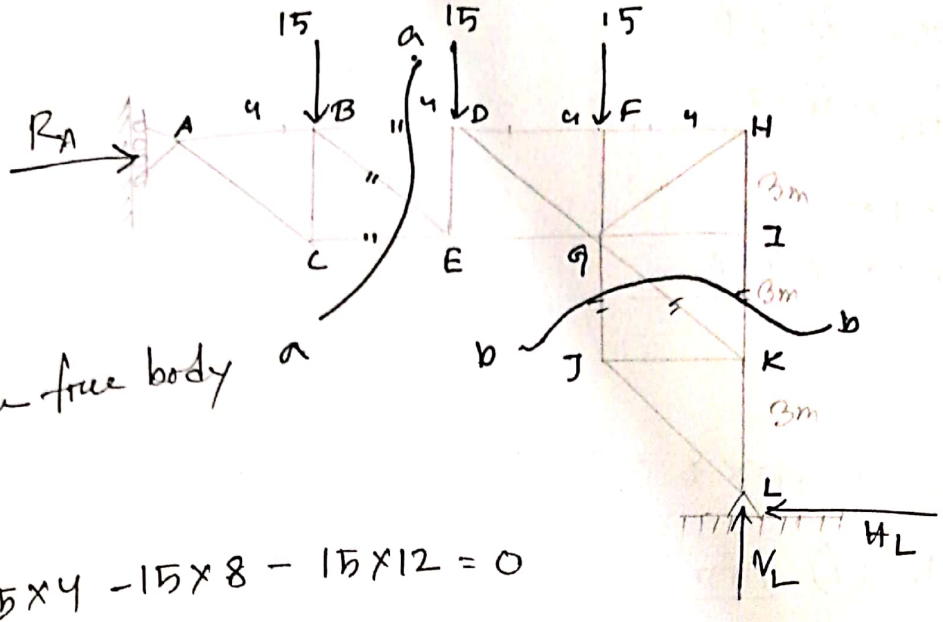
$\Rightarrow R_{EG} = 60\,KN\ (C)$ Ans.

$\Sigma M_H = 0$

$-16 \times 3 + V_1 \times 8 - R_{1E} \times 8 = 0$

$\Rightarrow R_{1E} = 54\,KN\ (T)$ Ans

3811



Consider the free body

$\Sigma M_L = 0$

$R_A \times 9 - 15 \times 4 - 15 \times 8 - 15 \times 12 = 0$

$\Rightarrow R_A = 40\ KN$ ---- (i)

$\Sigma F_x = 0$

$H_L - R_A = 0$

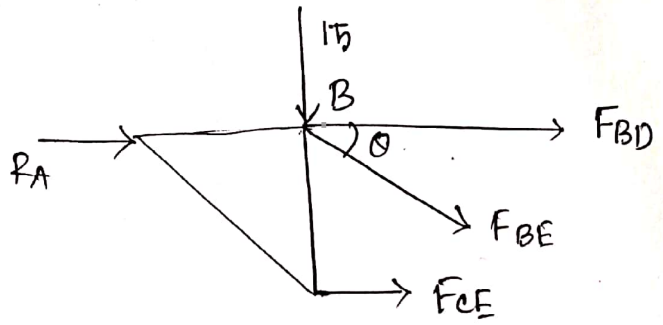
$H_L = 40\ KN$ --- (ii)

$\Sigma F_y = 0$

$V_L - 15 - 15 - 15 = 0$

$V_L = 45\ KN$ ---- (iii)

Consider the left portion of section (A-A)



$\Sigma F_y = 0$

$15 + F_{BE} \sin 36.87^\circ = 0$

$F_{BE} = -25\ KN$

$\boxed{F_{BE} = 25\ KN\ (C)}$ Ans.

$\theta = \tan^{-1}\frac{3}{4}$

$= 36.87^\circ$

$\Sigma M_B = 0$

$F_{CE} \times 3 = 0$

$\boxed{F_{CE} = 0\ KN}$ Ans.

$\Sigma F_{Hx} = 0$

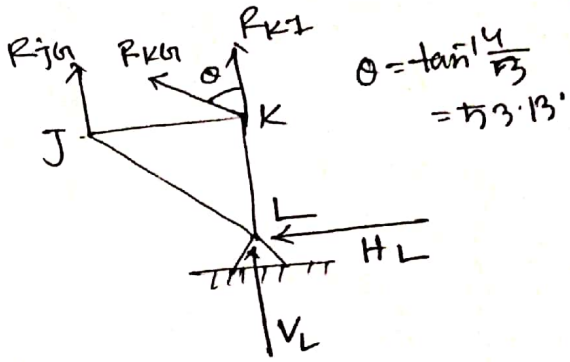
$F_A + F_{CE} + F_{BD} + F_{BE}\cos\theta = 0$

$40 + 0 + F_{BD} - 25\cos 36.87° = 0$

$F_{BD} = -20\ KN$

$\therefore \boxed{F_{BD} = 20\ KN\ (C)}$ Ans.

Consider the lower portion of section (b-b)



$\Sigma F_{Hx} = 0$

$H_L + R_{KG}\sin 53.13° = 0$

$40 + R_{KG}\sin 53.13° = 0$

$R_{KG} = -50\ KN$

$\therefore \boxed{R_{KG} = 50\ KN\ (C)}$ Ans.

$\Sigma M_{12} = 0$

$R_{JG} \times 4 + 0 \times H_L = 0$

$R_{JG} = -30\ KN$

$\therefore \boxed{R_{JG} = 30\ KN\ (C)}$ Ans.

$\Sigma F_{Hy} = 0$

$R_{JG} + V_L + R_{KI} + R_{KG}\cos 53.13° = 0$

$\Rightarrow -30 + 45 + R_{KI} + -50\cos 53.13° = 0$

$\Rightarrow \boxed{R_{KI} = 15\ KN\ (T)}$ Ans.