FE Exam Review

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Chapter 7 Statics - Lecture 1

Chapter 7 Statics - Lecture 1

- Introductory Concepts in Mechanics
- Vector Geometry and Algebra
- Force Systems
- Equilibrium
- Examples

Also in Ch. 7

- Trusses
- Couple-Supporting Members
- Systems with Friction
- Distributed Forces

Introductory Concepts in Mechanics

What is Statics?

- **Statics** is a subset of mechanics focused on loads analysis of rigid bodies in static equilibrium.
- .. fundamental to all disciplines of engineering.
- .. essential in **mechanical engineering** and **design**.

Vector Geometry and Algebra

Geometry is Mathematics!

- vectors are used to describe the geometry of a statics problem
- different mathematical representations of vectors are commonly used
  - Cartesian
  - unit vector notation
  - complex cartesian/complex Polar
- you can perform algebra and arithmetic with vectors

Vector Geometry and Algebra

- Cartesian
- unit vector notation
- complex cartesian/complex polar

Force Systems

- .. focused on loads analysis of rigid bodies

- most ME problems begin with loads analysis

Equilibrium

... in static equilibrium.

- Static equilibrium is the condition of a system at rest or stationary.
- The sum of all forces acting on the body is equal to zero.
- special case of _____

Equilibrium

Static vs. Dynamic Equilibrium

Examples

Example 1:

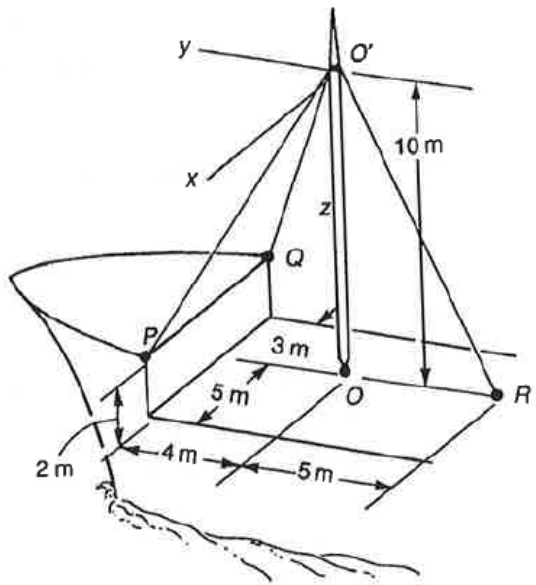

Exhibit 2

1. Determine the lengths of the guylines O'P and O'Q and the angle between them.
2. Suppose the guy line O'P has a tension of 800N. What is the moment from this force about O?

Examples

Example 1 (cont.):

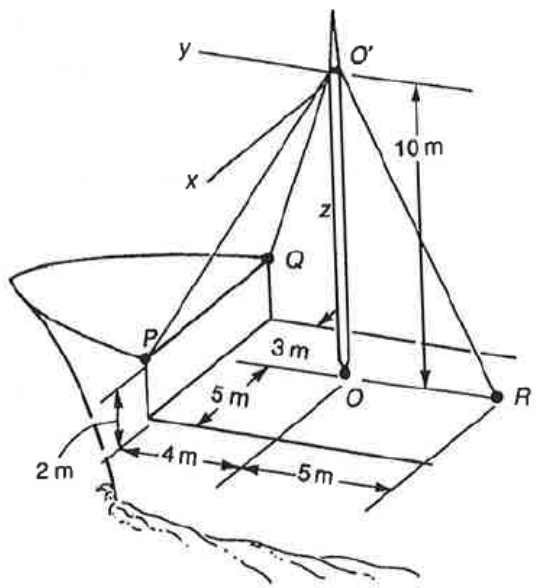

Exhibit 2

Examples

Example 1 (cont.):

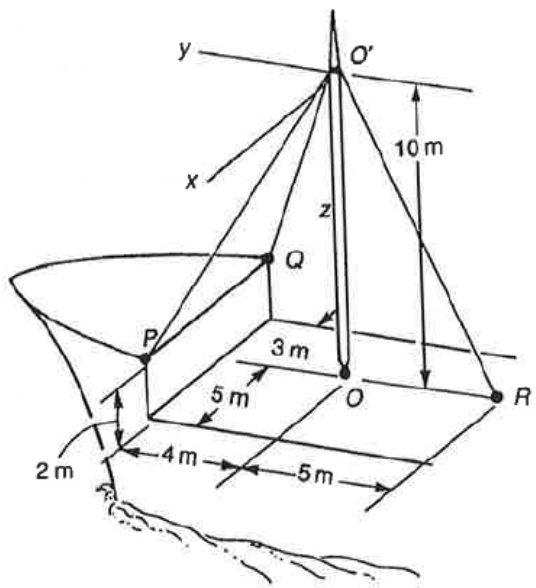

Exhibit 2

Examples

Example 2:

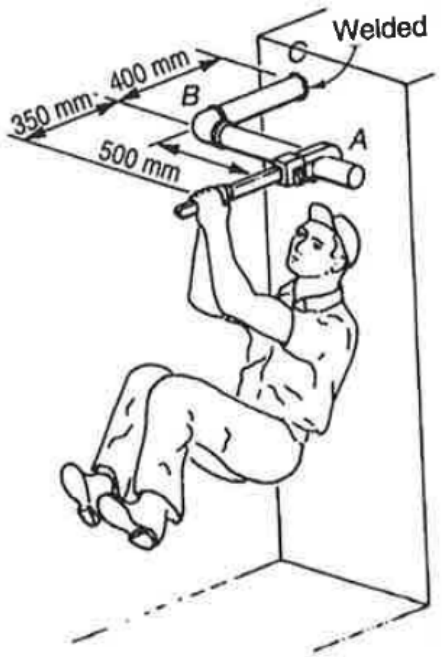

Exhibit 7.13

7.13 The plumber in Exhibit 7.13 exerts a vertical downward force of 1 kN on the wrench handle. The moment about C of this force has a magnitude of

a. 500 N•m
b. 750 N•m
c. 900 N•m
d. 1250 N•m

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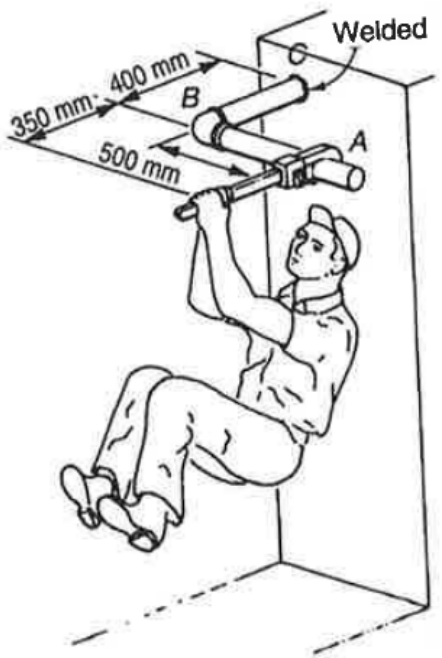

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