

# *King Fahd University of Petroleum & Minerals*

## Department of Civil and Environmental Engineering

### CE 201 – Static

**Semester:** 121  
**Examination:** First Major  
**Date (Day):** October 2, 2012 (Tuesday)  
**Time:** 07:00 – 09:00 p.m.

<b>Section</b>	<b>1 &amp; 2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8 &amp; 10</b>	<b>9</b>	<b>11</b>
<b>Instructor</b>	Malack	Schowdhury	Amoudi	Hussein	Gadhib	Vohra	Senan	Sharif	Ghamdi
<b>Time</b>	07:00 & 08:00	08:00	09:00	10:00	09:00	11:00	13:10 & 11:00	10:00	09:00
<b>Tick</b>									

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

<b>Problem</b>	<b>Assigned Grade</b>	<b>Earned Grade</b>
<b>1</b>	<b>25 (Points)</b>	
<b>2</b>	<b>25 (Points)</b>	
<b>3</b>	<b>25 (Points)</b>	
<b>4</b>	<b>25 (Points)</b>	
<b>Total</b>	<b>100 (Points)</b>	

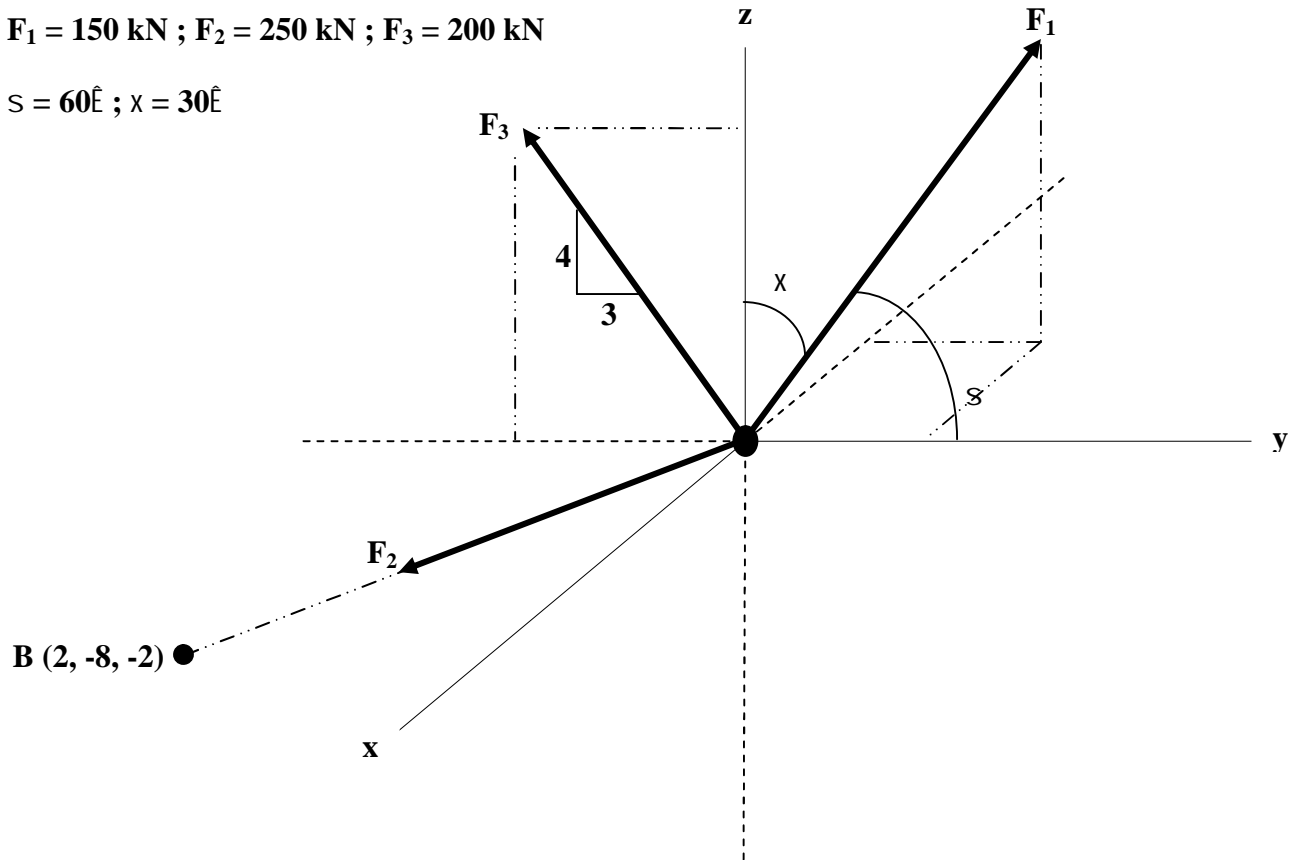
*Good Luck*

### Problem 1 (25 Points)

Using Cartesian Vector Formulation, find the magnitude and directional angles of the resultant of the three forces shown in the figure if:

$$F_1 = 150 \text{ kN} ; F_2 = 250 \text{ kN} ; F_3 = 200 \text{ kN}$$

$$s = 60^\circ ; \alpha = 30^\circ$$

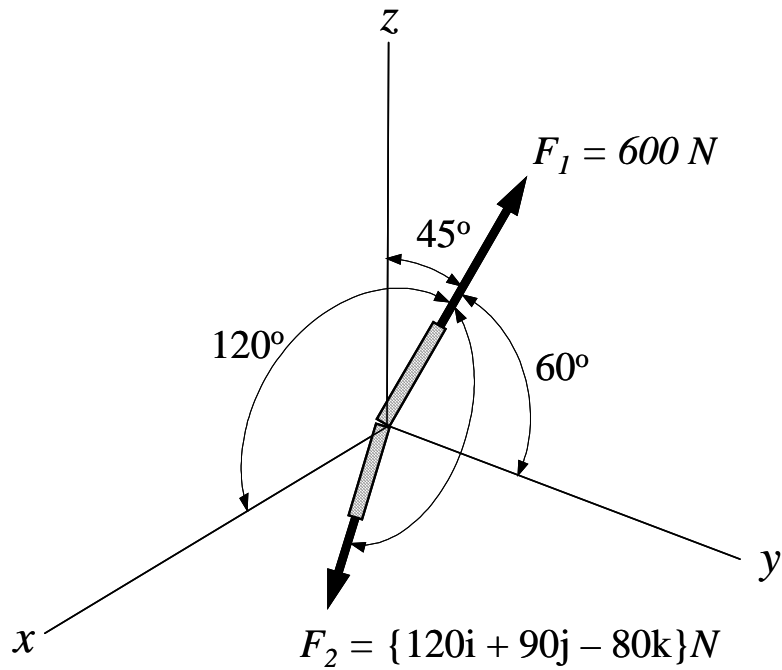




**Problem 2 (25 Points)**

The forces  $\mathbf{F}_1$  and  $\mathbf{F}_2$  are shown in the Figure below.

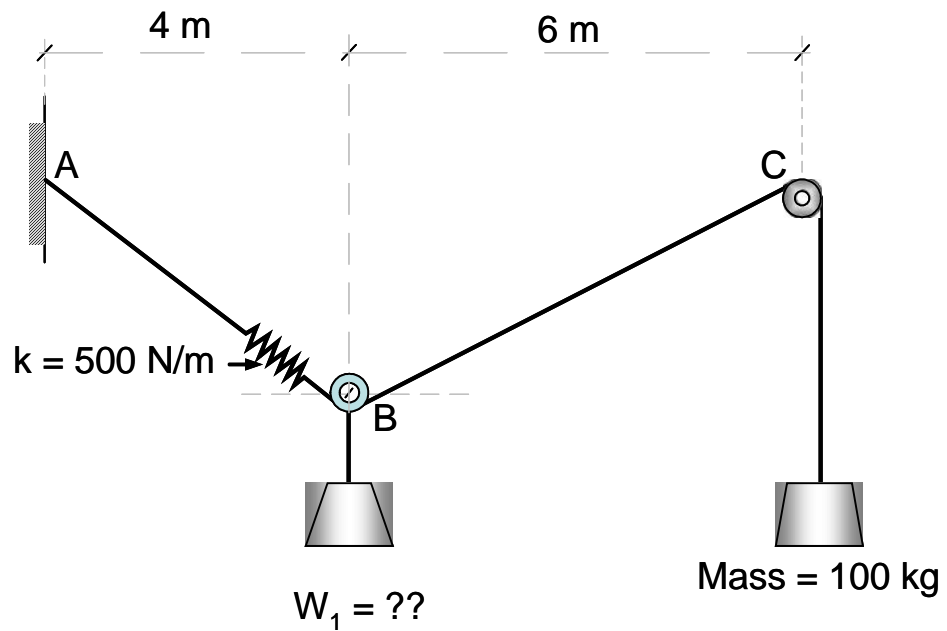
- (15 Points) (a) Determine the magnitude of the projection of  $\mathbf{F}_2$  along the line of action of  $\mathbf{F}_1$ .
- (10 Points) (b) Determine the angle  $\theta$  between  $\mathbf{F}_1$  and  $\mathbf{F}_2$ .





**Problem 3 (25 Points)**

A cable and spring are used to support blocks at B and C as shown in the Figure. The sum of the lengths of AB and BC is 50 meters [ $AB + BC = 50$  m]. Determine the Weight  $W_1$  and the stretch in the spring AB. The cable BC, spring AB and  $W_1$  are connected with a ring at B.





**Problem 4 (25 Points)**

If the mass of the bar  $OB$  is negligible compared to the mass of the suspended object  $E$ , the bar exerts a force on the ring at  $B$ . The position Vector from  $B$  to  $D$  is  $(4\mathbf{i} - 4\mathbf{j} + 2\mathbf{k})$ . Determine the tensions in cables  $BC$  and  $BD$  and the force in bar  $OB$ .

