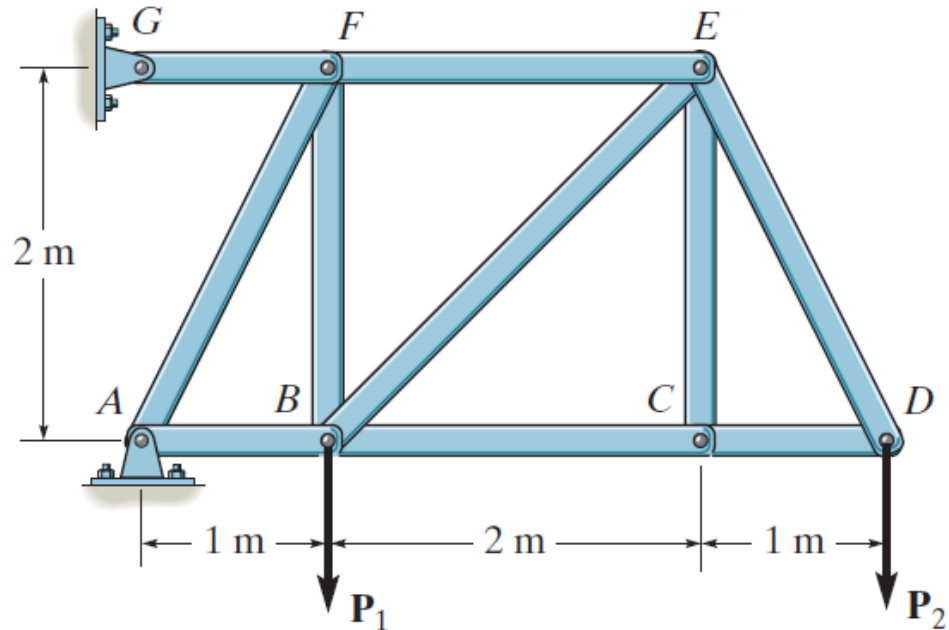# ENGR 057 Statics and Dynamics

Problems pre-exam 2

Summer 2022

Determine the force in each member of the truss and state if the members are in tension or compression. Set $P_1 = 8$ kN, $P_2 = 12$ kN.

Ans:

$F_{DE} = 13.4$ kN (T)

$F_{DC} = 6.00$ kN (C)

$F_{CB} = 6.00$ kN (C)

$F_{CE} = 0$

$F_{EB} = 17.0$ kN (C)

$F_{EF} = 18.0$ kN (T)

$F_{BA} = 18.0$ kN (C)

$F_{BF} = 20.0$ kN (T)

$F_{FA} = 22.4$ kN (C)
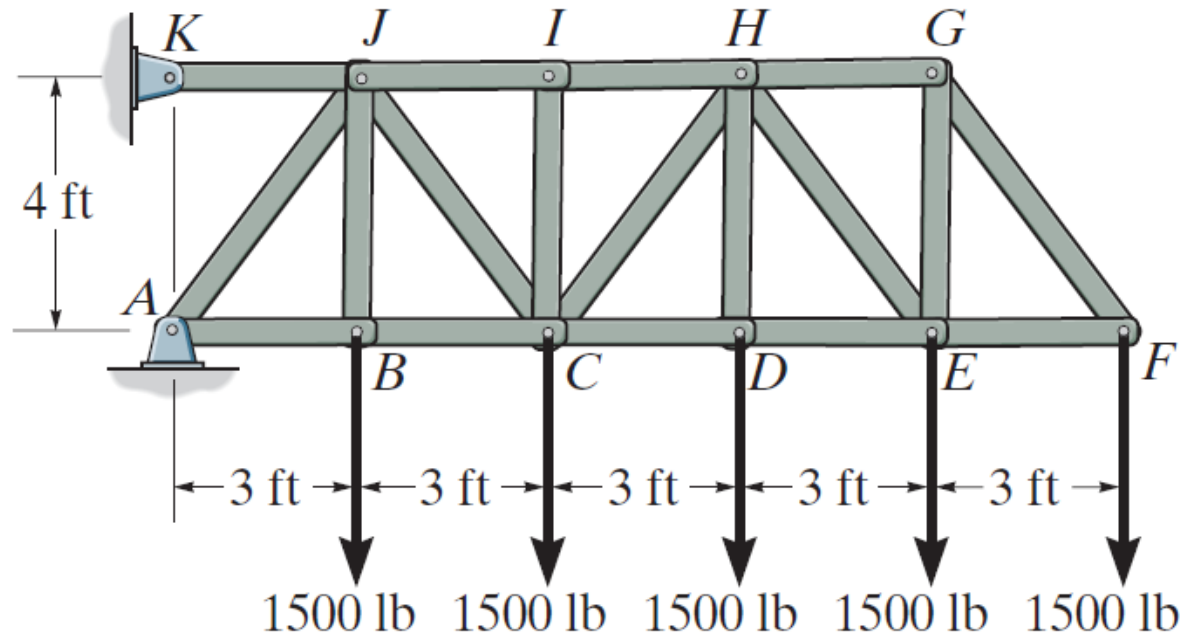
$F_{FG} = 28.0$ kN (T)

Suggestions to solve:

Method of joints

Support Reactions. Not required.

Method of Joints. Perform the joint equilibrium according to the sequence of joints D, C, E, B and F.

Determine the force in members CD, HI, and CH of the truss, and state if the members are in tension or compression.

Ans:
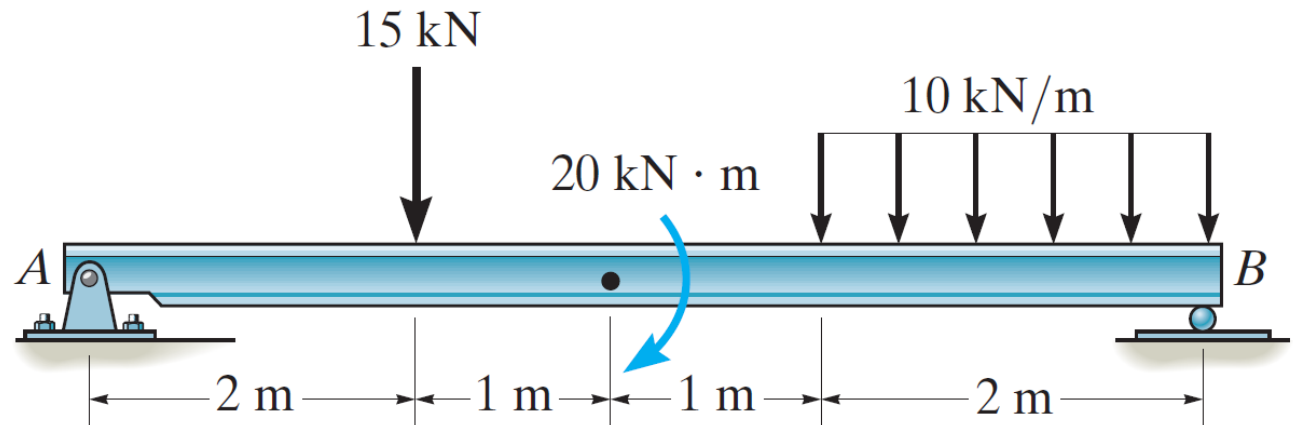
$F_{CD} = 3375$ lb (C)

$F_{HI} = 6750$ lb (T)

$F_{CH} = 5625$ lb (C)

- Draw the shear and moment diagrams for the beam.
- Determine the maximum bending moment M_{max}.
- If the couple moment of 20 kN.m is not applied, determine the maximum bending moment M_{max}.

15 kN

10 kN/m

20 kN · m

A

B

2 m ─── 1 m ─── 1 m ─── 2 m

Ans:

M_{max} = 35 kN.m at (x = 5)

Without the applied moment of 20 kN.m, the bending moment is maximum when V=0, then M_{max} = 20 kN.m at (x = 2)

Ans:

V(kN)

10.0

3   4   6
                    X(m)
2
-5.00

-25.0

M(kN·m)

35.0
15.0   30.0
20.0

0   2   3   4   6
                    X(m)