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Assignment # 02

Date :- 11/07/2020

Dept :- B.S Civil Engineering

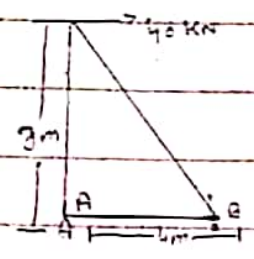
Section:- A

Question No. 01.

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

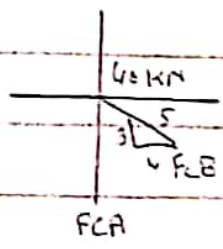
Solution:-

Given data-



First of all we analysis Joint C.

So



$$\rightarrow \sum F_x = 0$$

$$40 - F_{CB} \left(\frac{4}{5} \right) = 0$$

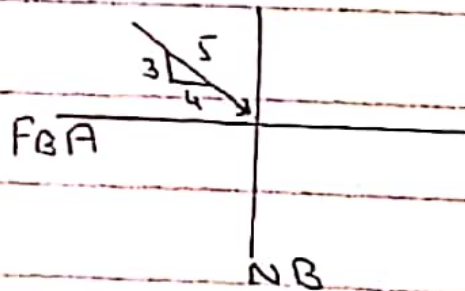
$$F_{CB} = 50.0 \text{ KN (C)}$$

$$\uparrow \sum F_y = 0$$

$$50 \left(\frac{3}{5} \right) - F_{CA} = 0$$

$$F_{CA} = 30.0 \text{ KN (T)}$$

Now we analysis joint (B).



$$\rightarrow \sum F_x = 0$$

$$50 \left(\frac{4}{5} \right) - F_{BA} = 0$$

$$F_{BA} = 40.0 \text{ KN (T)}$$

$$\uparrow \sum F_y = 0$$

$$N_B - 50.0 \left(\frac{3}{5} \right) = 0$$

$R_B = 30.0 \text{ kN}$



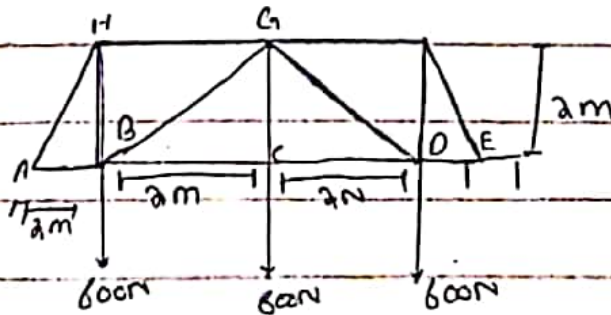
Question # 02.

Determine the force in each member of the truss - Indicate if the members are in tension or compression. Assume all members are pin connected.

~~Solution~~

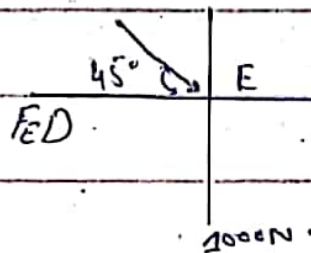
Solution:

Given that:-



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Now we analysis joint (E)



$$+\uparrow \sum E_y = 0;$$

$$2000 - F_{ED} \sin 45^\circ = 0$$

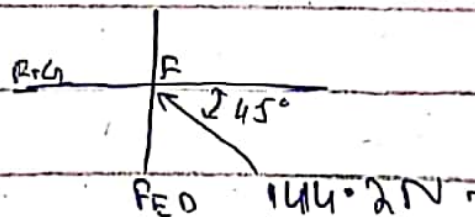
$$F_{ED} = 1414.21 \text{ N (C)} = 1.41 \text{ kN (C)}$$

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

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

$$F_{ED} = 2000 \text{ N (T)} = 2 \text{ kN (T)}$$

Joint (F)



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$$\rightarrow \sum F_x = 0$$

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

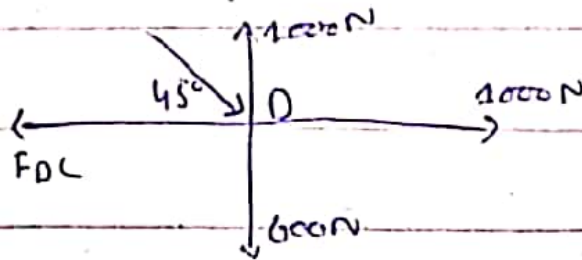
$$F_{FG} = 1000 \text{ N (C)} = 1 \text{ kN (C)}$$

$$\uparrow \sum F_y = 0;$$

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

$$F_{ED} = 1000 \text{ N (T)} = 1 \text{ kN (T)}$$

Joint (D)



$$\uparrow \sum F_y = 0$$

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

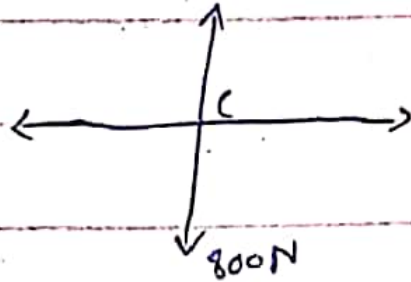
$$F_{DG} = 565.69 \text{ N (C)} = 566 \text{ N (C)}$$

$$\rightarrow \sum F_x = 0 \quad 1000 + 565.69 \cos 45^\circ - F_{DC} = 0$$

$$F_{DC} = 1400 \text{ N (T)} = 1.41 \text{ m (T)}$$

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Joint (C)



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

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

$$F_{CC} = 800 \text{ N (T)}$$

Due to symmetry

$$F_{BC} = F_{DC} = 1.4 \text{ kN (T)}$$

$$F_{HB} = F_{HD} = 1.0 \text{ kN (T)}$$

$$F_{BC} = F_{DC} = 5.66 \text{ N (T)}$$

$$F_{HC} = F_{FC} = 1.0 \text{ kN (C)}$$

$$F_{AH} = F_{EH} = 1.41 \text{ kN (C)}$$

$$F_{AB} = F_{ED} = 1.0 \text{ kN (T)}$$

