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SECTION: B

ASSIGNMENT: II

"STRUCTURE ANALYSIS"

QUESTION No 1

Determine the force in each member of the truss and whether it is in tension or compression.

REQUIRED:

Forces in member of the truss = ?

SOLUTION:

Joint C:

$$\sum F_x = 0 \quad \leftarrow \rightarrow +$$

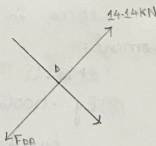
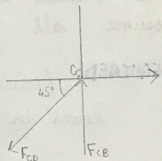
$$10 - F_{CB} \cos 45 = 0$$

$$F_{CB} = 14.14 \text{ KN (Tension)}$$

$$\sum F_y = 0 \quad \uparrow +$$

$$F_{CB} \sin 45 - 10 = 0$$

$$F_{CB} = 14.14 \text{ KN (Tension)}$$



Joint D:

$$\sum F_x = 0 \quad \rightarrow +$$

$$14.14 - F_{DB} = 0$$

$$F_{DB} = 14.14 \text{ KN (Tension)}$$

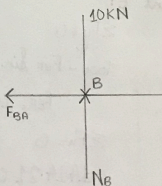
$$\sum F_y = 0 \quad \uparrow +$$

$$F_{DB} = 0$$

Joint B:

$$\sum F_x = 0$$

$$F_{BA} = 0$$



$$\begin{aligned}\sum F_y &= 0 \\ -10 \cdot 0 + N_B &= 0 \\ N_B &= 10 \cdot 0 \text{ kN}\end{aligned}$$

QUESTION No 2

Determine the forces in each member of the truss indicate if member in tension or compression. Assume all pin connected.

REQUIRED:

Forces in all members = ?

SOLUTION:

Forces in all members.

Moment:

$$\begin{aligned}\sum M_A &= 0 \\ (8) E_y - 600(2) - 800(4) - 600(6) &= 0 \\ E_y &= 1000 \text{ N}\end{aligned}$$

Forces:

Joint E:

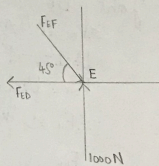
$$\begin{aligned}\sum F_y &= 0 \\ 1000 - F_{EF} \sin 45^\circ &= 0 \\ F_{EF} &= 1414.21 \text{ N (compression)}\end{aligned}$$

$$\sum F_x = 0$$

$$1414.21 \cos 45^\circ - F_{ED} = 0$$

$$F_{ED} = 1000 \text{ N}$$

$$F_{ED} = 1.00 \text{ kN (Tension)}$$



Joint F:

$$\sum F_x = 0$$

$$F_{FG} - 1414 \cdot 2 \cos 45^\circ = 0$$

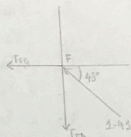
$$F_{FG} = 1000 \text{ N}$$

$$F_{FG} = 1.00 \text{ kN (Compression)}$$

$$\sum F_y = 0$$

$$1414 \cdot 2 \sin 45^\circ - F_{FD} = 0$$

$$F_{FD} = 1000 \text{ N (Tension)}$$



Joint D:

$$\sum F_y = 0$$

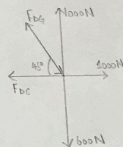
$$1000 - 600 - F_{DG} \sin 45^\circ = 0$$

$$F_{DG} = 566 \text{ N (compression)}$$

$$\sum F_x = 0$$

$$1000 + 566 \cos 45^\circ - F_{DC} = 0$$

$$F_{DC} = 1.40 \text{ kN (Tension)}$$

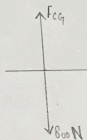


Joint C:

$$\sum F_y = 0$$

$$F_{CG} - 800 = 0$$

$$F_{CG} = 800 \text{ N (Tension)}$$



***RESULT:**

$$F_{DC} = F_{BC} = 1.40 \text{ KN (T)}$$

$$F_{FG} = F_{HD} = 1.00 \text{ KN (C)}$$

$$F_{FD} = F_{HB} = 1.00 \text{ KN (T)}$$

$$F_{EB} = F_{AB} = 1.00 \text{ KN (T)}$$

$$F_{DG} = F_{BG} = 566 \text{ N (C)}$$

$$F_{EF} = F_{AH} = 1.41 \text{ KN (C)}$$