Course Code: ESC106A
Course Title: Construction Materials and Engineering Mechanics

Lecture No. 15:
Problems on Coplanar Concurrent Force Systems

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Lecture Intended Learning Outcomes

At the end of this lecture, students will be able to:

- Apply the method of Resolution and find the resultant of Coplanar Concurrent force system

- Solve for the unknown forces given the resultant of concurrent force system

- Calculate the angles of applied forces given the resultant of concurrent force system

Contents

- **Analysis of Coplanar Concurrent and Non-Concurrent System of Forces**

Resultant of Concurrent force systems by method of Resolution-Numerical problems

Problems

1.An eyebolt is being pulled from ground by three forces as shown in the figure. Determine the resultant force.
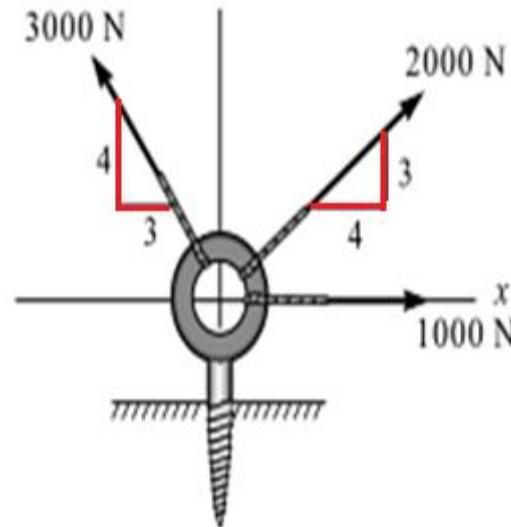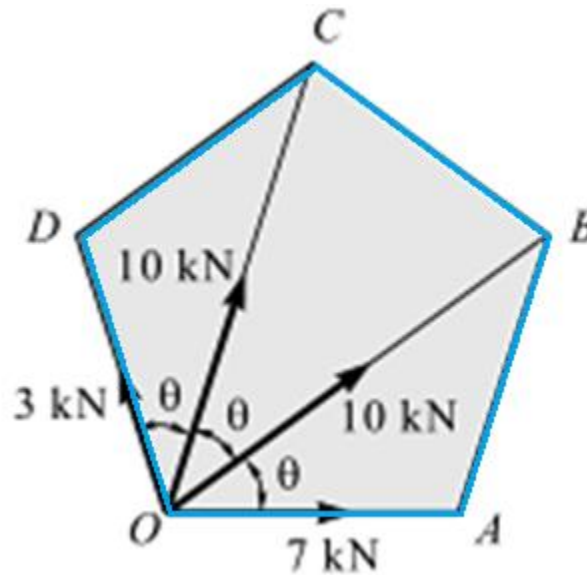

R=3687.82N

Problems

2.Forces 7kN,10 kN,10 kN and 3 kN act at one of the angular point of a regular pentagon towards the other four points taken in order. Find the Resultant of the force system
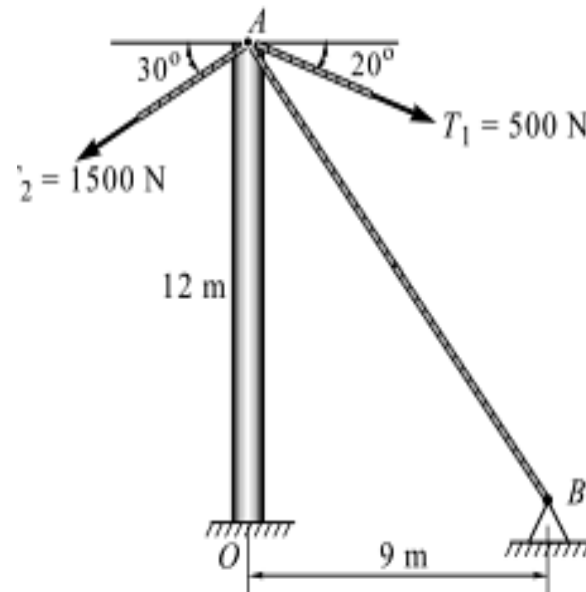
Hint: Sum of interior angles of a polygon = 180(n-2)

R=25.10kN

Problems

3.The top end of a vertical pole is connected by two cables having tensions T_1 =500N and T_2 =1500 N as shown in the figure. The third cable AB is used as guy wire. Determine the tension in the cable AB if the resultant of the three concurrent forces acting at A is vertical. Also find the Resultant.
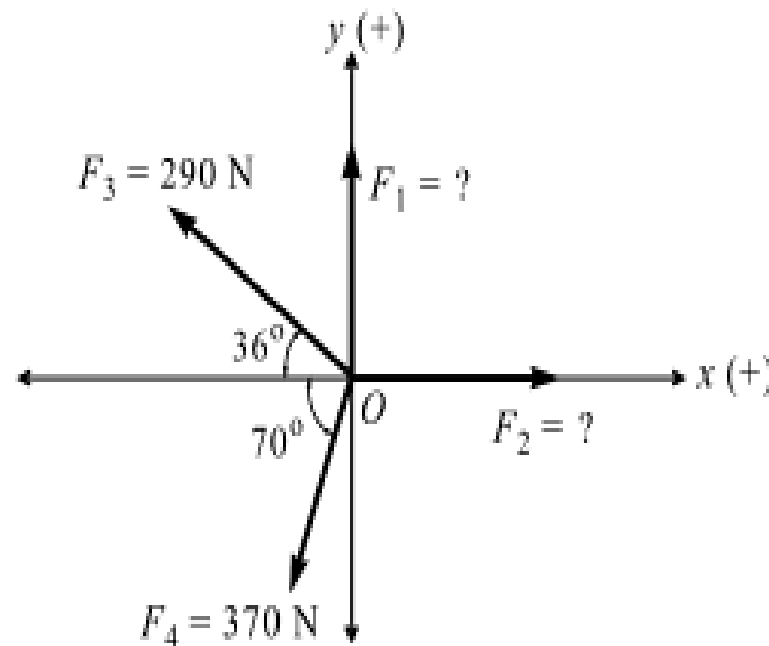

R=-2026.59N

Problems

4.Determine the magnitude and direction of the forces F_1 and F_2 shown in the figure when the resultant of the given force system is found to be 800N along the positive X-axis
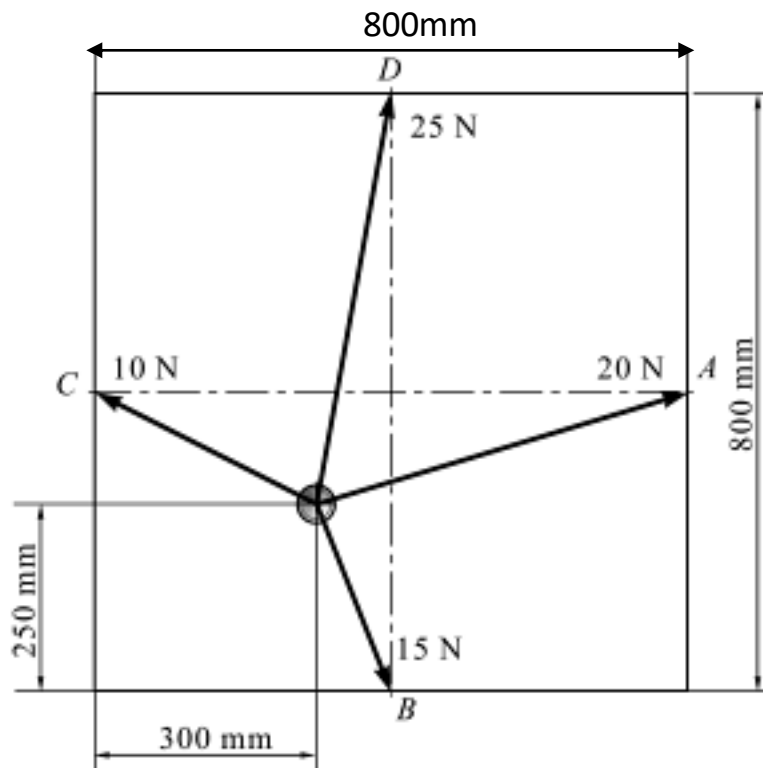

F_1=177.23N
F_2=1161.2N

Problems

5.The striker of a carom board lying on the board is being pulled by four players as shown in the figure. The players are sitting exactly at the centre of the four sides. Determine the resultant of forces in magnitude and direction.

R=29.09N

Summary

- The forces can be resolved and the resultant of Coplanar Concurrent force system can be obtained