Q 1 (6 pts):

If the resultant force acting on the bracket is to be \( F_R = 750 \text{ N} \) directed along the positive X axis, determine the magnitude of the force \( F_2 \) and its direction \( \theta \).

Solution:

\[
\begin{align*}
F_R &= 750 \text{ N} \\
F_1 &= 200 \text{ N} \\
F_2 &= 450 \text{ N}
\end{align*}
\]
Q 2 (7 pts):

Determine the tension in cables (AB), (BC), and (CD) necessary to support the (15 kg) and (20 kg) traffic lights at (B) and (C) respectively. Also find the angle (θ).

Solution:
Q 3 (6 pts):

The force \( \mathbf{F} = 350i + 175j - 400k \) N acts at the end of the beam (at point B). Determine the moment of the force about point (A).

القوة \( \mathbf{F} = 350i + 175j - 400k \) N تؤثر على نهاية العتبة في نقطة (B). جد عزم هذه القوة حول نقطة (A).

Solution:
Q 4 (6 pts):

Replace the distributed loading by an equivalent resultant force and specify where its line of action intersects member (AB) measured from (A).

Solution:
**Q 5 (7 pts):**

Determine the reactions at the supports (A) and (B). Neglect the weight and thickness of the beam.

A – Pin (Hinge)
B – Roller

Solution:
Q 6 (8 pts):

Determine the force in each member of the truss. State if the members are in tension or compression.
A – Pin (Hinge)
C – Roller

Solution: