

Q. A truss of span 9m is loaded in Fig. Find the reaction and forces in the member 1, 2, & 3.

Solⁿ

Apply condⁿ of Equilibrium to whole truss.

$$\sum V = 0$$

$$R_A + R_B = 9 + 12$$

$$R_A + R_B = 21 \quad \text{--- (1)}$$

$$\sum M = 0 \quad X$$

$$\sum M_A = 0$$

~~9 x 3 + 12 x 6 = R_B x 9~~

$$9 R_B = 9 \times 3 + 12 \times 6$$

$$R_B = \frac{99}{9} = 11 \text{ kN}$$

$$\boxed{R_B = 11 \text{ kN}}$$

and $R_A = 21 - 11 = 10 \text{ kN}$

$$\boxed{R_A = 10 \text{ kN}}$$

In Fig (2) Again Apply

Eqⁿ equation.

$$\sum H = 0$$

$$F_1 + F_3 = 0 \quad \text{--- (2)}$$

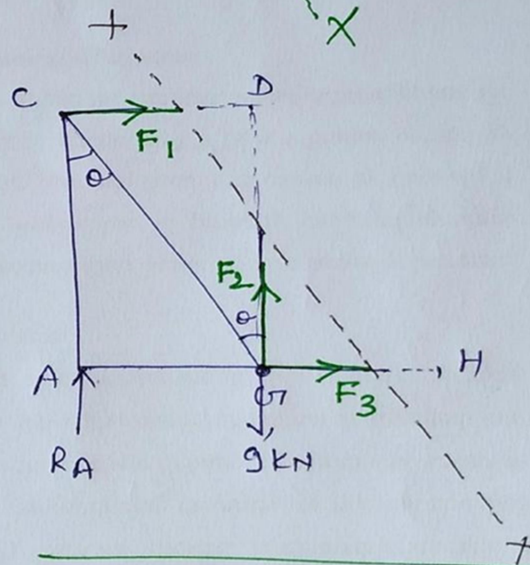
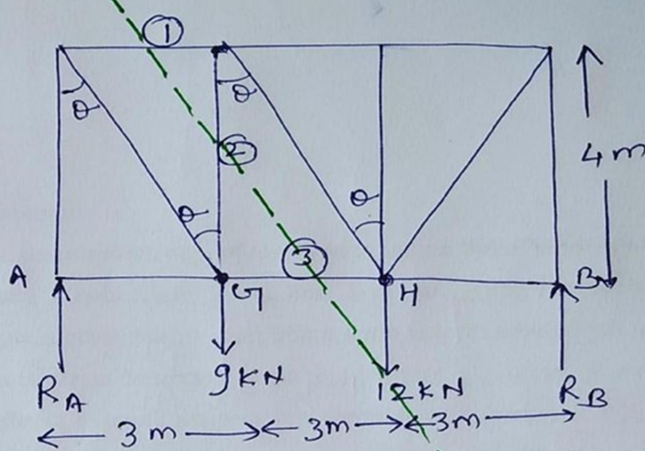
$$\sum V = 0$$

$$R_A + F_2 = 9$$

$$F_2 = 9 - 10$$

$$\boxed{F_2 = -1 \text{ kN}}$$

$$\boxed{F_2 = 1 \text{ kN}} \text{ (compressive)}$$



Take Moment about G.

$$\sum M_G = 0$$

$$R_A \times AG + F_1 \times DG = 0$$

$$10 \times 3 + F_1 \times 4 = 0$$

$$F_1 = \frac{-30}{4} = -7.5 \text{ kN}$$

$$\boxed{F_1 = 7.5 \text{ kN}} \text{ Compressive nature.}$$

From eqⁿ (2)

$$F_3 = -F_1$$

$$F_3 = -(-7.5) = 7.5 \text{ kN (Tension)}$$

Ans