

# *King Fahd University of Petroleum & Minerals*

## Department of Civil and Environmental Engineering

### CE 201 – Statics

**Semester:** 141  
**Examination:** First Major  
**Date (Day):** October 19, 2014 (Sunday)  
**Time:** 07:00 – 09:00 p.m.

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

Student's Name :
Student's ID :

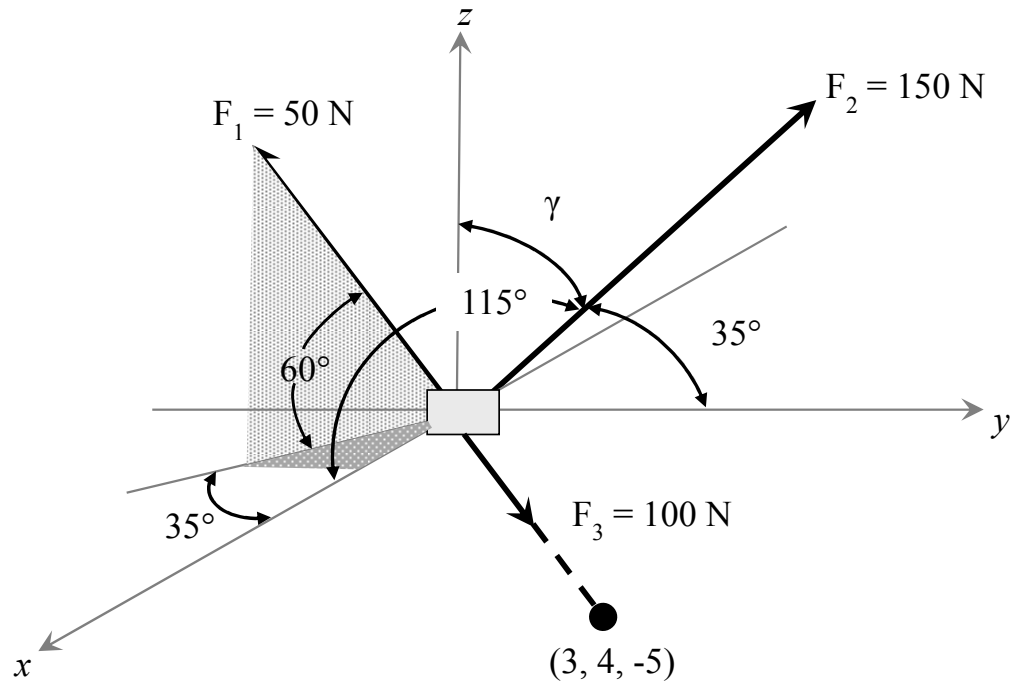
Problem	Assigned Grade	Earned Grade
1	25 (Points)	
2	25 (Points)	
3	25 (Points)	
4	25 (Points)	
<b>Total</b>	<b>100 (Points)</b>	

*Good Luck*

**Problem 1 (25 Points)**

The ball shown below is acted upon by forces  $F_1$ ,  $F_2$ , and  $F_3$ . Determine:

1. The resultant force of the system expressed in Cartesian vector form
2. The magnitude of the resultant force
3. The directional angles of the resultant force

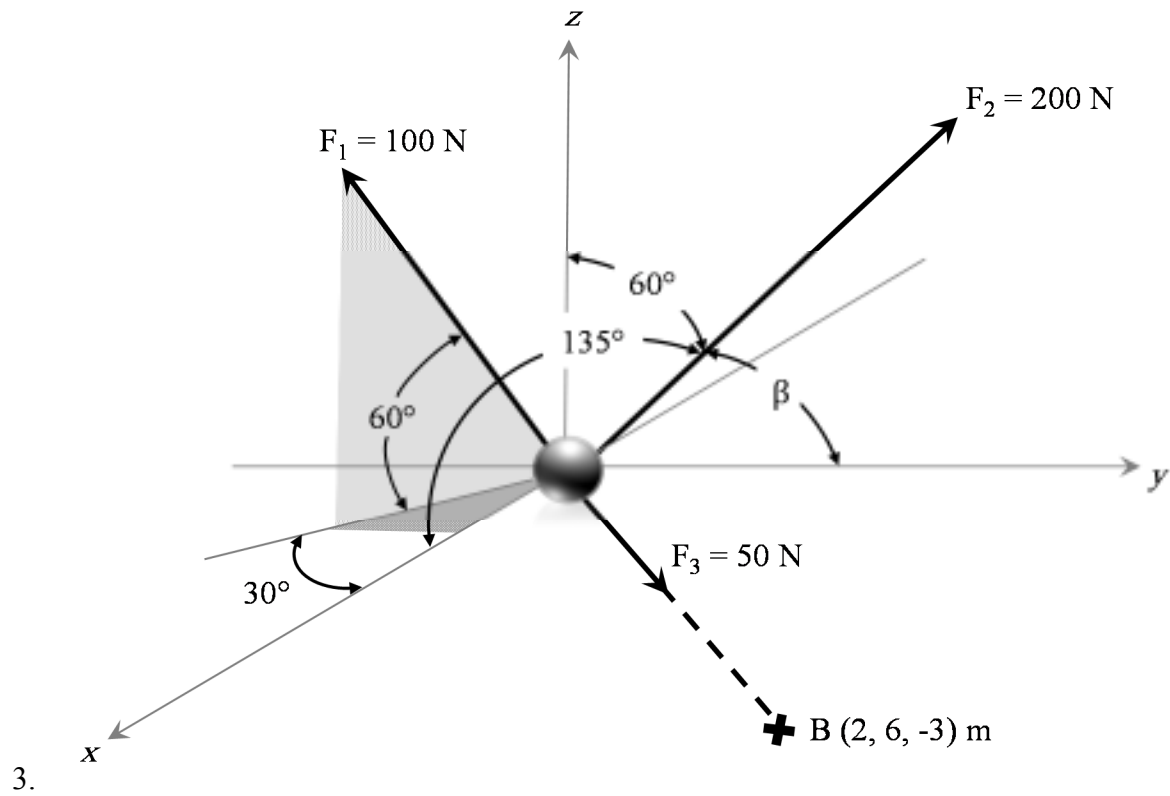




**Problem 2 (25 Points)**

For the figure shown below:

1. Use the **DOT PRODUCT** to determine the angle between ( $\mathbf{F}_1$ ) and ( $\mathbf{F}_2$ ).
2. Use the **DOT PRODUCT** to determine the projection of ( $\mathbf{F}_2$ ) along the line of action of ( $\mathbf{F}_3$ ).  
Express the projected force in Cartesian.





**Problem 3 (25 Points)**

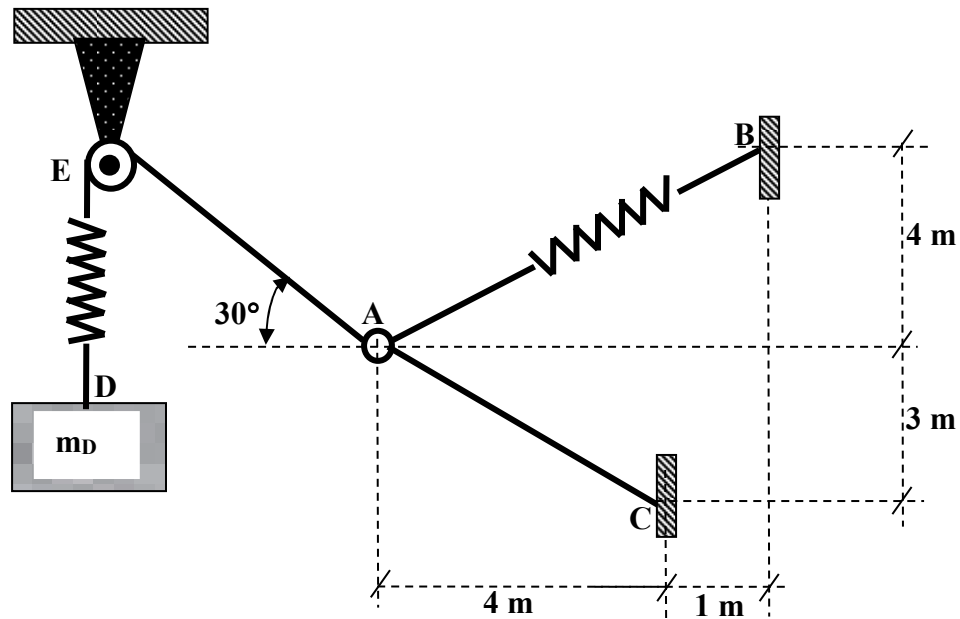
Equilibrium has been reached in the system of cables, pulley (E), ring (A) and springs as shown in the figure below. If the mass ( $m_D$ ) attached to the spring at point (D) is 20 kg, determine:

- The extension in spring AD
- The force in cable AC
- The distance between points A and B before mass  $m_D$  was added to the system.

**Note:**

$$k_{AB} = 200 \text{ N/m}$$

$$k_{AD} = 400 \text{ N/m}$$





**Problem 4 (25 Points)**

In the figure below, if the mass of the box ( $W$ ) is 51 kg, the force  $F_{AB}$  is 1200 N and the force in cable  $AD$  is 1000 N, determine the force in cable  $AC$  and the coordinates of point  $C$  to have equilibrium of the assembly.

