

Course Code: ESC106A

Course Title: Construction Materials and Engineering Mechanics

Lecture No. 8:

Problems on Resolution of forces

Delivered By: Deepthi M V



Lecture Intended Learning Outcomes

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

- Solve problems on resolution of forces to find the components of a force



Contents

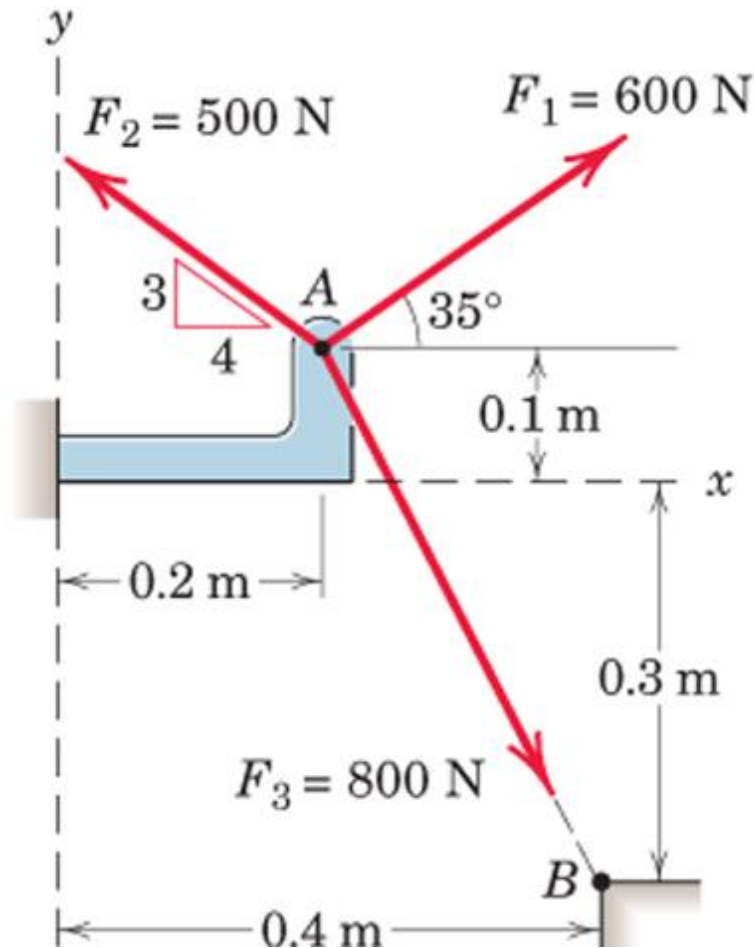
- **Engineering Mechanics**

Resolution of forces; Numerical problems



Problems on Resolution

1) Resolve the forces F_1 , F_2 and F_3 as shown in the figure

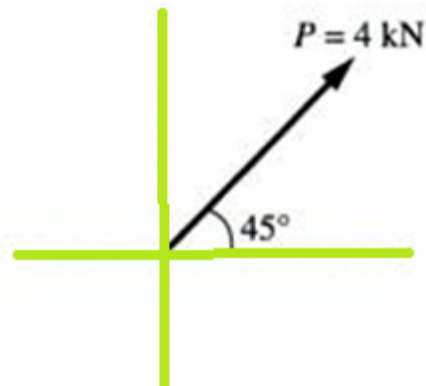


$$\begin{aligned}F_{1X} &= 491.5\text{ N} \\F_{1Y} &= 344.15\text{ N} \\F_{2X} &= -400\text{ N} \\F_{2Y} &= 300\text{ N} \\F_{3X} &= 358\text{ N} \\F_{3Y} &= -716\text{ N}\end{aligned}$$



Problems on Resolution

2) Resolve the forces P along x-y axis



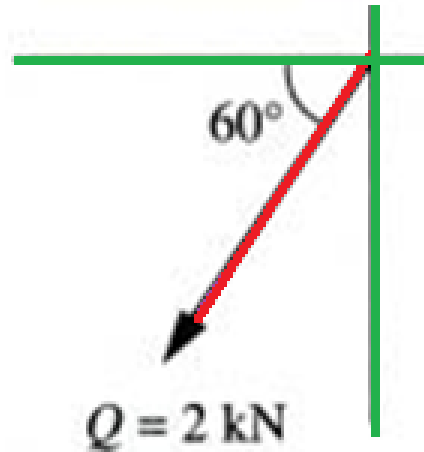
$$P_x = 2.82 \text{ kN}$$

$$P_y = 2.82 \text{ kN}$$



Problems on Resolution of Forces

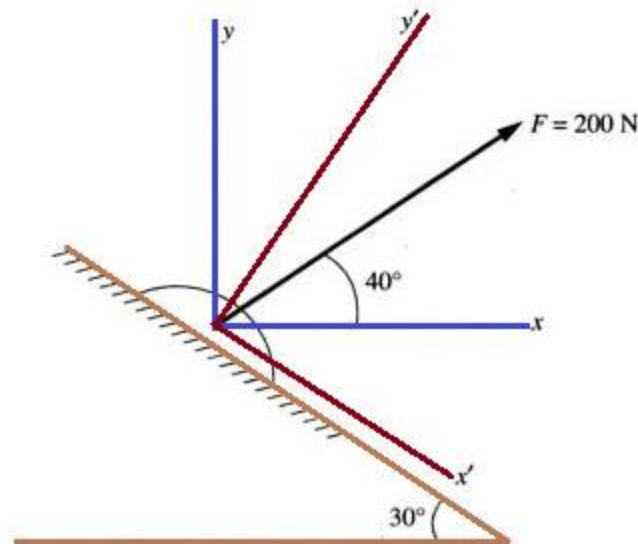
3) Resolve the forces Q along x-y axis



$$Q_x = -1 \text{ kN}$$
$$Q_y = -1.73 \text{ kN}$$

Problems on Resolution of Forces

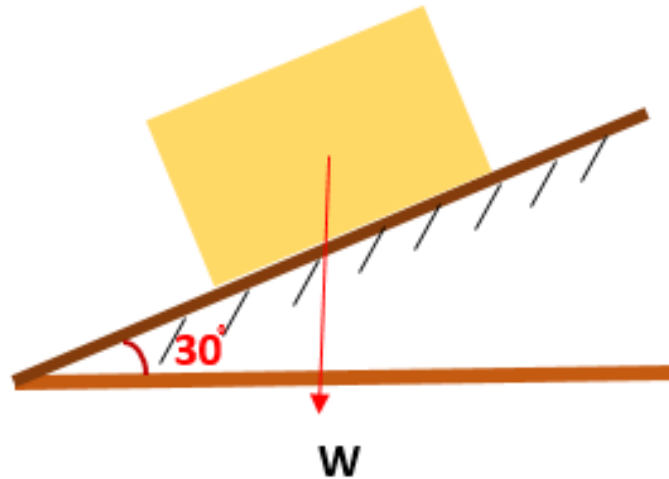
4) Resolve the given force along x-y and x'-y' axes.



Along x-y axis,
 $F_x = 153.2\text{ N}$
 $F_y = 128.5\text{ N}$
Along x'-y' axis,
 $F_x = 68.4\text{ N}$
 $F_y = 187.9\text{ N}$

Problems on Resolution of Forces

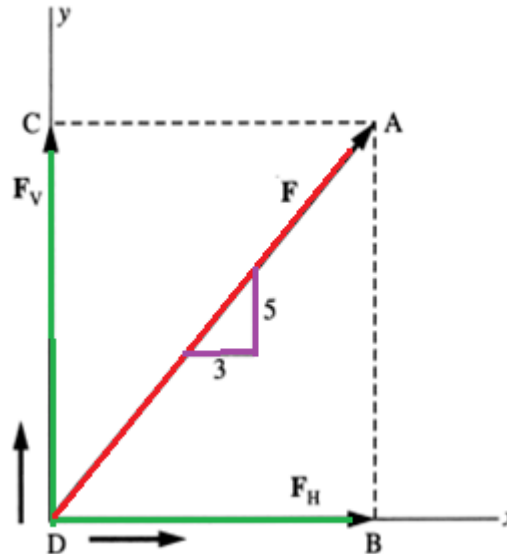
5) Resolve the self weight of the block into x and y components $W=50\text{kN}$



$$F_x = 25\text{kN}$$
$$F_y = 43.3\text{kN}$$

Problems on Resolution of Forces

6) Resolve the force $F=400\text{kN}$ shown in the figure



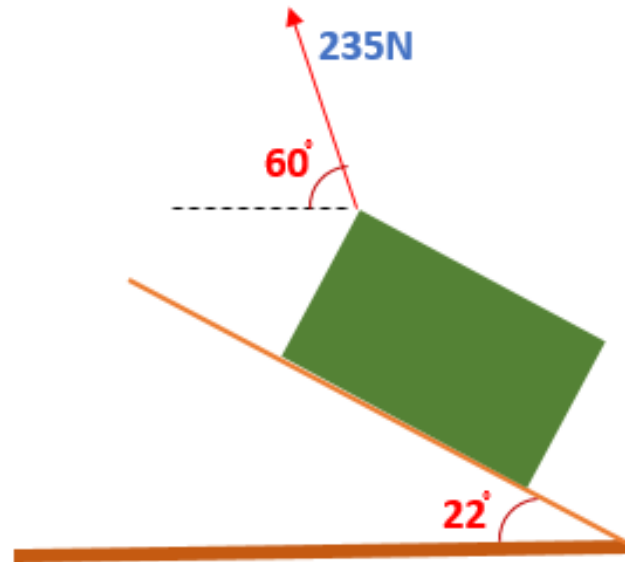
$$F_x = 205.79\text{kN}$$

$$F_y = 342.99\text{kN}$$



Problems on Resolution of Forces

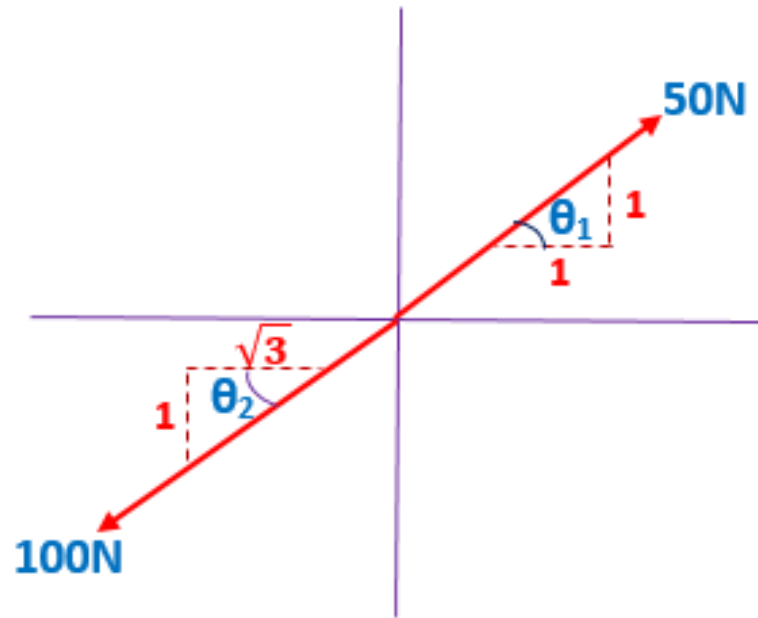
7) Resolve the forces shown in the figure into horizontal and vertical components



$$F_x = 117.5\text{N}$$
$$F_y = 203.51\text{N}$$

Problems on Resolution of Forces

8) Resolve the forces shown in the figure into horizontal and vertical components if $F_1=50\text{N}$ and $F_2=100\text{N}$



$$F_{1X}=35.35\text{N}$$

$$F_{1Y}=35.35\text{N}$$

$$F_{2X}=-86.6\text{N}$$

$$F_{2Y}=-50\text{N}$$



Summary

- The technique of finding the components of a force along any direction is called resolution of force
- The effect of a force along any specified direction is called component of a force

