

*King Fahd University of Petroleum & Minerals*

**Department of Civil and Environmental Engineering**

**CE 201 – Statics**

**Semester:** 141  
**Examination:** Second Major  
**Date (Day):** December 02, 2014 (Tuesday)  
**Time:** 07:00 – 10:00 p.m.

<b>Section</b>	<b>1 &amp; 2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>8</b>	<b>9</b>	<b>10</b>
<b>Instructor</b>	Al-Malack	Vohra	Al-Attas	Essa	Al-Senan	Al-Ghamdi	Chowdhury	Al-Osta
<b>Time</b>	07:00 & 08:00	09:00	09:00	10:00	11:00	11:00	10:00	08:00
<b>Tick</b>								

<b>Student's Name</b>	:
<b>Student's ID</b>	:

<b>Problem</b>	<b>Assigned Grade</b>	<b>Earned Grade</b>
1 - A	12 (Points)	
1 - B	08 (Points)	
2	25 (Points)	
3	30 (Points)	
4	25 (Points)	
<b>Total</b>	<b>100 (Points)</b>	

*Good Luck*

**Problem 1A (12 Points)**

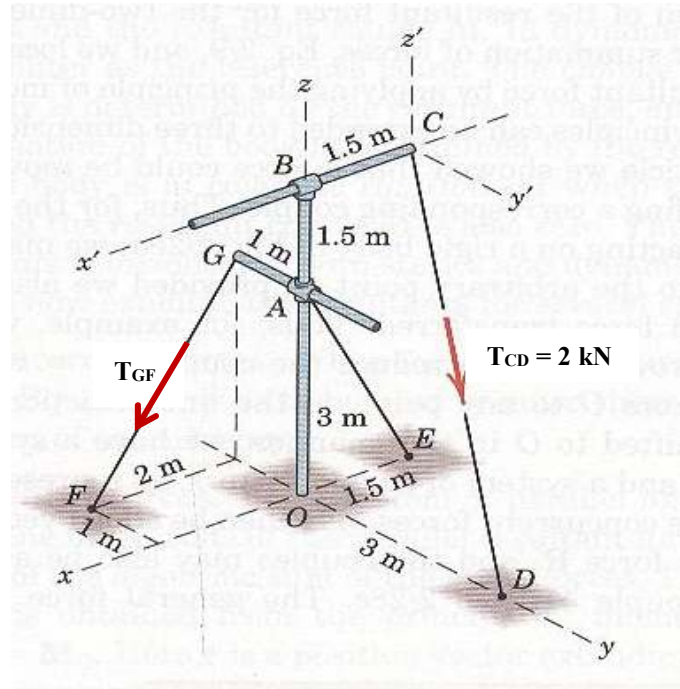
A rigid pole OAB is supported by a fixed support at O and three cables AE, CD and GF (as shown in the Figure). Knowing that tension in cable CD is  $T_{CD} = 2.0 \text{ kN}$ ,

- 1) Determine the moment of the tension  $T_{CD}$  about point O.
- 2) Determine the moment of the tension  $T_{CD}$  about the z-axis
- 3) Determine the magnitude of the tension  $T_{GF}$  that will make the resultant moment about the z-axis equal to zero

**Note:**

**BA = 1.5 m**

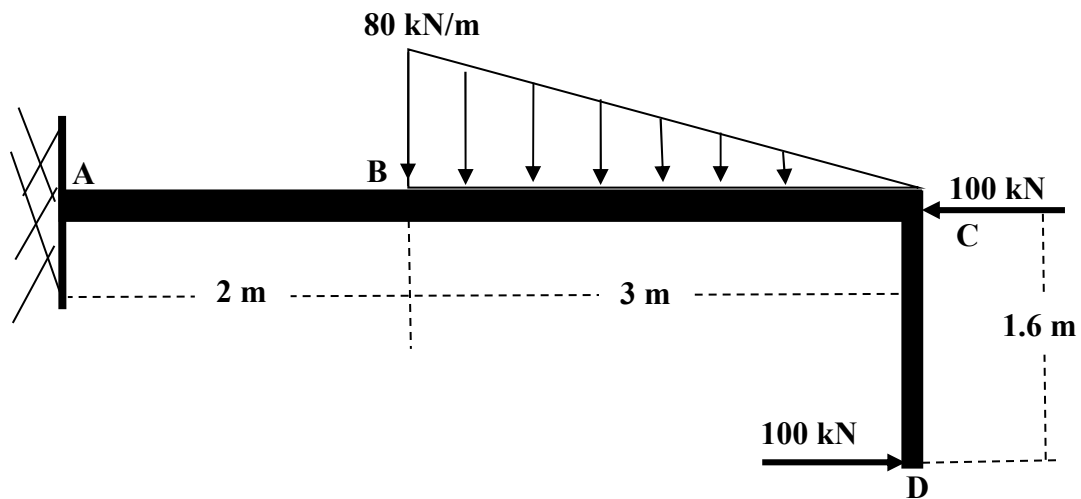
**AO = 3.0 m**





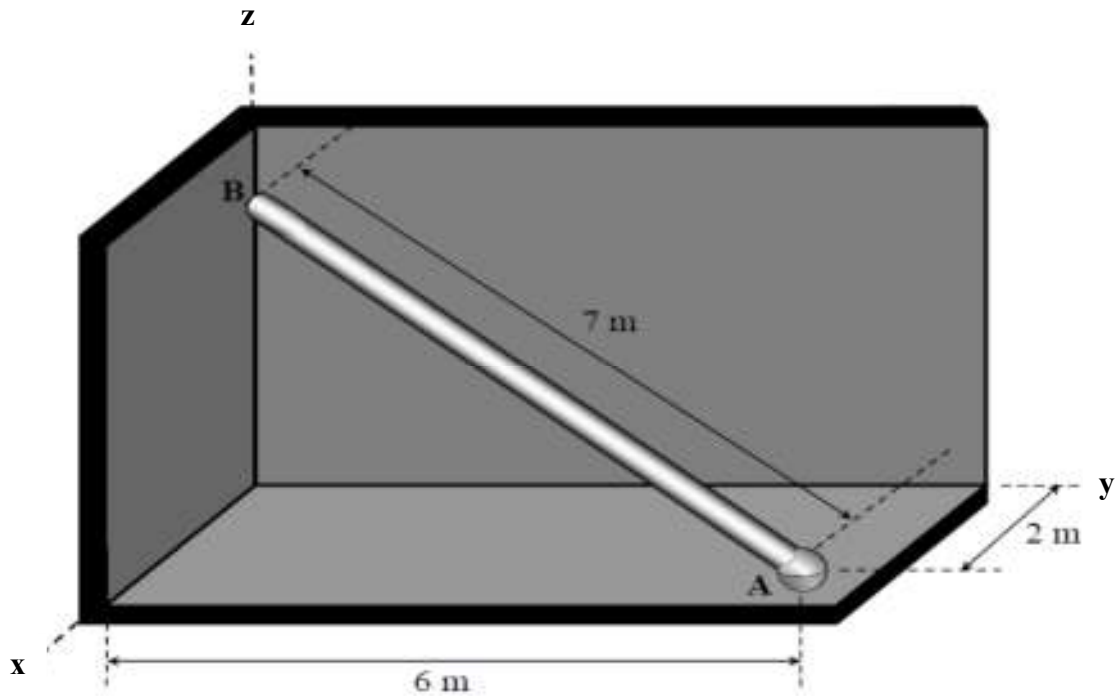
**Problem 1B (08 Points)**

For the rigid bar ABCD loaded as shown in the Figure, replace the loading system by an equivalent resultant force and couple moment acting at point A (the fixed support).



**Problem 2 (25 Points)**

The uniform steel shaft **AB**, shown in the Figure below, has a mass of 200 kg. The shaft is supported by a ball-and-socket at **A**. The other end of the shaft just rests against the smooth vertical walls at **B** (rests at the corner between the two walls). Determine the components of reactions at supports **A** and **B**.

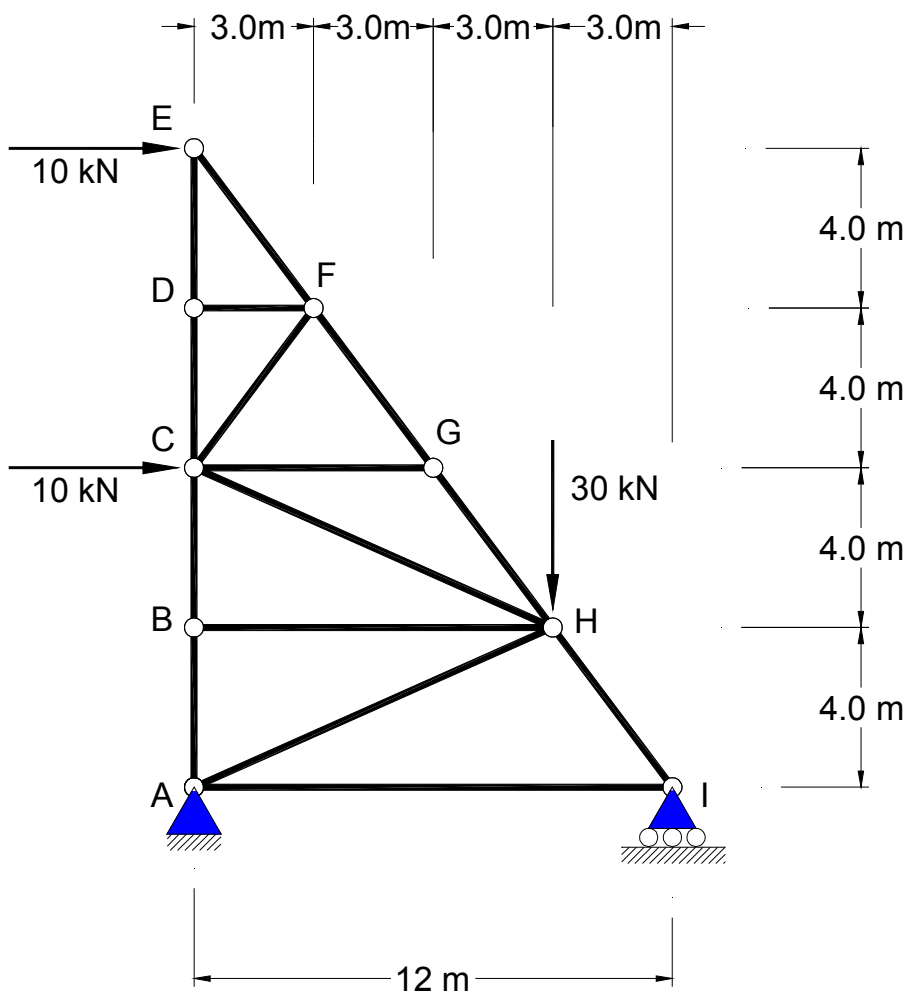




### Problem 3 (30 Points)

In the truss shown below, determine:

- (5 Points) 1. The support reactions at **A (pin)** and **I (roller)**.
- (5 Points) 2. Identify, by inspection, the zero-force members in the truss shown below.
- Note: There is a penalty of 1.0 point for each wrong answer.**
- (10 Points) 3. The force in members **AH** and **CH** of the truss **using the method of joints**. Indicate whether the members are in tension or compression.
- (10 Points) 4. The force in member **BC** of the truss **using the method of sections**. Indicate whether the member is in tension or compression.







**Problem 4 (25 Points)**

The frame structure has a fixed support at point **C** and supports a weight 70 kN using a pulley-cable system as shown in the figure. Determine the horizontal and vertical components of reaction at **A**, **B**, **D** and **E** and the reactions at **C**.

**Note:** the pulley at **D** is of a negligible weight and is frictionless.

