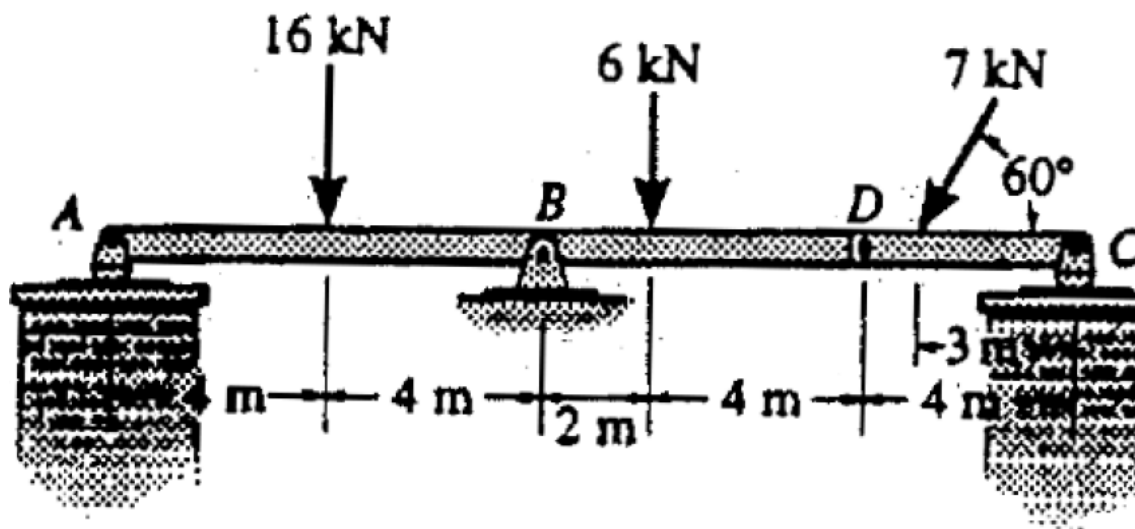


Problem 1 – Frame I

Solve for the reactions at rockers A and C, and pins B and D.



FBD

16 kN, 6 kN, 7 kN, 60°

4m, 4m, 2m, 4m, 3m

A_y, B_x, B_y, C_x, C_y

NONCONCURRENT
3 EQNS
4 UNKS

PULL PIN @ D

FBD DC

7 kN, 60°

1m, 3m

D_x, D_y, C_x, C_y

NONCONCURRENT
3 EQNS
3 UNKS

2 $\sum M_D = 0 = 1m(7\text{ kN} \sin 60^\circ) - 4C_y$
 $C_y = 1.51 \text{ kN} \uparrow$

$\uparrow \sum F_y = 0 = D_y - 7\text{ kN} \sin 60^\circ + C_y$
 $D_y = 4.55 \text{ kN} \uparrow$ ON DC

$\rightarrow \sum F_x = 0 = D_x - 7\text{ kN} \cos 60^\circ$
 $D_x = 3.5 \text{ kN} \rightarrow$ ON DC

FBD ABD

16 kN, 6 kN, 3.5 kN, 4.55 kN

4m, 4m, 2m, 4m

A_y, B_x, B_y

NONCONCURRENT
3 EQNS
3 UNKS

2 $\sum M_A = 0 = 4m(16\text{ kN}) - 0m(B_y) + 10m(6\text{ kN}) + 14m(4.55)$
 $B_y = 23.5 \text{ kN} \uparrow$

$\uparrow \sum F_y = 0 = A_y - 16 + B_y - 6 - 4.55$
 $A_y = 3.09 \text{ kN} \uparrow$