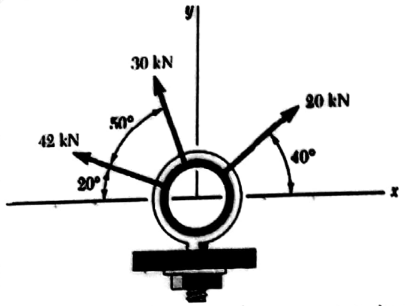
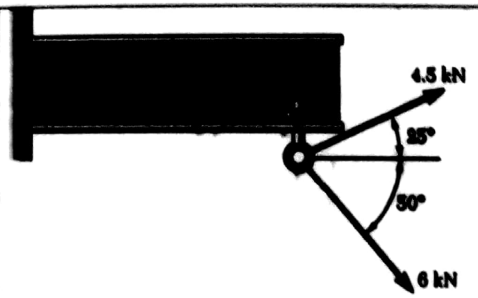
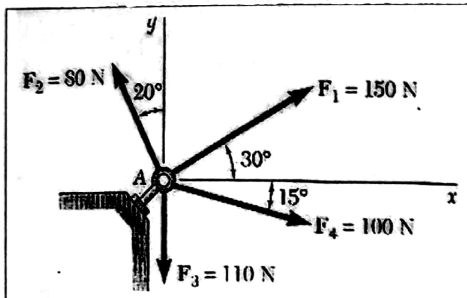


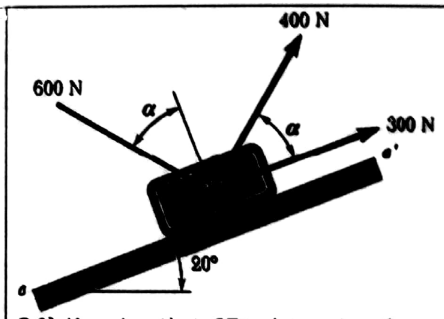
Q1) Determine the **x** and **y** components of each of the forces shown.



Q2) Two forces are applied to an eye bolt fastened to a beam. Determine the magnitude and direction of their resultant.

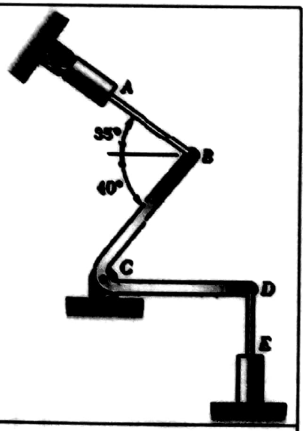


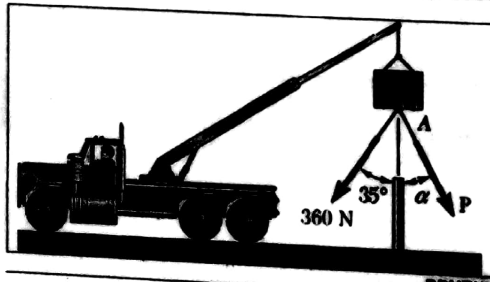
Q3) Four forces act on bolt. Determine the resultant of the forces on the bolt



Q4) Knowing that **65°**, determine the resultant of the three forces shown.

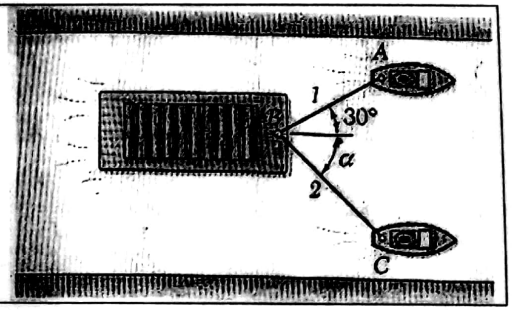
Q5) Activator rod **AB** exerts on crank **BCD** a force **'P'** directed along line **AB**. Knowing that **P** must have a **25N** component perpendicular to arm **BC** of the crank, determine (a) the magnitude of the force **P**, (b) its component along line **BC**.



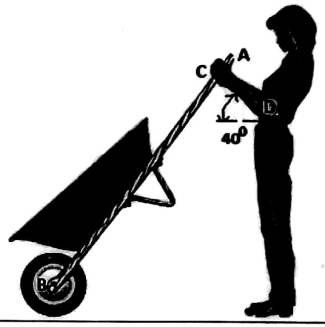


Q6) To steady a sign as it is being lowered, two cables are attached to the sign at **A**. Using any method and knowing that the magnitude of **P** is **300 N**, determine
(a) the required angle '**α**' if the resultant **R** of the two forces applied at **A** is to be vertical,
(b) the corresponding magnitude of **R**.

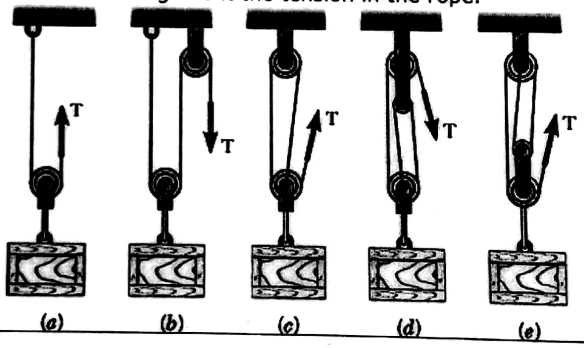
Q7) A barge is pulled by two tugboats. If the resultant of the forces exerted by the tugboats is a **5000N** force directed along the axis of the barge, determine
(a) the tension in each of the ropes knowing that 'α' = **45°**
(b) The value of 'α' for which the tension in **rope 2** is minimum

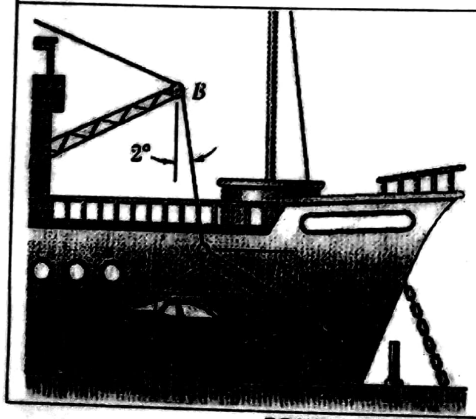


Q8) While emptying a wheelbarrow, a gardener exerts on each handle **AB** a force **P** directed along line **CD**. Knowing that **P** must have a **135-N** horizontal component, determine **(a)** the magnitude of the force **P**, **(b)** its vertical component.



Q9) A **280-kg** crate is supported by several rope-and-pulley arrangements as shown. Determine for **each** arrangement the tension in the rope.





Q10) In a ship-unloading operation, a **3500N** automobile is supported by a cable. A rope is tied to the cable at '**A**' and pulled in order to centre the automobile over its intended position. The angle between the cable and the vertical is **2°**, while the angle between the rope and the horizontal is **30°**. What is the tension in the rope?