2/1 The force \( \mathbf{F} \) has a magnitude of 500 N. Express \( \mathbf{F} \) as a vector in terms of the unit vectors \( \mathbf{i} \) and \( \mathbf{j} \). Identify the \( x \) and \( y \) scalar components of \( \mathbf{F} \).

Ans. \( \mathbf{F} = 383 \mathbf{i} - 321 \mathbf{j} \) N, \( F_x = 383 \) N, \( F_y = -321 \) N

2/24 In the design of the robot to insert the small cylindrical part into a close-fitting circular hole, the robot arm must exert a 90-N force \( \mathbf{P} \) on the part parallel to the axis of the hole as shown. Determine the components of the force which the part exerts on the robot along axes (a) parallel and perpendicular to the arm \( AB \), and (b) parallel and perpendicular to the arm \( BC \).

2/11 In the design of a control mechanism, it is determined that rod \( AB \) transmits a 280-N force \( \mathbf{P} \) to the crank \( BC \). Determine the \( x \) and \( y \) scalar components of \( \mathbf{P} \).

Ans. \( P_x = -240 \) N, \( P_y = -100 \) N

Problem 2/1

Problem 2/11

Problem 2/24