

ES2013-1 Statics Fall 2007
Practice Test #1
13 September 2007

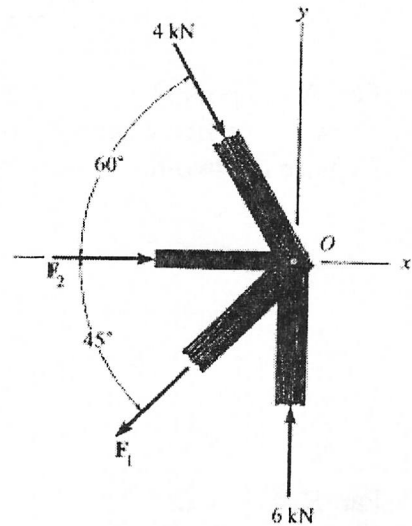
- Closed Book. Closed Notes. Individual exam (No joint efforts allowed)
- Show all work for full credit.
- Box final answers.
- Allotted time for exam: 1 Hour and 15 Minutes

Problem 1 (25 pts)

The members of a truss are pin-connected at Joint O.
Geometry and known forces are as shown to the right and
the truss section is in equilibrium..

Part A (5 points)

Draw a Free Body Diagram with labeled axes for the Truss.



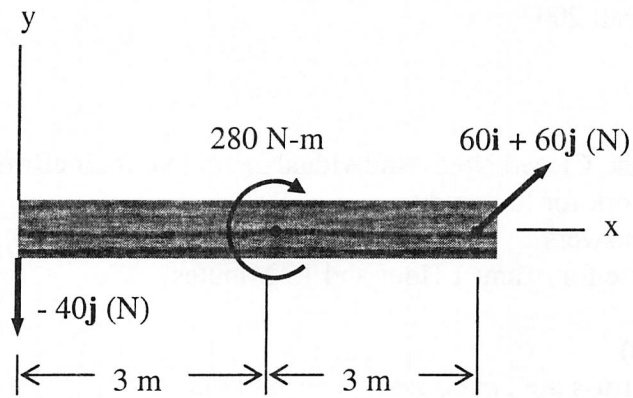
Part B (10 points)

Write the equations for summing forces in the x and y direction.

Part C (10 points)

Determine the Magnitude of forces F_1 and F_2 .

Problem 2 (30 pts)



Part A (10 points)

Draw a Free Body Diagram of an equivalent system for the loading on the beam. Replace the two forces and the moment acting on the beam with a single force F .

Part B (10 points)

Determine F such that it replaces the forces acting on the beam.

Part C (10 points)

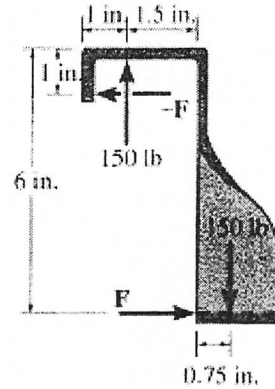
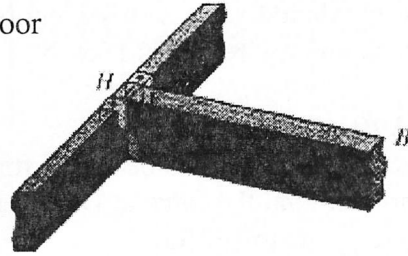
Determine where the line of action of F intersects the x axis so that it replaces the two forces and the moment on the beam.

Problem 3 (30 pts)

A metal hanger (H) is used to support the end of the floor beam (B). The loading on the hanger consists of two couples, a horizontal couple and a vertical couple.

Part A (5 points)

Draw a 2D Free Body Diagram with labeled axes for the Bracket.



Part B (10 points)

Write an equation for the couple moment for each pair of Forces.

Part C (15 points)

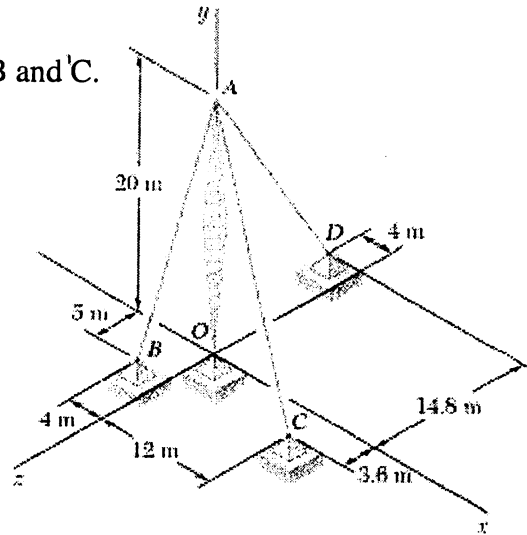
Determine the magnitude of the horizontal forces F and $-F$ so that the resultant couple moment on the hanger is zero.

Problem 4 (15 pts)

A tower is held by guy wires anchored at A, B and C.
The tension in wire AD is 1260 N.

Part A (5 points)

Draw a FBD that would be useful for finding
the moment that the force at D causes around
the base of the tower (O).



Part B (5 points)

Determine the components of the Force exerted by the wire on the bolt at D.

Part C (5 points)

Determine the moment that the force at D causes around the base of the tower (O).