

Date: _____



NAME :

MUHAMMAD GLYAS

ID :

7956

SECTION :

"B"

SEMESTER :

4th

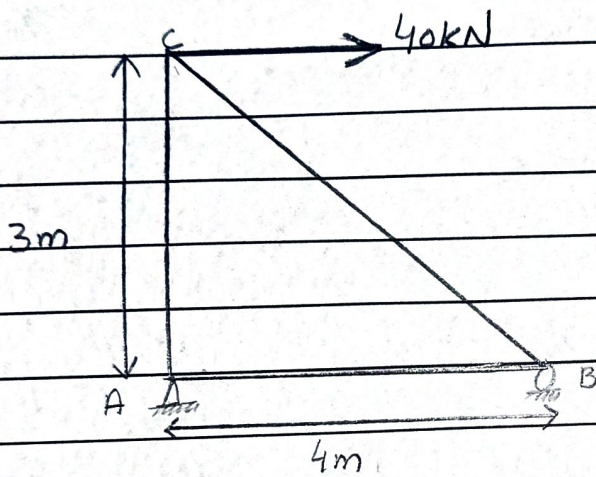
ASSIGNMENT NO; 02



Date: _____

①

DETERMINE THE FORCE IN EACH MEMBER OF THE TRUSS AND WHETHER IT IS IN TENSION OR COMPRESSION.

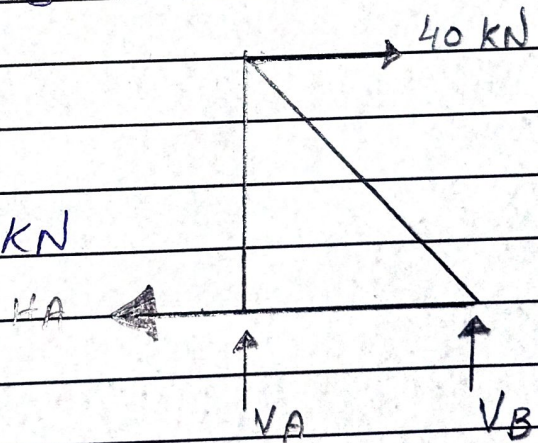


Solution;

$$\begin{matrix} + \rightarrow \\ - \leftarrow \end{matrix} \quad \sum F_x = 0$$

$$- H_A + 40$$

$$H_A = 40 \text{ kN}$$



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(2)

$$\curvearrowright \sum M_A = 0$$

$$- V_B \times 4 + 40 \times 3 = 0$$

$$V_B = \frac{120}{4}$$

$$V_B = 30 \text{ kN}$$

$$\curvearrowright \sum M_B = 0$$

$$V_B \times 4 + 40 \times 3 = 0$$

$$V_B = -30 \text{ kN}$$

" So our assume direction was wrong!"

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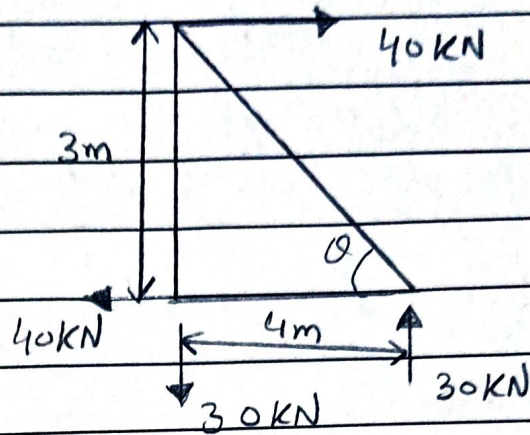
(3)

NOW FOR ANGLE θ .

$$\tan \theta = \frac{3}{4}$$

$$\theta = \tan^{-1} \left(\frac{3}{4} \right)$$

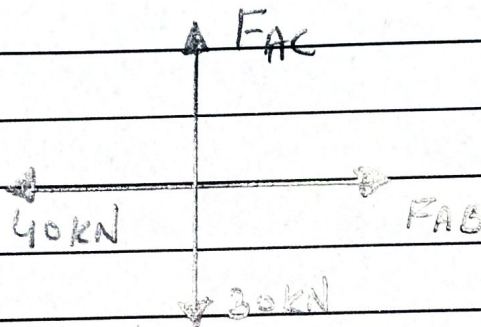
$$\theta = 36.87^\circ$$



"Joint ANALYSIS"

CONSIDER:

JOINT A:



$$\sum F_x = 0$$

$$F_{AB} - 40 = 0$$

$$F_{AB} = 40 \text{ kN (TENSION)}$$

$$\sum F_y = 0$$

$$F_{AC} - 30 = 0$$

$$F_{AC} = 30 \text{ kN (TENSION)}$$

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(4)

JOINT B :

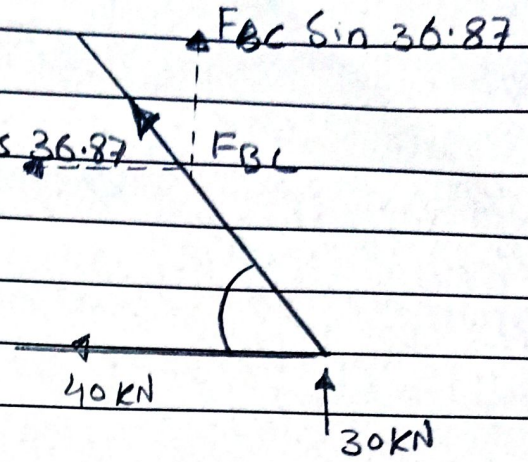
$$\uparrow \downarrow \sum F_y = 0$$

$$30 + F_{bc} \sin 36.87^\circ = 0$$

$$F_{bc} = \frac{-30}{\sin 36.87}$$

$$F_{bc} = -50 \text{ kN}$$

" So our assume direction was wrong and F_{bc} is compression force.

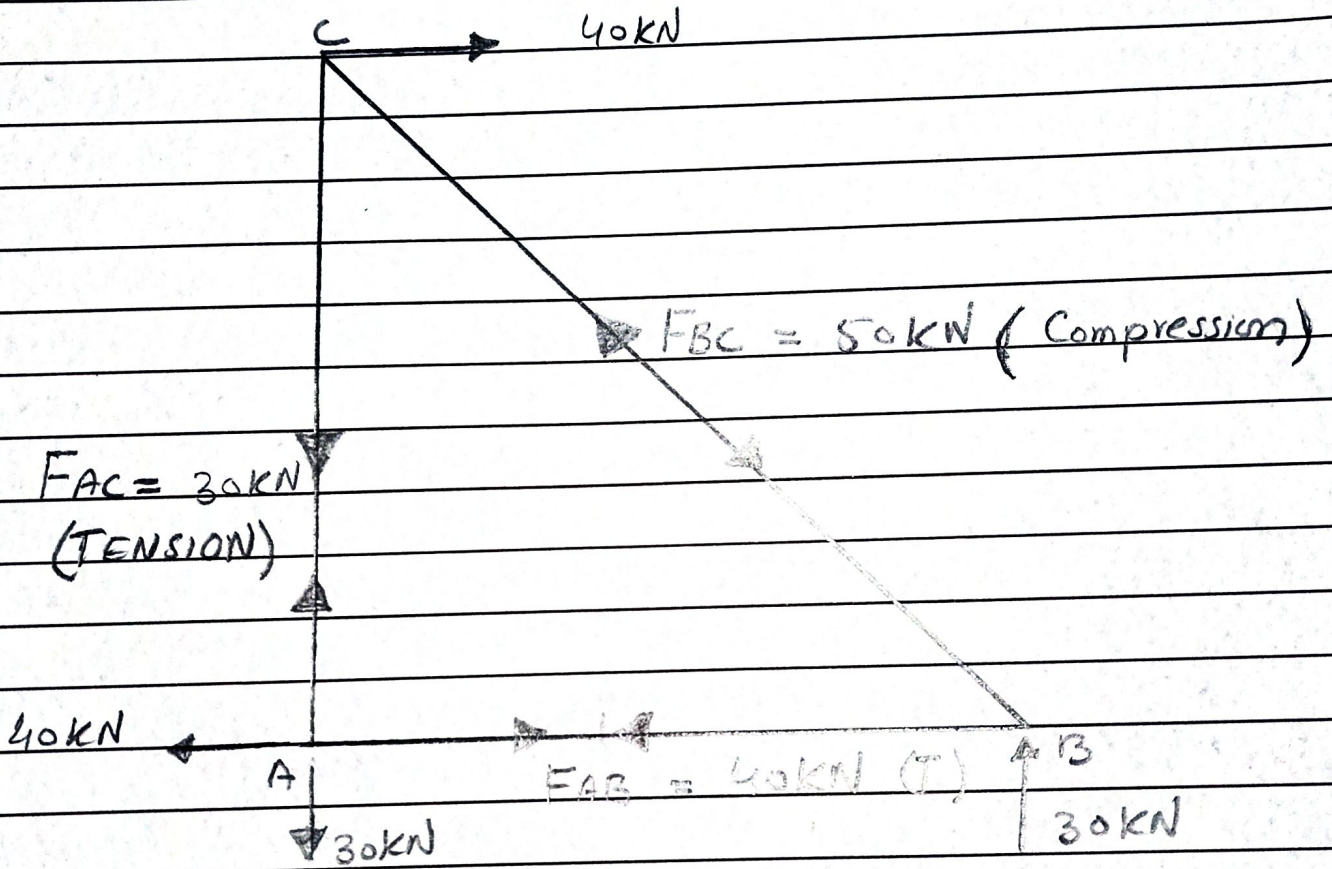


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FINAL DIAGRAM:

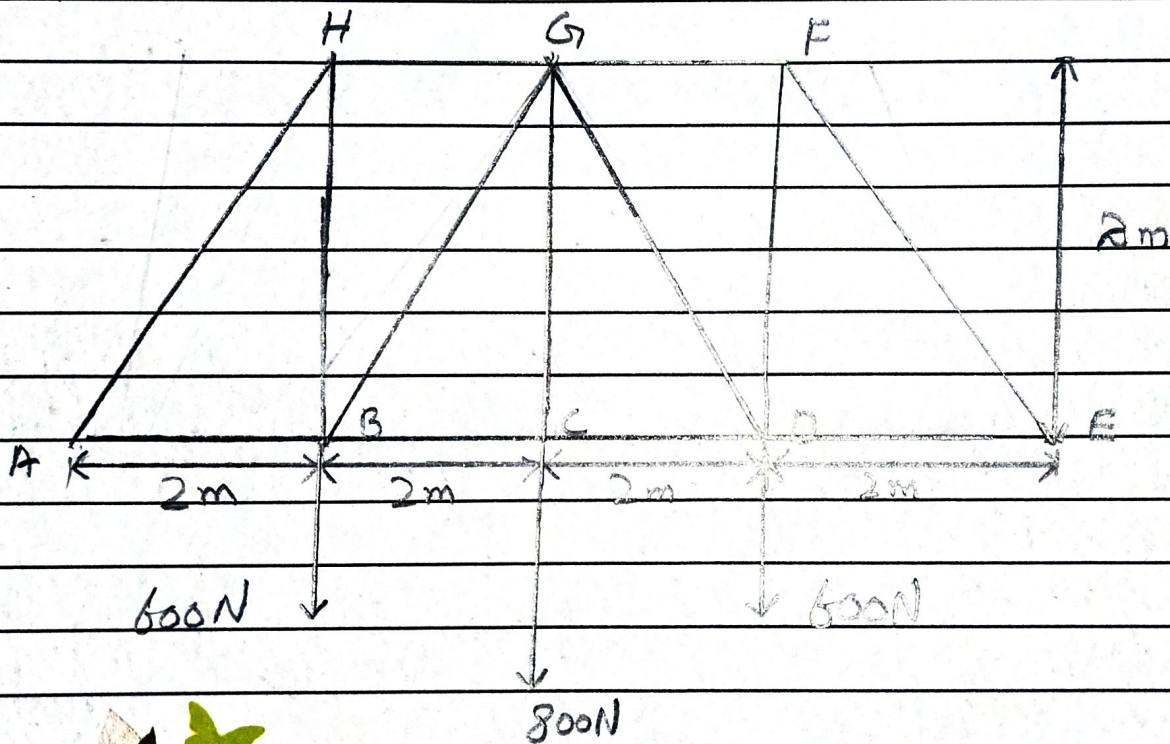


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Q

Q : 02

DETERMINE THE FORCES IN EACH MEMBER OF THE TRUSS. INDICATE IF THE MEMBERS ARE IN TENSION OR COMPRESSION. ASSUME ALL MEMBERS ARE PIN CONNECTED.



Solution:

"As there is no external horizontal force therefore H_A and H_E is equal to zero"

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(7)

FOR V_A and V_E

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

$$V_A + V_E - 600 - 800 - 600 = 0$$

$$V_A + V_E = 2000 \text{ N}$$

"As truss symmetrical"

$$V_A = V_E$$

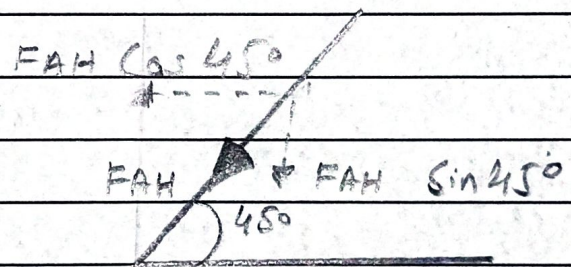
Therefore

$$2V_A = 2000$$

$$V_A = 1000 \text{ N}, \quad V_E = 1000 \text{ N}$$

CONSIDER;

Joint A :



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

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

$$F_{AH} = \frac{1000}{\sin 40}$$

(P.T.O)

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⑧

$$F_{AH} = 1414.2 \text{ N (Compression)}$$

$$\sum F_x = 0$$

$$F_{AB} - F_{AH} \cos 45^\circ = 0$$

$$F_{AB} = 1414.21 \times \cos 45^\circ$$

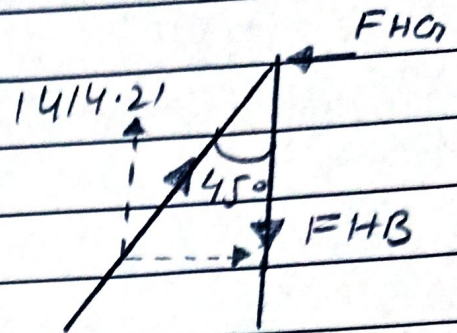
$$F_{AB} = 1000 \text{ N (Tension)}$$

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JOINT H:

$$\sum F_x = 0$$



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

(1000 N)

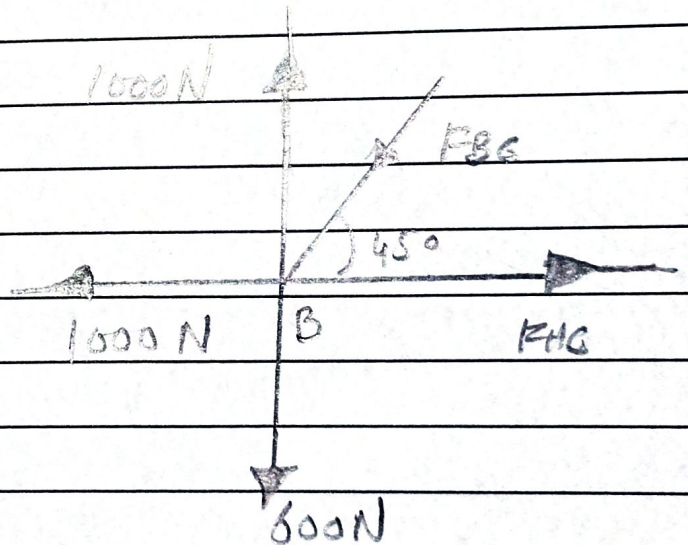
$$F_{HG} = 1000 \text{ N (Compression)}$$

$$\sum F_y = 0$$

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

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

JOINT B;



$$\sum F_y = 0$$

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

$$F_{BG} = 565.7 \text{ N (Compression)}$$

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(10)

$$\begin{array}{c} + \\ \rightleftarrows \\ - \end{array} \quad \sum F_x = 0$$

$$F_{BC} - 1000 - 565.7 \cos 45^\circ = 0$$

$$F_{BC} - 1000 - 400 = 0$$

$$F_{BC} = 1400 \text{ N (Tension)}$$

JOINT "C";

$$\begin{array}{c} + \rightarrow \\ \rightleftarrows \\ - \end{array} \quad \sum F_x = 0$$

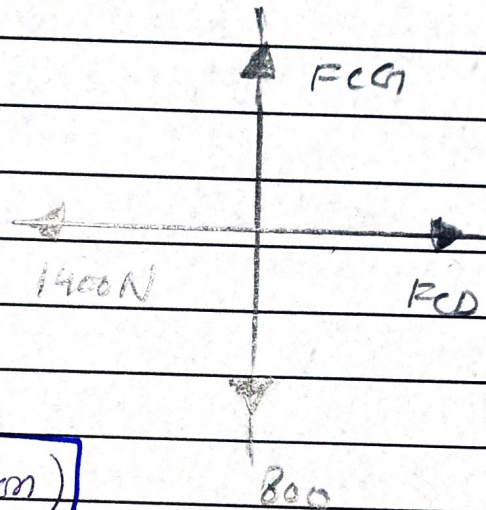
$$F_{CD} - 1400 = 0$$

$$F_{CD} = 1400 \text{ N (Tension)}$$

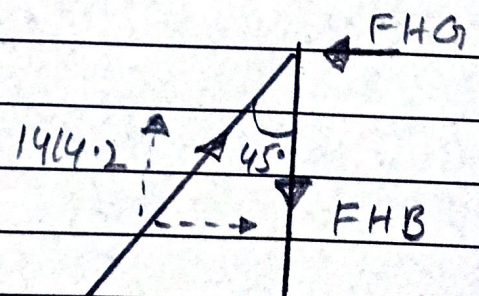
$$\begin{array}{c} + \uparrow \\ \updownarrow \\ - \end{array} \quad \sum F_y = 0$$

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

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



"JOINT H;"



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(11)

$$\begin{array}{c} + \\ \rightleftarrows \\ - \end{array} \sum F_x = 0$$

$$- F_{HG} + 1414.2 \sin 45^\circ = 0$$

$$F_{HG} = 1000 \text{ N (Compression)}$$

$$\begin{array}{c} + \\ \updownarrow \\ - \end{array} \sum F_y = 0$$

$$F_{HB} - 1414.2 \cos 45^\circ = 0$$

$$F_{HB} = 1000 \text{ N (TENSION)}$$

"JOINT B";

