King Fahd University of Petroleum & Minerals

Department of Civil and Environmental Engineering

CE 201 – Statics

Semester: 152
Examination: First Major
Date (Day): February 21, 2016 (Sunday)
Time: 07:00 – 09:30 p.m.

Section	1	2	3	4	5	6	7
Instructor	Vohra	Al-Malack	Al-Malack	Al-Osta	Al-Attas	Essa	Al-Shayea
Time	09:00	07:00	08:00	09:00	10:00	11:00	10:00
Tick							

Student's Name :
Student's ID :

Problem	Assigned Grade	Earned Grade
1A	15 (Points)	
1B	10 (Points)	
2	25 (Points)	
3	25 (Points)	
4	25 (Points)	
Total	100 (Points)	

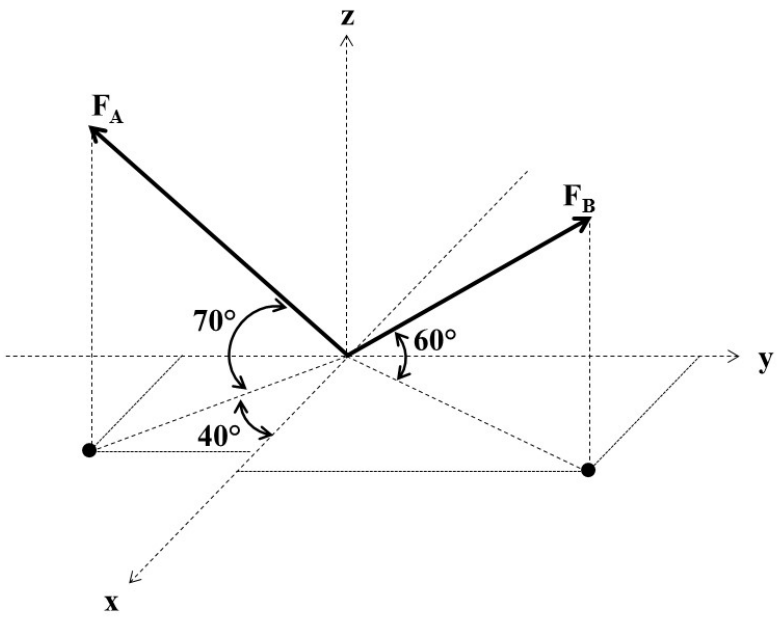
Good Luck

Problem 1A (15 Points)

Express F_A and F_B in Cartesian vector forms knowing that:

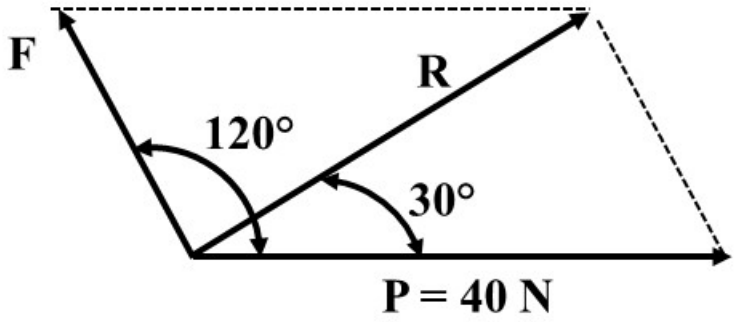
- Magnitude of F_A = 120 N
- {$\mathbf{F_A} + \mathbf{F_B}$ = 80 **i** + 30 **j** + (?) **k**} N

Find the magnitude and directional angles of the resultant force of F_A and F_B



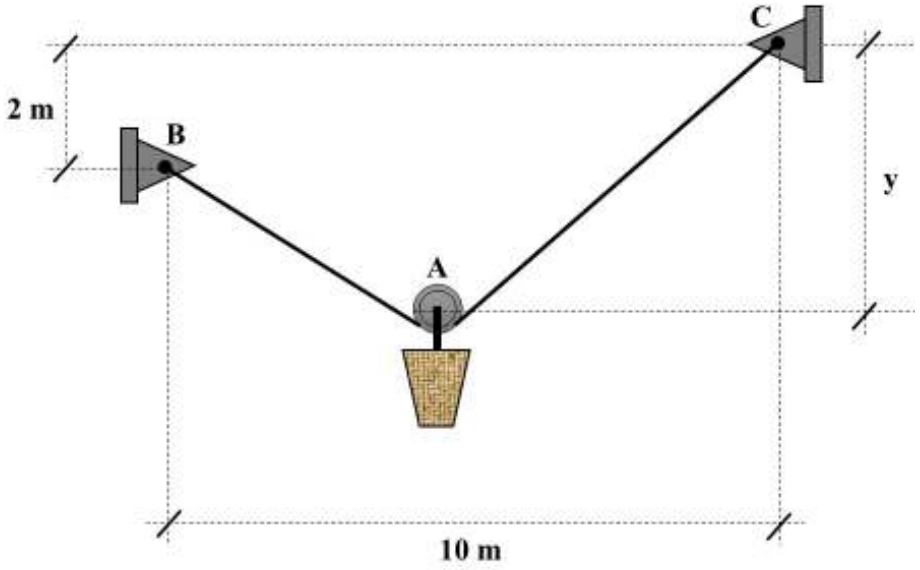
Problem 1B (10 Points)

Two forces (F and P) act at an angle of 120°. The larger force is 40 N and the resultant force (R) is perpendicular to the smaller force (F). Determine the magnitude of **F.**



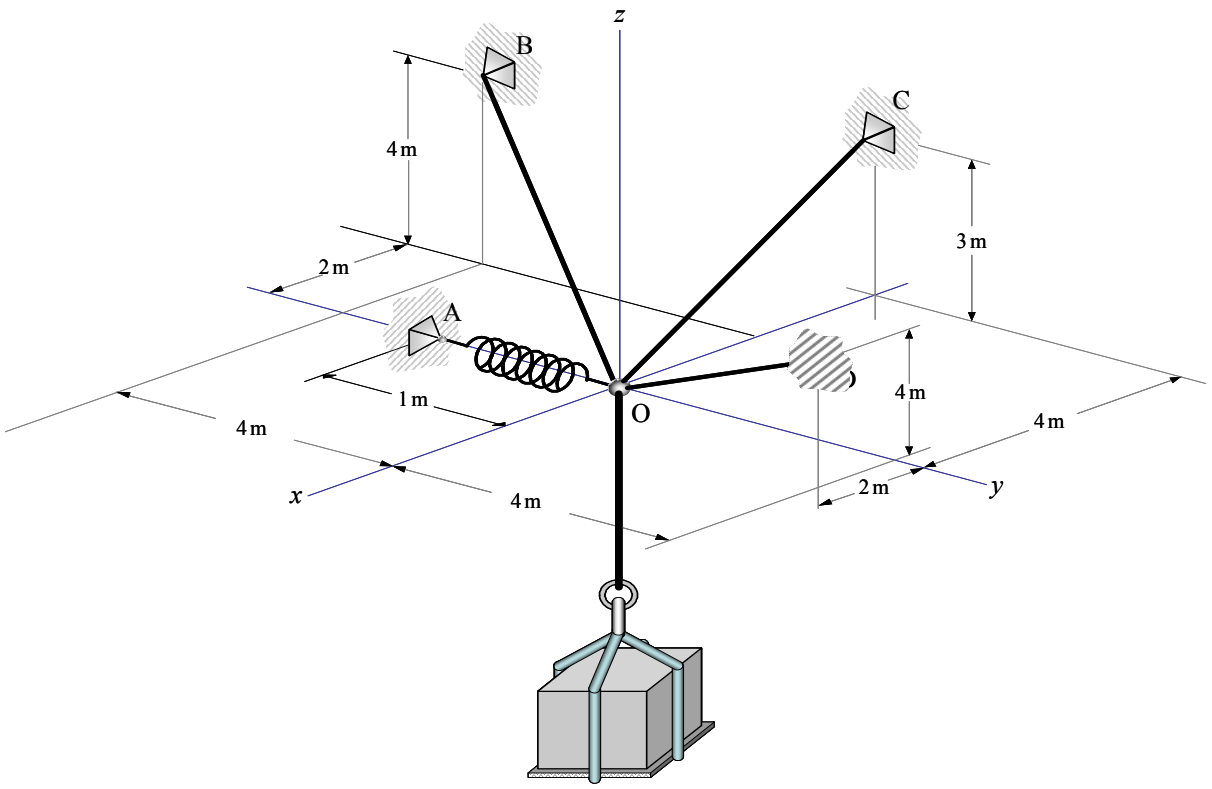
Problem 2 (25 Points)

The pail and its contents have a mass of 60 kg. If the cable (BAC) is 15 m long, determine the tension in cable BAC at equilibrium. Neglect the size of the pulley at A.



Problem 3 (25 Points)

The 100-kg box, shown in the figure below, is supported by three cables (OB, OC and OD) and spring OA. Determine the tensions developed in cables OB, OC and OD. The spring OA has an un-stretched length of 0.8 m and a stiffness k_{OA} = 1.2 kN/m. Cable OC lies in the x-z plane and spring OA lies on the x-axis.



Problem 4 (25 Points)

Given the following information:

F = 100 N; P = 150 N; M_C (applied moment) = 200 N.m

Coordinates of B (4, 5, 2)

Determine:

1. The angle between F and P
2. The resultant moment (M_R) of F, P and M_C about the axis passing points O and D. Express M_R in Cartesian vector form
3. The perpendicular distance between the force P and the axis passing points O and D