ASSIGNMENT 7

(1)

$\Sigma M_A = 0$

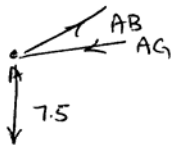
$F_Y \times 9 = 18 \times 9 + 15 \times 13.5$

$F_Y = 40.5$ kN

$\Sigma F_Y = 0 \qquad A_Y = -7.5$ kN

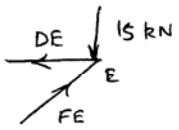
JOINT EQUILIBRIUM.

(i) JOINT A



BG
GC
FC
} zero force members

(ii) JOINT E



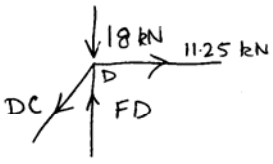
$\Sigma F_Y = 0 \quad FE \sin 53.13 = 15$

$FE = 18.75$ kN

$\Sigma F_X = 0 \quad 18.75 \cos 53.13 = DE$

$DE = 11.25$ kN

(iii) JOINT D



$\Sigma F_X = 0 \quad DC \cos 45 = 11.25$

$DC = 15.90$ kN

$\Sigma F_Y = 0$

$FD = 15.90 \sin 45 + 18$

$= 29.25$ kN.

SUMMARY.

FE	18.75 kN	C
DE	11.25 kN	T
DC	15.90 kN	T
FD	29.25 kN	C

(2)

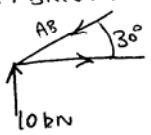
$$DE - GH - BE - GJ ; BC - IJ - CE - EF - IG - GF = 0$$

$\sum M_A = 0$

$$20 \times 4.5 = K_Y \times 9 \Rightarrow K_Y = 10 \text{ kN}.$$

JOINT EQUILIBRIUM

(1) JOINT A



$\sum F_Y = 0$

$AB \sin 30 = 10$

$AB = 20 \text{ kN}$

$\sum F_X = 0$

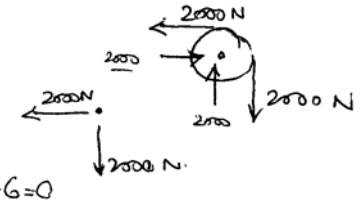
$20 \cos 30 = AC$

$AC = 17.32 \text{ kN}$

SUMMARY

1. KJ JH FH AB BD DF 20 kN COMPRESSION
2. AC CI KI 17.32 kN TENSION.

(3)



$\Sigma M_G = 0$

$A_x \times 3.5 - 2000 \times 6.1 + 2000 \times 4.6 = 0$

$A_x = 857.14$ N

$\Sigma F_x = 0$ $G_x = 1142.86$ N

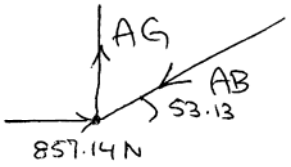
$\Sigma F_Y = 0$

$G_Y = 2000$ N

CE – CF – BF – BG — zero force numbers

JOINT EQUILIBRIUM. –

(i) JOINT A



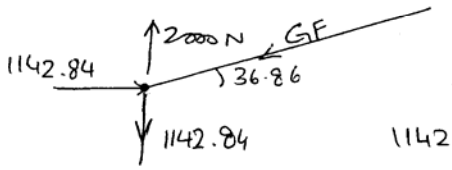
$\Sigma F_x = 0$ $AB \cos 53.13 = 857.14$

$AB = 1428.56$ N

$\Sigma F_Y = 0$ $1428.56 \sin 53.13 = AG$

$AG = 1142.84$ N

(ii) JOINT G



$\Sigma F_x = 0$

$1142.84 = GF \cos 36.86$

$GF = 1428.38$ N

$\Sigma F_Y = 0$

$2000 - 1142.84 - 1428.86 \sin 36.86 = 0$

$0 = 0$ (OK)

Summary

AB	BC	CD	1428.56 N	COMPRESSION
GF	FE	ED	1428.38 N	COMPRESSION.
AG			1142.4 N	TENSION.