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Semester :- 12<sup>th</sup>

Subject :- Structure Analysis 1

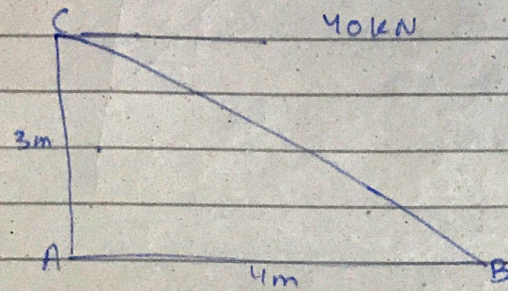
Assignment :- 2

Submitted to :- Engr Amjad Islam



①

Qno1.



First we will start from joint C

$$\sum F_x = 0$$

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

$$F_{CB} = 50 \text{ kN}$$

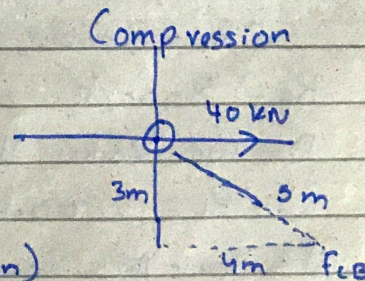
$$\sum F_y = 0$$

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

$$F_{CA} = 30 \text{ kN (Tension)}$$

Now joint B

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





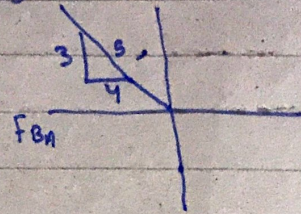
②

$$F_{BA} = 40.0 \text{ kN (Tension)}$$

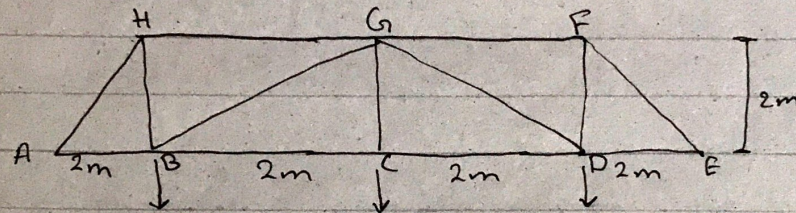
$$+ve \uparrow \sum F_y = 0$$

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

$$N_B = 30.0 \text{ kN}$$



Q no 2 :-



Sol:- Now finding reactions

$$\sum M_A = 0 \quad \downarrow +ve \quad \uparrow -ve$$

$$0 = (2 \times 600) + (4 \times 800) + (6 \times 600) - R_E \times 8$$

$$R_E = 8000$$

$$R_E = 8000/8 = 1000 \text{ N}$$

As we know that,

$$R_A + R_E = 2000 \text{ N}$$

$$R_A + 1000 = 2000 \text{ N}$$

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



③

Joint E:

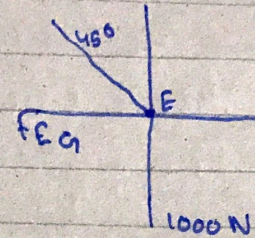
First we will start from joint E

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

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

$$0.707 F_{EF} = 1000$$

$$F_{EF} = 1414.42 \text{ (compression)}$$



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

$$1414.42 \cos 45^\circ - F_{ED} = 0$$

$$F_{ED} = 1000.14 \text{ N (Tension)}$$

Joint F :-

$$+\vee \sum F_x = 0$$

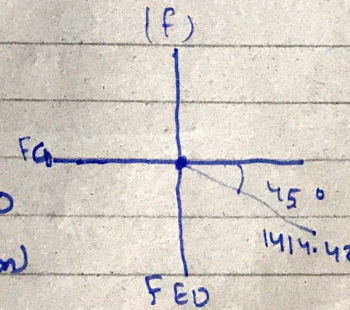
$$F_{FG} - 1414.42 \cos 45^\circ = 0$$

$$F_{FG} = 1000.14 \text{ N (compression)}$$

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

$$1414.42 \sin 45^\circ - F_{ED} = 0$$

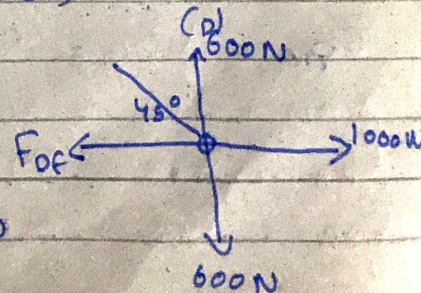
$$F_{ED} = 1000.14 \text{ N (Tension)}$$



Joint D :-

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

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





4

$$F_{DC} = 565.77 \text{ N (compression)}$$

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

$$1000 + 565.77 \cos 45^\circ - F_{DC} = 0$$

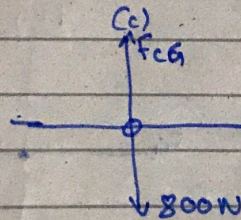
$$1400 = F_{DC}$$

$$\Rightarrow F_{DC} = 1400 \text{ N}$$

Joint C:-

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

$$F_{CG} - 800 = 0 \Rightarrow F_{CG} = 800 \text{ N (Tension)}$$



Due to Symmetry

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

$$F_{HB} = F_{FD} = 1000.14 \text{ N (Tension)}$$

$$F_{BG} = F_{DG} = 565.77 \text{ N (Tension)}$$

$$F_{HG} = F_{FG} = 1000.14 \text{ N (compression)}$$

$$F_{AH} = F_{EF} = 1414.42 \text{ (compression)}$$

$$F_{AB} = F_{ED} = 1000.42 \text{ (Tension)}$$