Selected Problems

From the Set Involving Making the Net Force Zero

1. A force $\vec{F_1}$ of 10 N acts at 30° to the positive x-axis. Another force $\vec{F_2}$ of 5 N acts along the negative y-axis. What is the magnitude and direction of a third force $\vec{F_3}$ required to make the net force zero?

    2. A force $\vec{F_1}$ of 15 N acts at 120° to the positive x-axis. Another force $\vec{F_2}$ of 10 N acts at 210° to the positive x-axis. What is the magnitude and direction of the force $\vec{F_3}$ needed to make the net force zero?

    3. A force $\vec{F_1}$ of 40 N acts at 250° to the positive x-axis. Another force $\vec{F_2}$ of 35 N acts at 325° to the positive x-axis. Determine the force $\vec{F_3}$ required to make the net force zero.

From the Set Involving Resolving Vectors

4. A vector $\vec{A}$ has a magnitude of 5 units and makes an angle of 30° with the positive x-axis. Resolve the vector into its x and y components.

    5. A vector $\vec{D}$ has a magnitude of 12 units and is oriented at 120° to the positive x-axis. Resolve this vector into its x and y components.

    6. A displacement vector $\vec{H}$ has a magnitude of 15 units and is directed 37° below the negative x-axis. Calculate the x and y components of this vector.

Additional Questions

1. Obtain the condition to be satisfied by the direction and magnitude of force $\vec{F_3}$ such that the net force acting along $y = x$ is zero when a force $\vec{F_1}$ making an angle 30° with the x-axis and a force $\vec{F_2}$ making an angle 210° with the x-axis are acting on a point.

    2. Determine the conditions for the direction and magnitude of a third force $\vec{F_3}$ such that the net force is zero along $y = -x$, given a force $\vec{F_1}$ acting at 45° to the x-axis and another force $\vec{F_2}$ acting at 135° to the x-axis.

    3. Find the necessary conditions for the direction and magnitude of force $\vec{F_3}$ such that the resultant force along the line $y = 2x$ is zero. The forces $\vec{F_1}$ and $\vec{F_2}$ act at 60° and 240° to the x-axis, respectively.