

ASSIGNMENT :- 02

TROSS

NAME :- MUHAMMAD TAHA

AD :- 7965

SECTION :- "B"

SUBJECT :- STRUCTURAL ANALYSIS

SUBMITTED TO :- SIR AMTJAD ISLAM

DEPARTMENT :- BE (CIVIL)

DATE :- 13 - JULY 2020

①

QUESTION :- 01

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

Required :-

Forces in each member of the truss = ?

Solution :-

Joint C :-

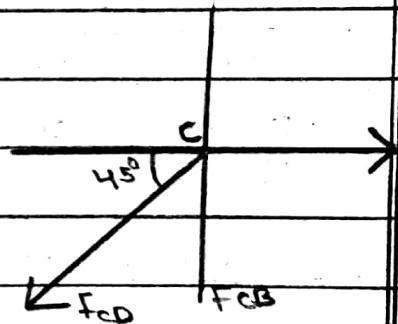
$$\sum F_x = 0 \quad \leftarrow \quad \rightarrow$$
$$10 - F_{CD} \cos 45^\circ = 0$$

$$F_{CD} = 14.14 \text{ kN (Tension)}$$

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

$$F_{CB} - 14.14 \sin 45^\circ = 0$$

$$F_{CB} = 10.0 \text{ kN (compression)}$$



Joint D :-

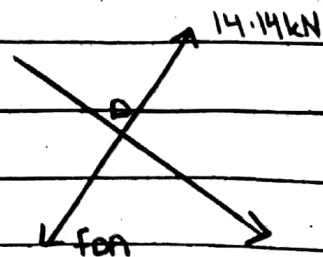
$$\sum F_x = 0 \quad \rightarrow \quad \leftarrow$$

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

$$F_{DA} = 14.14 \text{ kN (Tension)}$$

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

$$F_{DB} = 0$$



(2)

Joint B :-

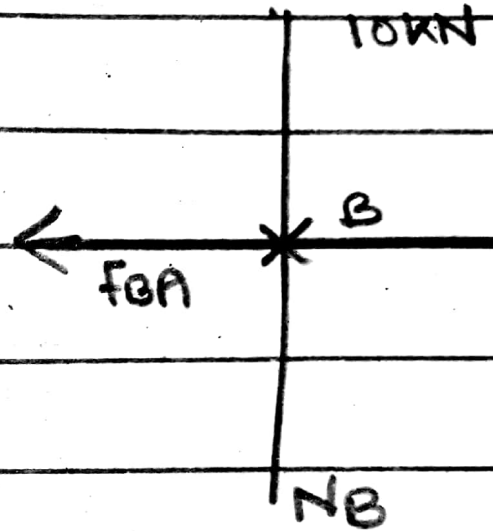
$$\sum f_x = 0$$

$$f_{BA} = 0$$

$$\sum f_y = 0$$

$$-10 \cdot 0 + N_B = 0$$

$$N_B = 10.0 \text{ kN}$$



③

QUESTION:-02

Determine the forces in each member of the truss. Also indicate the members are tension or compression.

Solution :-

Forces in all members

Moment :-

$$\sum M_A = 0$$

$$(8) E_y - 600(2) - 800(4) - 600(6) = 0$$

$$E_y = 1000 \text{ N}$$

Forces :-

* Joint E :-

$$\sum F_y = 0$$

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

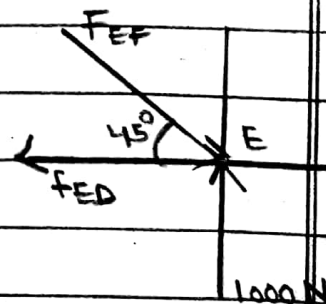
$$F_{EF} = 1414.21 \text{ N (compression)}$$

$$\sum F_x = 0$$

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

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

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

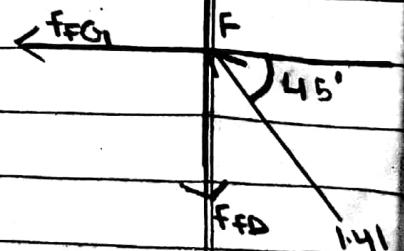


* Joint F :-

$$\sum F_x = 0$$

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

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



(4)

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

$$\sum f_y = 0$$

$$1414.21 \sin 45^\circ - F_{FD} = 0$$

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

* Joint D :-

$$\sum f_y = 0$$

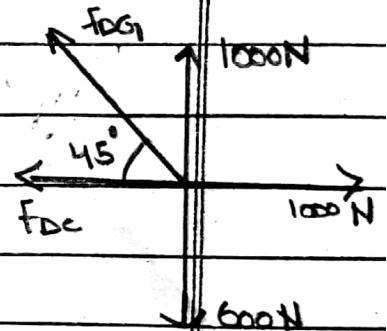
$$1000 - 600 - F_{DG} \sin 45^\circ = 0$$

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

$$\sum f_x = 0$$

$$1000 + 565 \cos 45^\circ - F_{DC} = 0$$

$$F_{DC} = 1400 \text{ kN (Tension)}$$

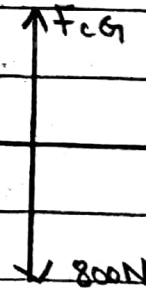


* Joint C :-

$$\sum f_x = 0$$

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

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



Result :-

$$F_{DC} = F_{CD} = 1400 \text{ kN (T)}$$

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

$$F_{FD} = F_{DF} = 1.00 \text{ kN (T)}$$

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

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

$$F_{EF} = F_{FE} = 1.41 \text{ kN (C)}$$